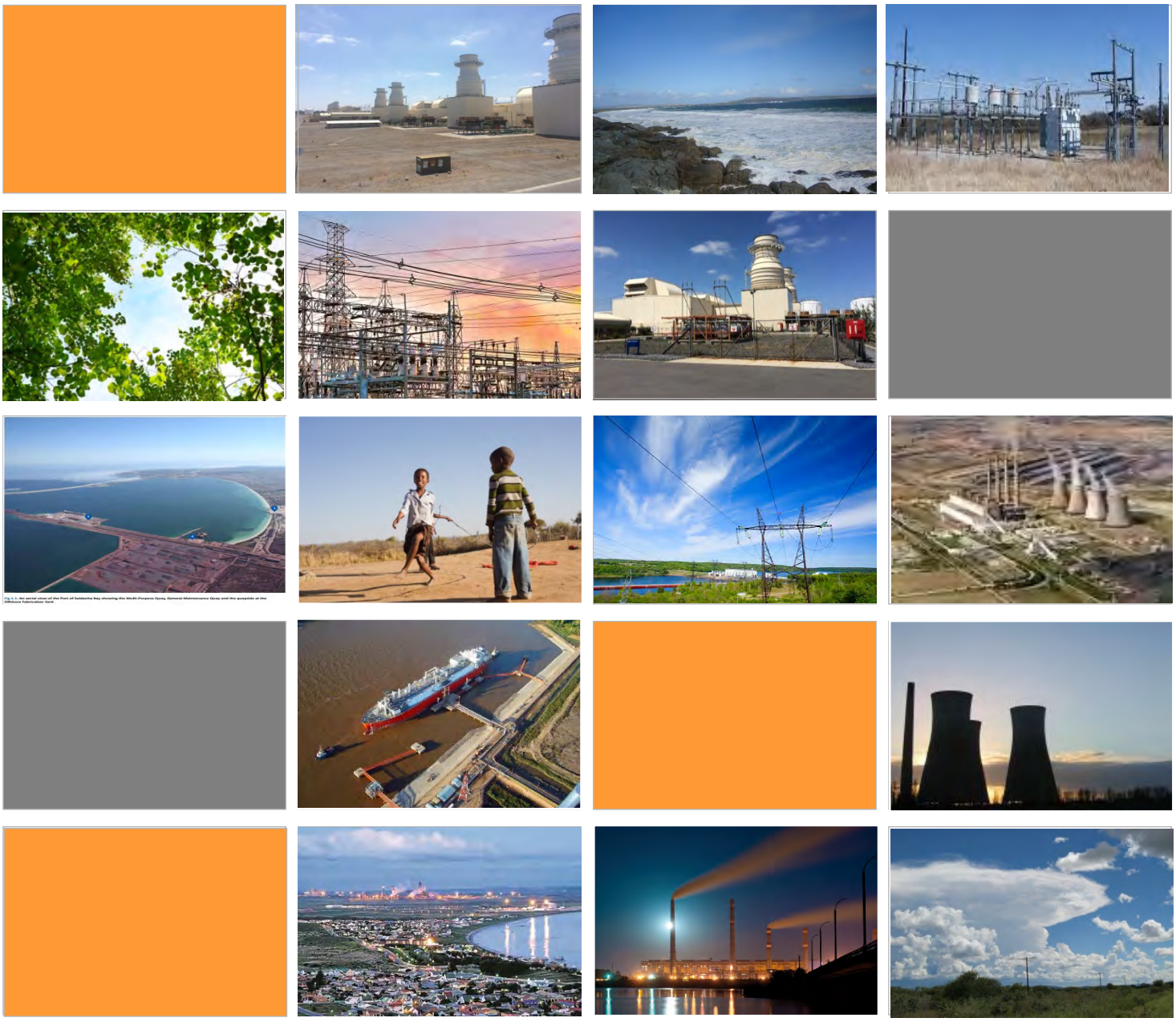

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape

Final Report: V1

ArcelorMittal

October 2016

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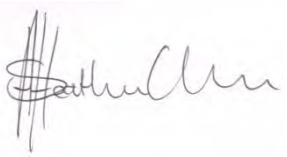
ERM

Environmental Impact Assessment Report for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Environmental Resources Management

Final Report

Client: ArcelorMittal	Project No: 0315829
Summary and version history: V1 This EIA Report has been compiled as part of the EIA process in accordance with the regulatory requirements stipulated in the EIA Government Notice Regulations (GNR 982/2014) promulgated in terms of Section 24(5) of NEMA. This EIA Report documents the findings of the Specialist Study and Impact Assessment Phases. Note that this is a re-release of the draft EIA Report.	Date: 20 October 2016 Approved by: 
1	Draft EIA Report
	Compiled by: Claire Alborough, Nadia Mol, Lindsey Bungartz and Stephan van den Berg Reviewed by: Stuart Heather-Clark and Brett Lawson
This report has been prepared for ArcelorMittal in accordance with the terms and conditions of ERM's contract with ArcelorMittal for submission to commenting authorities and the Competent Authority in support of ArcelorMittal's application for an Environmental Authorisation and for disclosure through the prescribed review process. Any other use, distribution or publication of this report is prohibited without the prior written approval of ERM and ArcelorMittal	**Distribution**: Public

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List of Abbreviations and Terms

ACC	Air Cooled Condenser
ADI	Area of Direct Influence
AII	Area of Indirect Influence
ALARP	As Low As Reasonably Practicable
AMSS	ArcelorMittal Saldanha Steel
ANSI	American National Standards Institute
AoI	Area of Influence
ART	Antiretroviral Treatment
BAR	Basic Assessment Report
BFS	Bankable Feasibility Study
CAPEX	Capital Expenditure
CBA	Critical Biodiversity Area
CCGT	Combined Cycle Gas Turbine
CFR	Cape Floristic Region
CMDM	Cape Metro District Municipality
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
COTO	Committee of Transport Officials
CP	Cathodic Protection
CPI	Consumer Price Index
CWDM	Cape Winelands District Municipality
DBSA	Development Bank of Southern Africa
DC	Decision Control
DCS	Decision Control Systems
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DOE	Department of Energy
DTI	Department of Trade and Industry
EAP	Environmental Action Plan
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
EPC	Engineering Procurement Construction
ERA	Electricity Regulations Act
ERM	Environmental Resources Management
FSRU	Floating Storage Regasification Unit
G2P	Gas to Power
GDP	Gross Development Product
GDPR	Regional Gross Development Product
GHG	Greenhouse Gas
GJ	Giga Joules
GNR	Government Notice Regulation
GUMP	Gas Utilisation Master Plan
HFO	Heavy Fuel Oil
HGV	Heavy Goods Vehicle
HIV/Aids	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
HP	High Pressure
HRSG	Heat Recovery Steam Generator
HV	High Voltage

HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
ICDA	Internal Corrosion Direct Assessment
IDZ	Industrial Development Zone
IPCSA	International Power Consortium South Africa
IPPPP	Independent Power Producers Procurement Programme
IRP	Integrated Regional Plan
ISO	International Organisation for Standardization
kV	kilo Volt
LED	Light Emitting Diode
LHV	lower heating value
LNG	Liquefied Natural Gas
LP	Low Pressure
LPG	Propane
LQSM	Langeberg Quartz Sand Member
LRAS	Langebaan Road Aquifer System
MAE	Mean Annual Evaporation
MCR	Maximum Continuous Rating
MOGS	Mass Oil and Gas Services
MPPM	Muishond Fontein Pelletal Phosphorite Member
MSFD	Multi-Stage Flash Distillation
MW	Mega Watt
NCDM	Northern Cape District Municipality
NDP	National Development Plan
NEMA	National Environmental Management Act
NEMAQA	National Environmental Management: Air Quality Act
NEMBA	National Environmental Management: Biodiversity Act
NEMICMA	National Environmental Management: Integrated Coastal Management Act
NEMWA	National Environmental Management: Waste Act
NERSA	National Energy Regulator of South Africa
NGA	National Groundwater Archive
NID	Notice of Intent to Develop
NOx	Nitrogen Oxide
NSD	Noise Sensitive Developments
OCGT	Open Cycle Gas Turbine
PCS Africa	Power & Combustion Services Africa
PM	Particulate Matter
PV	Photovoltaics
RISFSA	Road Infrastructure Strategic Framework for South Africa
RO	Reverse Osmosis
RoW	Right of Way
S&EIR	Scoping and Environmental Impact Report
SABAP	South African Bird Atlas Project
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SBLM	Saldanha Bay Local Municipality
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SDFP	Spatial Development Framework Plan
SO2	Sulfur Dioxide

TB	Tuberculosis
TDS	Total Dissolved Solids
TNPA	Transnet National Ports Authority
UAV	Unmanned Aerial Vehicle
UNIDO	United Nations Industrial Development Organization
VOC	Volatile Organic Compounds
WCDM	West Coast District Municipality
WML	Waste Management Licence
ZLD	zero liquid discharge

List of Abbreviations and Terms

BAR	Basic Assessment Report
BFS	Bankable Feasibility Study
CBA	Critical Biodiversity Area
CCGT	Combined Cycle Gas Turbine
CFR	Cape Floristic Region
CNG	Compressed Natural Gas
CWDM	Cape Winelands District Municipality
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DOE	Department of Energy
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EPC	Engineering Procurement Construction
ERA	Electricity Regulations Act
ERM	Environmental Resources Management
GDPR	Regional Gross Development Product
GJ	Giga Joules
GNR	Government Notice Regulation
GUMP	Gas Utilisation Master Plan
HP	High Pressure
HFO	Heavy Fuel Oil
HRSG	Heat Recovery Steam Generator
HV	High Voltage
IDZ	Industrial Development Zone
HWC	Heritage Western Cape
IPCSA	International Power Consortium South Africa
IPPPP	Independent Power Producers Procurement Programme
IRP	Integrated Regional Plan
LNG	Liquefied Natural Gas
LP	Low Pressure
NCDM	Northern Cape District Municipality
NDP	National Development Plan
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMWA	National Environmental Management: Waste Act
NEMAQA	National Environmental Management: Air Quality Act
NEMICMA	National Environmental Management: Integrated Coastal Management Act
NERSA	National Energy Regulator of South Africa
NID	Notice of Intent to Develop
OCGT	Open Cycle Gas Turbine
PCS Africa	Power & Combustion Services Africa
SAHRA	South African Heritage Resources Agency
SDFP	Spatial Development Framework Plan
S&EIR	Scoping and Environmental Impact Report
TNPA	Transnet National Ports Authority
ToR	Terms of Reference

WCDM	West Coast District Municipality
WML	Waste Management Licence

PROJECT MAIN FEATURES IN COMPLIANCE WITH EIA GUIDELINES
SUMMARY OF INFORMATION INCLUDED IN THE REPORT

GENERAL SITE INFORMATION

Affected Farm Portions

The two properties on which the proposed power plant site is located are detailed in *Table 1.1*.

Properties which are intersected by the power plant footprint

Farm Name	Portion Number	Parcel Number	SG Code
Yzervarkensrug	129	Remaining Extent	W014C04600000000012900000
Jackels kloof	195	2	W014C04600000000019500002

The proposed pipeline corridor intersects with the properties as listed in *Table 1.2*.

Properties which are intersected by the pipeline corridor

Farm Name	Portion Number	Parcel Number	Landowner	SG Code
None	0	1185	Transnet	W014C046000000001185000000
STATE LAND 196	0	196	Transnet	W014C046000000000196000000
Farm 195	195	0	Transnet	W014C046000000000195000001
Farm 195	7	195	Transnet	W014C046000000000195000070
Farm 195	1	195	AMSA	W014C046000000000195000010
Jackals Kloof 195	2	195	AMSA	W014C046000000000195000020
None	0	1132	AMSA	W014C046000000001132000000
YZERVARKENSRUG 129	0	129	AMSA	W014C046000000000129000001

The proposed feeder transmission line from the power plant to ArcelorMittal Steel intersects with the properties as listed in *Table 1.3*.

Properties which are intersected by proposed feeder transmission line from the power plant to ArcelorMittal Steel

Farm Name	Portion Number	Parcel Number	Landowner	SG Code
YZERVARKENSRUG 129	0	129	AMSA	W014C04600000000012900 0001
YZERVARKENSRUG 129	3	129	Transnet	W015C04600000000012900 0030
None	0	1132	AMSA	W014C04600000000113200 0000

Photographs

Power Plant Site Looking South-east

Centre of Power Plant Site

Photograph taken on the south-east corner of the Power Plant Depicting the Proximity to Saldanha Steel

*Note that this photo was taken at noise measurement location AMSGSTASL02

View from the South towards the Site Alternative (Site A) in the foreground, and the ArcelorMittal Steel Works in the background

View along Pipeline Route

Technical Details

Design Information

Technology type	Open Cycle Gas Turbine – Phase 1 Combined Cycle Gas Turbine – Phase 2
Total Installed Gross Capacity	1605 MW
Total Operating Capacity	1507 MW
Total surface area	55.81 ha (Operation) 83.54 ha (Construction)
Structure orientation	N/A
Height of power generation buildings (x3)	25 m
Height of Stacks	60m (max)
Area of gas receiving facility	0.18 ha + 0.07
Area occupied by inverter/transformer stations/substations	4.88 ha
Capacity of on-site substation	1 x 132 kV switchyard (Phase 1) and 1 x 400 kV switchyard (Phase 2)
Area occupied by both permanent and construction laydown areas	10.69 ha
Area occupied by ancillary buildings	0.94 ha
Area occupied by Gas Turbine, Steam Turbine and HRSG Island 1	1.89 ha
Area occupied by air cooled condensers	1.56 ha
Area occupied by roads	5.59 ha
Length of internal roads	6,900 m (total)
Internal Roads	
Road type: 8m wide	Length - 4652.2 m; Surface Area - 3.7 ha
Road type: 10m wide	Length - 148.5 m; Surface Area - 0.1 ha
Road type: 12m wide	Length - 1414.2 m; Surface Area - 1.7 ha
Road type: 20m wide	Length - 490.4 m; Surface Area 1 ha
Road type: 32m wide	Length - 120.1 m; Surface Area - 0.4 ha
Proximity to grid connection	150 m to Blouwater Substation
Capacity of transmission line	132 kV connection to ArcelorMittal Saldanha Steel. Existing line to be upgraded.
Length of transmission line	2.5 km
Length of pipelines	4.6 km
Pipeline Construction ROW area	30.49 ha
Pipeline permanent easement area	2.76 ha
Size and number of storage vessels for gas and other fuels	1 x 30m^3 LPG storage tank; 1 X 50 m^3 diesel storage tank during construction
Height of fencing	3 m
Type of fencing	ClearVu Reinforced

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The International Power Consortium South Africa (IPCSA) has developed a solution to Saldanha Steel's requirement for stable, economical electricity over the long term. This solution consists of a 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to ArcelorMittal's Saldanha Steel site.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the Bankable Feasibility Study (BFS) completion.

The Project will require Liquefied Natural Gas (LNG) as its main fuel supply and will consume about 76 Million Gigajoules of natural gas per year. LNG will be supplied by ship to the Port of Saldanha, where it will be regasified and then offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha. Initial discussions have been held with Transnet National Ports Authority (TNPA) in Saldanha in this regard (1).

The Project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160 MW of base load energy, peaking up to 250 MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

1.2 PURPOSE OF THIS REPORT

Environmental Resources Management Southern Africa (ERM) has been appointed by ArcelorMittal to conduct the Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended). This EIA Report has been compiled as part of the EIA process in accordance with the regulatory requirements stipulated in the EIA Government Notice Regulations (GNR 982/2014) promulgated in terms of Section 24(5) of NEMA.

This EIA has been undertaken in three phases, namely Scoping Phase, Specialist Study Phase and Impact Assessment Phase. This EIA Report documents the findings of the Specialist Study and Impact Assessment Phases.

(1) The supply of fuel and import facilities have not been considered in this EIA. The Department of Energy initiated a project in 2015 to permit the construction of an LNG import terminal at the Port of Saldanha, it was understood that individual developers were not required to undertake the EIA for this component. Should this information change, a separate EIA for the import of gas will be undertaken.

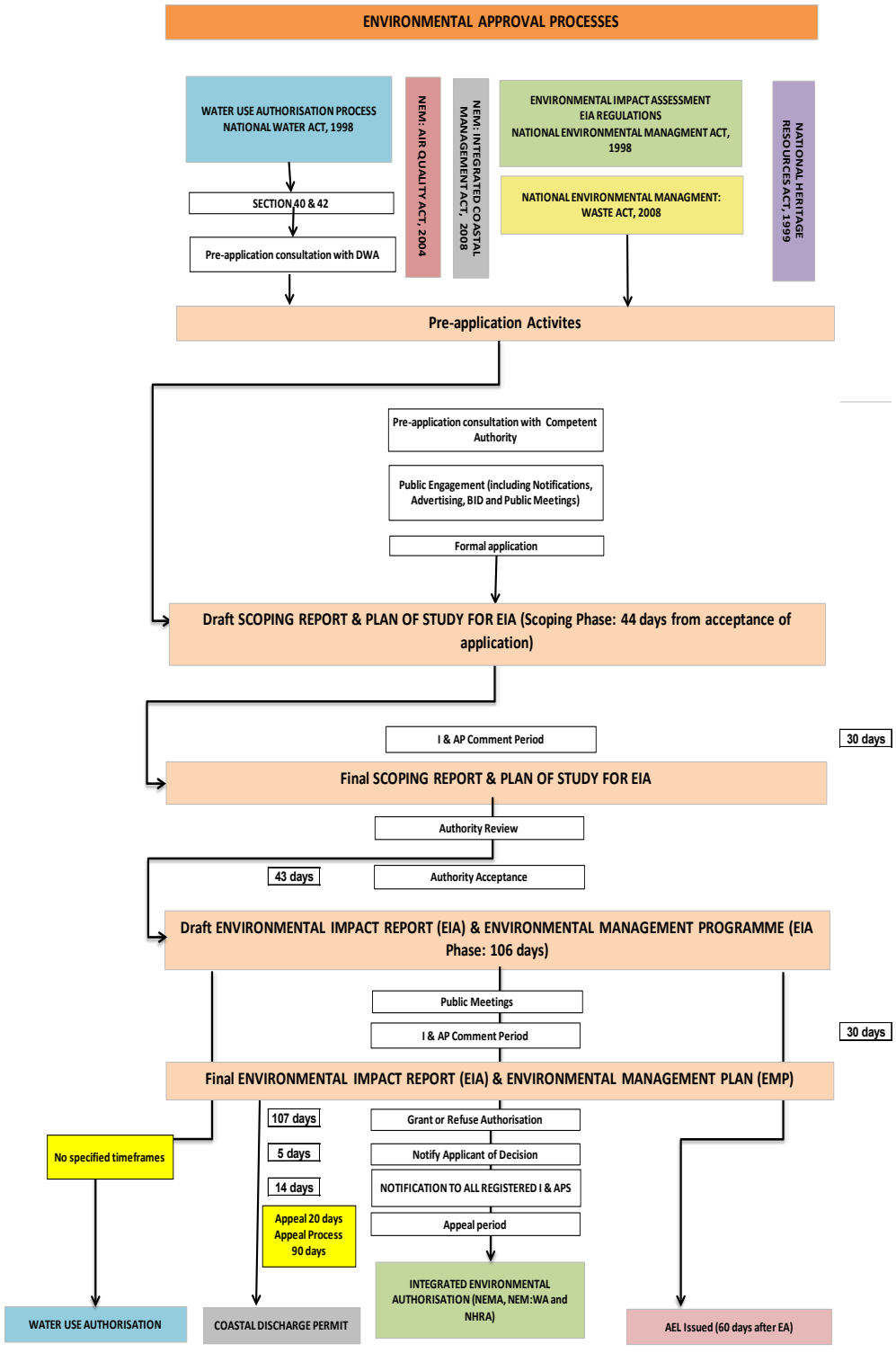
The purpose of this EIA is to present the following:

- A detailed description of the proposed Project and relevant Project alternatives;
- The EIA process and a legal review of legislation and guidelines pertinent to the proposed Project and associated EIA;
- The outcomes associated with stakeholder engagement activities carried out to date;
- A detailed baseline review of the physical, biological and socio-economic characteristics of the study area;
- An assessment of impacts to the physical, biological and socio-economic environments related with the different phases (construction, operational and decommissioning phases) of the proposed Project;
- Mitigation measures that aim to avoid /minimise/manage the severity of identified impacts; and
- An assessment of cumulative impacts associated with project-related developments in the study area.

1.3 OVERVIEW OF THE EIA PROCESS

The EIA process in South Africa is regulated by the NEMA Environmental Assessment Regulations (GNR R982/2014). The overall Scoping and EIR process is illustrated in *Figure 1.1.*

Figure 1.1 Integrated Environmental Impact Assessment Process



1.3.1 *Pre Assessment Public Participation*

The EIA process is initiated through a pre-assessment Public Participation Process (PPP). The pre-assessment process is not a mandatory requirement in terms of the EIA regulations (2014) but is beneficial in order to identify Interested and Affected Parties (I&APs). An open house meeting was held at

Hoedjiesbaai Hotel, Saldanha Bay on 16 February 2016 to present the proposed Project and solicit input from stakeholders into the scoping process.

1.3.2 Application

An application form for the Project was completed and submitted to the National Department of Environmental Affairs (DEA) on 22 February 2016. The application included the proposed listed activities for the Project. The DEA responded on the 25 February 2016 acknowledging receipt of the application.

1.3.3 Scoping

A principal objective of the scoping phase is to identify the key physical, biological and socio-economic issues and those Project activities with the potential to cause or contribute to impacts to the environmental and social receptors.

At the scoping stage, the key issues are identified (often together with input from key stakeholders) and understood to a level which allows the definition of the Plan of Study for the EIA.

Issues that are not relevant are scoped out. This enables the resources for the EIA to be focused on collecting required information and identifying significant impacts while carrying out specialist studies and stakeholder engagement activities in an effective and efficient manner.

The draft Scoping Report was made available to stakeholders through the Project website, selected libraries, and hard copies provided on request for a period of 30 days (4 March – 6 April 2016). After the 30 day public comment period, a Comments and Responses Report was compiled and included as an annex to the Final Scoping Report. The objective of the stakeholder engagement undertaken was to present the proposed Project and EIA process as well as identify associated issues, concerns and opportunities. Further details on the stakeholder consultation and engagement process are included in *Chapter 9*.

A Final Scoping Report, including ToR for the EIA, was submitted to the DEA on 11 April 2016. The letter of acceptance from DEA for the Scoping Report was received on 16 May 2016. The Final Scoping Report addressed comments received by the proponent on the draft Scoping Report during the 30 day public comment period mentioned above.

1.3.4 Baseline Data Collection

The EIA report provides a description of the existing biophysical, biological and socio-economic conditions as a basis against which the impacts of the Project can be assessed. The baseline includes information on receptors and resources that were identified during scoping as having the potential to be

significantly affected by the proposed Project. The description of the baseline has the following main objectives:

- to identify the key physical, biological and socio-economic resources and conditions in areas potentially affected by the Project;
- to describe, and where possible quantify, their characteristics (i.e. their nature, condition, quality and extent);
- to provide data to aid the prediction and evaluation of possible impacts;
- to inform judgements about the importance, value and sensitivity or vulnerability of resources and receptors; and
- to serve as a reference for future monitoring of impacts of the Project.

For the current Project, baseline data collection was obtained from existing sources including previous EIAs, government census data, and existing academic research documents.

Additional primary baseline data were collected by the noise, heritage, flora and fauna specialists (specialists details provided in *Section 1.5.3* below).

1.3.5 Quantitative Assessment

The following quantitative studies were undertaken by the EIA team to support the impact assessment:

- An assessment of the potential noise impacts of the construction and operations phases of the power plant and associated infrastructure.
- An assessment of the potential impacts on air quality during the construction and operation of the power plant, including cumulative impacts.
- A Quantitative Risk Assessment of the risks associated with the natural gas pipeline and the storage of Propane on site.

1.3.6 Impact Assessment

Impact assessment and development of mitigation measures is an iterative process that commences during the scoping stage and continues throughout the EIA process. The key objectives of this process are as follows:

- To analyse how the Project may interact with the baseline conditions in order to define, predict and evaluate the likely extent and significance of environmental, social and health impacts that may be caused by the Project.

- To develop and describe acceptable and cost effective mitigation measures that avoid, reduce, control, remedy or compensate for negative impacts and enhance positive benefits.

- To evaluate the predicted positive and negative residual impacts of the Project.

- To develop a system whereby mitigation measures will be integrated with the Project and will be taken forward as commitments. This is achieved through the development of a draft Environmental Management Programme, included in *Chapter 11*.

The objectives of the impact assessment process described above may thus be summarised by reference to the following four main steps:

- Prediction of what will happen as a consequence of Project activities;
- Evaluation of the importance and significance of the impact;
- Development of mitigation measures to manage significant impacts where practicable; and
- Evaluation of the significance of the residual impact.

Where significant residual impacts remain after mitigation measures are applied, further options for mitigation may be considered and impacts re-assessed until they are reduced to as low as reasonably practicable (ALARP) levels. This approach takes into account the technical and financial feasibility of mitigation measures.

In addition to predicted impacts from planned activities, those impacts that could result from an accident or a non-routine event within the Project are taken into account. In these cases the likelihood (probability) of the event occurring is considered. The impact of non-routine events is therefore assessed in terms of the risk, taking into account both the consequence of the event and the probability of occurrence.

1.3.7 Management Planning

The range of measures to mitigate impacts identified through the EIA process is reported in the EIA report within the project description and impact assessment chapters. These have been brought together in the draft EMPr for the Project (see *Chapter 11*).

The EMP consists of the set of management, mitigation and monitoring measures to be taken during implementation of the Project, to eliminate adverse environmental and socioeconomic impacts, offset them, or reduce them to acceptable levels. The plan details the specific actions that are required to implement the controls and mitigation measures that have been agreed through the EIA process, including details on monitoring, responsible parties, documentation and reporting and estimated costs.

1.3.8 Reporting and Disclosure

This draft EIA was released for a 30 day public comment period (22 July – 25 August 2016). Notifications were sent out to I&APs. The report was made available online on the Project webpage (www.erm.com/saldanhasteel) and in the Saldanha Bay Library.

Based on comments received on the Draft EIA Report in the above mentioned comment period, the report was revised and made available for comment for a further 30 days, from 16 September - 18 October. A notification letter has been sent to all registered I&APs on the project database and the report made available online on the Project webpage (www.erm.com/saldanhasteel) and in the Saldanha Bay Library. All comments received, along with responses, have been included in the final EIR in *Annex B*.

Comments received have been incorporated into this Final EIA report and documented in the Comments and Responses Report. The Final EIA report is to be submitted to the DEA for decision making.

1.4 THE APPLICANT

The contact details for the applicant are presented below:

Box 1.1 Contact Details of the Applicant

ArcelorMittal South Africa
Saldanha Works t/a Saldanha Steel Pty Ltd
Reg. No: 1995/00628/07
Private Bag X11
Saldanha
7395
Tel: 022 709 4000
Fax: 022 709 4296

1.5 THE EIA TEAM

1.5.1 ERM Southern Africa

ERM is a global environmental consulting organisation employing over 5,000 specialists in over 150 offices in more than 40 countries. In South Africa, ERM Southern Africa employs over 150 environmental consultants out of offices in Johannesburg, Durban and Cape Town.

Declaration of Independence

The requirement for environmental consultants to act independently and objectively is a well-established principle in South African law and elsewhere. The EIA regulations (GNR 982/2014), specifically state that:

"'independent', in relation to an EAP, a specialist or the person responsible for the preparation of an environmental audit report, means –

(a) that such EAP, specialist or person has no business, financial, personal or other interest in the activity or application in respond of which that EAP, specialist or person is appointed in terms of these Regulations; or

(b) that there are no circumstances that may compromise the objectivity of that EAP, specialist or person in performing such work;

excluding-

(i) normal remuneration for a specialist permanently employed by the EAP; or

(ii) fair remuneration for work performed in connection with that activity, application or environmental audit."

ERM is a privately owned company registered in South Africa. ERM has no financial ties to, nor is ERM a subsidiary, legally or financially, of ArcelorMittal. Remuneration for the services by the Proponent in relation to this EIA is not linked to an approval by the decision-making authority. Furthermore, ERM has no secondary or downstream interest in the development.

The role of the environmental consultants is to provide credible, objective and accessible information to government and other stakeholders, so that an informed decision can be made about whether the project should proceed or not.

1.5.2 The ERM Project Team

The ERM team selected for this Project possess the relevant expertise and experience to undertake this EIA. As such, ERM has signed the legally required declaration of independence to function as an objective Environmental Assessment Practitioner (EAP). The CVs and details of the independent EAP are presented in *Annex A*.

The contact details of the EAP for the application are presented in *Box 1.2.*

Box 1.2 Contact Details of the EAP

Environmental Resources Management Southern Africa (Pty) Ltd.
Postnet Suite 90
Private Bag X12
Tokai
7966

Mr Stuart Heather Clark
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700
Cape Town | South Africa
T +27 21 681 5400 | F +27 21 686 0736
E stuart.heather-clark@erm.com

The core EIA team members involved in this EIA are listed in *Table 1.1*.

Table 1.1 The EIA Team

Name	Role	Qualifications, Experience
Stuart Heather-Clark	Partner in Charge	BSc., MPhil. Registered EAP >20 years
Stephan van den Berg	Project Manager	BSc (Hons) > 9 years' experience
Claire Alborough	Environmental Specialist	BSc (Hons), MPhil, > 8 years' experience
Lindsey Bungartz	Social Specialist	BSocSc (Hons), >8 years' experience
Nadia Mol	Environmental Specialist	BSc (Hons) Pr.Sci.Nat > 17 years' experience

1.5.3 Specialist Team

The following specialists have been appointed to provide input into this EIA process. The specialists' reports are attached in *Annex D*. As required by the DEA, peer reviews have been undertaken for the specialist studies done internally by ERM.

Table 1.2 List of EIA Specialists

Specialist Study	Specialist
Air quality	uMoya-NILU Consulting (Pty) Ltd
Terrestrial flora	Nick Helme Botanical Surveys
Terrestrial fauna	Simon Todd Consulting
Noise	Enviro Acoustic Research cc
Cultural and heritage	ACO and Associates
Palaeontology	ACO and Associates
Socio-economic	ERM

Specialist Study	Specialist
Quantitative Risk Assessment	ERM
Climate change	ERM

1.6 UNDERTAKING BY EAP

ERM believes that the information provided in this EIA Report is correct, based on what has been received from the proponent and specialists thus far. Inputs and recommendations from the specialists' reports have been included into the report where relevant.

Proof of correspondence between the EAP and I&APs is included in *Annex C*.

1.7 ASSUMPTIONS AND LIMITATIONS

During the compilation of this EIA Report, the following limitations and assumptions were made:

- Information sourced from secondary sources was correct.
- The report was prepared based on the most up to date project description provided. However, it should be recognised that during the course of the design phase, the project description may be amended.
- All information received from the proponent and associated specialist team is accurate.

1.8 REPORT STRUCTURE

The remainder of this Report is structured as follows:

- Chapter 2: Project Motivation
- Chapter 3: Project Description
- Chapter 4: Project Alternatives
- Chapter 5: Administrative and Legal Framework
- Chapter 6: Biophysical Baseline
- Chapter 7: Social Baseline
- Chapter 8: Stakeholder Engagement
- Chapter 9: EIA Methodology
- Chapter 10: Impact Assessment and Mitigation
- Chapter 11: Environmental and Social Management Plan
- Chapter 12: Summary and Conclusion

The Report is supported by the following annexes:

- Annex A: Details of Environmental Assessment Practitioner and Declaration of Independence
- Annex B: Stakeholder Engagement Materials
- Annex C: Layout Plans and Maps
- Annex D: Specialist Reports

1.9 EIA REPORT REQUIREMENTS AS PER EIA REGULATIONS GNR 982/2014

Table 1.3 illustrates the legislated content of the EIA Report.

Table 1.3 Legislated Content of EIA Report (GNR 982/2014) and Corresponding Sections in this Report

Legislated Content- Appendix 3 Section 3	**Section in this Report**
(a) details of-	
(i) the EAP who prepared the report	*Annex A*
(ii) the expertise of the EAP, including a curriculum vitae	
(b) the location of the activity (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	*Chapter 3*
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	*Chapter 3 and Annex C*
(d) a description of the scope of the proposed activity, including-	
(i) all listed and specified activities triggered and being applied for; and	*Chapter 5*
(ii) a description of the associated structures and infrastructure related to the development;	*Chapter 3*
(e) a description of the policy and legislative context within which the development is located and explanation of how the proposed development complies with and responds to the legislation and policy context;	*Chapter 5*
(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;	*Chapter 2*
(g) a motivation for the preferred development footprint within the approved site;	*Chapter 4*
(h) a full description of the process followed to reach the proposed development footprint within the approved site, including:	
(i) details of all the development footprint alternatives considered;	*Chapter 4*
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	*Chapter 8 and Annex B*
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	*Chapter 8 and Annex B*
(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	*Chapters 6 and 7*

Legislated Content- Appendix 3 Section 3	Section in this Report
(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated.	*Chapter 10*
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	*Chapter 4*
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	*Chapter 4 and Chapter 10*
(viii) the possible mitigation measures that could be applied and level of residual risk	*Chapter 10 and 11*
(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and	*N/A*
(x) a concluding statement indicating the preferred alternative development location within the approved site;	*Chapter 4*
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including-	
(i) a description of all environmental issues and risks that were identified during the environmental impact process; and	*Chapter 10*
(ii) an assessment of the significance of each issue and risk and an identification of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	*Chapter 10*
(j) an assessment of each identified potentially significant impact and risk, including-	*Chapter 10*
(i) cumulative impacts;	
(ii) the nature, significance and consequences of the impact and risk;	
(iii) the extent and duration of the impact and risk;	
(iv) the probability of the impact and risk occurring;	
(v) the degree to which the impact and risk can be reversed;	
(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and	
(vii) the degree to which the impact and risk can be mitigated;	
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	*Chapter 10 and Annex D*
(l) an environmental impact statement which contains-	*Chapter 10 and 12*
(i)a summary of the key findings of the environmental impact assessment;	
(ii)a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	
(iii)a summary of the positive and negative impacts of the proposed activity and identified alternatives;	
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	*Chapter 10 and 11*
(n) the final proposed alternatives which respond to the impact management	

Legislated Content- Appendix 3 Section 3	Section in this Report
measures, avoidance, and mitigation measures identified through assessment;	
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	*Chapter 10 and 12*
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	*Chapter 12*
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	*N/A*
(s) an undertaking under oath or affirmation b the EAP in relation to:	*Chapter 1 and Annex A*
(i) the correctness of the information provided in the reports;	
(ii)the inclusion of comments and inputs from stakeholders and I&APs;	
(iii)the inclusion of inputs and recommendations from the specialist reports where relevant; and	
(iv)any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	*N/A*
(u) an indication of any deviation from the approved scoping report, including the plan of study, including-	*N/A*
(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	
(ii)a motivation for the deviation;	
(v) any specific information that may be required by the competent authority; and	
(w) any other matters required in terms of section24(4)(a) and (b) of the Act.	

2 PROJECT MOTIVATION

When considering an application submitted under the EIA Regulations (GNR 982/2014), the relevant competent authority must take a number of factors into consideration, including the need for, and desirability of the activity.

The need and desirability of this Project is discussed below, including strategic plans, frameworks and policies applicable to the area and Project.

2.1 NEED AND DESIRABILITY

2.1.1 Project Background: South Africa's Energy Crisis

Electricity consumption has outpaced power system capacity building in South Africa (Independent Power Producer (IPP) Projects, n.d.). As a result the country has been experiencing severe electricity supply constraints since 2008.

To maintain system stability, load shedding in the form of scheduled rolling black outs are instituted when required, but with negative implications for the economy (IPP Projects, n.d.). This was also the commencement of steep price increases which placed a heavy cost burden on intensive electricity users at a time when commodity prices were dropping. China became a major exporter of steel and targeted traditional export markets.

The National Development Plan (NDP) is a long term (2030) development plan and aims to eliminate poverty and reduce inequality by growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society (RSA, 2012). The NDP requires the development of 10,000 MW of additional electricity capacity to be established by 2025, against the 2013 baseline of 44,000 MW (IPP Projects, n.d.). This plan presents the overall national power generation plan.

An Integrated Resource Plan (IRP, 2010) has been developed in addition to the NDP. The IRP outlines the preferred energy mix to meet electricity needs over a 20 year planning horizon to 2030 (IPP Projects, n.d.). In terms of gas turbine power, the IRP highlights the need to commission 2,370 MW with Combined Cycle Gas Turbines (CCGT) technology and 3,910 MW with Peak-Open Cycle Gas Turbine (OCGT) technology by the end of 2030.

In May 2011, the Department of Energy (DoE) gazetted the Electricity Regulations on New Generation Capacity ("New Generation Regulations") under the Electricity Regulation Act, 2006 (Act No. 4 of 2006) ("the ERA"). Section 34 of the ERA and the New Generation Regulations enable the Minister of Energy (in consultation with the National Energy Regulator of

South Africa (NERSA)) to determine, *inter alia*, what new capacity is required (IPP Projects, n.d.).

These determinations specify that new generation capacity should be procured from, *inter alia*, hydro, coal and gas sources to support South Africa's baseload energy mix and that new generation from gas and cogeneration should be part of the medium-term risk mitigation project programme**.** The proposed ArcelorMittal Saldanha Steel (AMSS) Gas Fired Power Plant Project is thus aligned with the Government's vision for additional power generation in the country. The Project will:

- Initially reduce AMSS's power need off the national grid, by enabling it to be more self-sufficient;
- Further meet the demand for power of other users by providing excess power to the grid;
- Contribute towards the requirements of the IRP in terms of gas power production; and
- Reduce environmental impacts associated with the generation of baseload power through coal and large hydro-dam projects by providing an environmentally cleaner and less harmful alternative.

2.1.2 Alternative Energy Sources

AMSS requires power at a consistent and guaranteed forward price in order to continue operating beyond 2018. A comparative analysis of alternative methods of generating power was undertaken by AMSS. Based on the needs and desirability for the project, four key criteria were defined for the comparative analysis, as follows:

- Cost per MW hour;
- Baseload power requirement;
- Time to first power; and
- Difficultly of obtaining regulatory approval.

The following power generation options were considered:

1. Nuclear – This option is not open to private investment from a regulatory perspective. The cost of this option over a 50 year time horizon is competitive. However, the option was not considered viable because the regulatory framework is very onerous and this option has a very high initial capital expenditure (CAPEX) cost. Also, the time to first power is more than 10 years, which is too long considering the needs of AMSS within the short term.

2. Coal – This option was not considered viable based on the already high greenhouse gas (GHG) emissions from the plant without adding to the difficulties of achieving environment emission requirements (National

Environment Management: Air Quality Act, 2004) and the feasibility of locating a coal fired power station so far from a source of coal.

3. Renewable power (solar PV, concentrated solar or wind energy) – This alternative was investigated in detail. Renewable power generation facilities cannot provide baseload power (without backup storage, but reliable and cost effective battery solutions are not available at present) so the cost of this option becomes too high for an individual off-taker. This would not reduce the reliance on Eskom in the time periods of no generation in order to provide baseload power. In order to achieve total independence, back up storage is required which increases the costs significantly and makes this option too expensive to implement.

   With regard to the provision of solar power, when comparing like for like capacity with all the competing technologies, solar has consistently shown to be undesirable; this mainly due to a high capital cost per kW to plant factor ratio. Where solar PV has penetrated the market significantly, high electricity tariffs reflect the cost of energy and thus can only be effectively utilised in wealthier economies where the consumer pays a premium or else the government subsides the higher electricity cost. Other constraints to solar energy options are:

   - Changes in output with weather elements.
   - Not stable during disturbances.
   - Inability to change output on demand and with demand.
   - Requires large amounts of land.

   It should however be noted that the Project will include solar PV panels on the roof of the buildings. The integration of solar panels will be undertaken after the commissioning of the main plant. It is estimated that up to 500 kW of solar panels can be installed on building roofs, generating up to 800 MWh of solar power per year which will help dissipate the plant's parasitic loads [(1)].

   Winds are irregular, both by season and vary widely diurnally. They also as per solar projects require large tracts of land for the generation of adequate power to make projects viable.

4. Liquid hydrocarbon fuel derivatives and biofuel options – This alternative involves the use of fuels other than gas to fire a power plant. This is not a viable alternative in this case as the cost of generation is unfeasible even when considered in combination with renewables.

5. Waste heat recovery on existing production processes at AMSS – Steam options and lower temperature regimes were considered, but these

(1) Parasitic load refers to the load generated by activities at the power plant which consume electricity, such as the office buildings, workshops, water treatment plants, etc.

technologies have low efficiencies and become uneconomical due to long payback periods. This option was therefore not considered viable.

Energy mix for this Project

With regard to the partial use of renewables for energy generation for this project, the following should be noted:

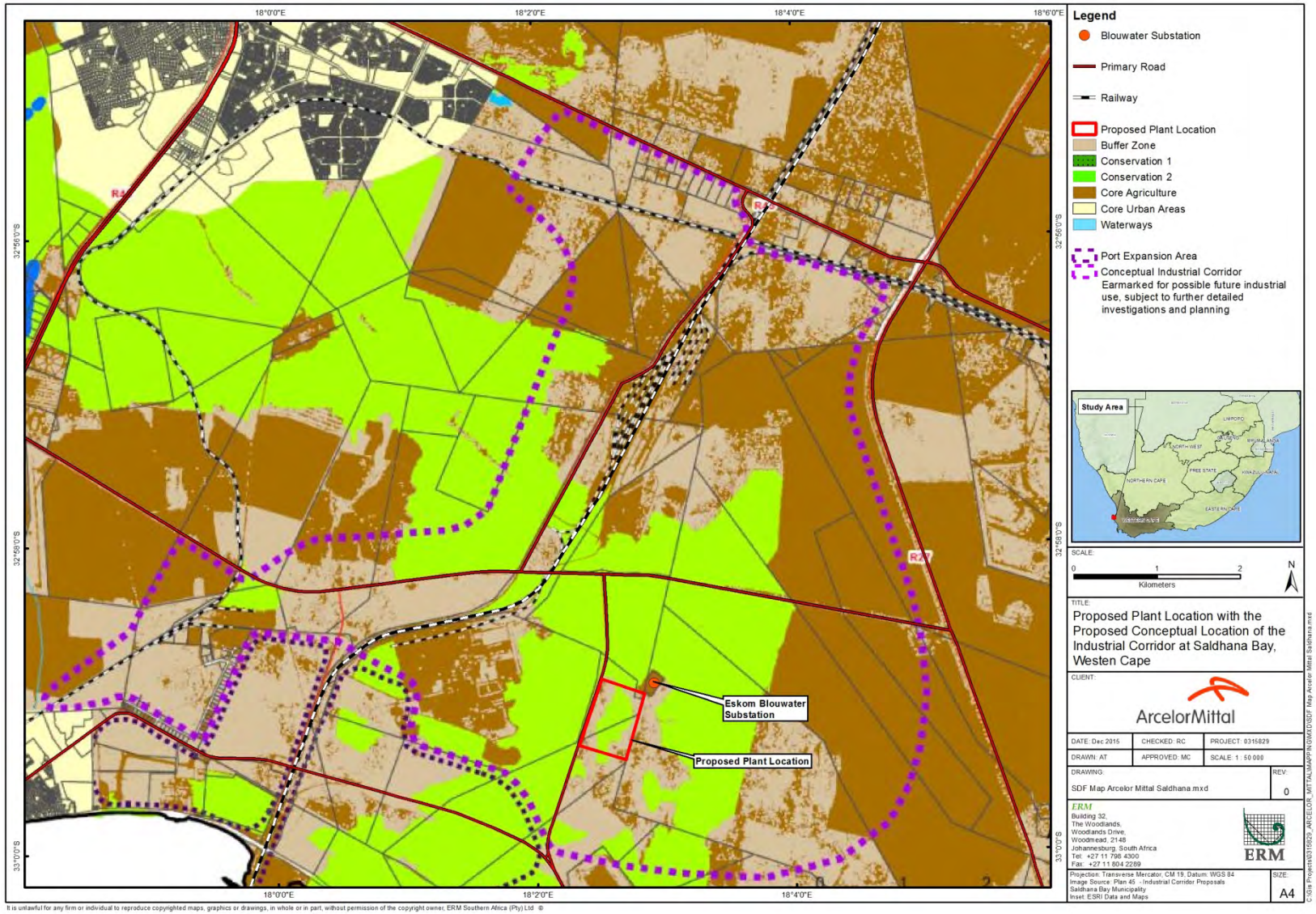
- Alternative renewable energy sources will not present economic benefits, rather environmental benefits. This proposed development has been assessed to have very few significant associated impacts and therefore the consideration of alternatives to minimise the environmental impacts while significantly increasing the cost of electricity does not appear justified from an overall cost benefit analysis perspective;
- If gas import volumes are reduced to make use of renewable sources, the gas cost advantage is diminished due to reduced economies of scale;
- The land currently proposed for the project is not sufficient to benefit from the economies of scale that an appropriately sized renewable energy project would provide. A further discussion on location alternatives is provided in *Section 4.1.2*;
- Power supply to AMSS would be unpredictable;
- There would be an unquantifiable annual load factor for the gas turbine consumption and therefore no contractual commitment for the import of natural gas would be possible, thus increasing the cost of gas-generated power for the project.

2.1.3 Compatibility with Local Development Planning

The proposed site for the development of the power plant is in close proximity to both the Port of Saldanha and Vredenburg, within an area referred to by the West Coast District Municipality Spatial Development Framework (SDF, 2014) as the 'growth engine' of the municipality. The SDF also states that the Port of Saldanha is the key economic catalyst within the district and its utilisation and potential should be optimised, through promotion of initiatives such as the Industrial Development Zone (IDZ), better use of the back of port areas and promotion of oil and gas industries.

The Saldanha Bay Local Municipality's SDF (2011) indicates that the proposed power plant site falls within what is referred to in the SDF as a 'planned industrial corridor' (see *Figure 2.1*). The location of the proposed facility therefore is in accordance with the current district and local municipal plans for development.

Figure 2.1 Saldanha Bay Municipality Conceptual Industrial Corridor



Source: Saldanha Bay Municipality SDF (2011)

2.1.4 ArcelorMittal's Energy Needs

The current Eskom electricity situation, which affects both the availability as well as the cost of electricity, has resulted in a particularly challenging situation for the manufacturing industry in the Saldanha area. The timing of the energy crisis within South Africa, in combination with the structural changes in the global commodity markets, has the potential to severely constrain the manufacturing industry and, specifically, the companies focused on the export market (where cost pressures cannot be given through to the customer).

AMSS has tried to negate the effect of rising electricity cost through actively engaging in energy efficiency programs run by the Department of Trade and Industry (DTI), United Nations Industrial Development Organization (UNIDO), National Cleaner Production Centre of South Africa (NCPC) and DoE. The plant made significant improvements and has been used as a case study to illustrate what is possible in an industrial environment with energy efficiency (1). However, there is little opportunity for further improvement without significant capital investment in technology.

Electricity prices in South Africa started to rise steeply from 2007 and have increased by 328% up to 2015 / 16. The price escalation going forward is expected to be higher than the Consumer Price Index (CPI) for the next five years. This price path is unaffordable to AMSA (ArcelorMittal South Africa) and in particular AMSS (ArcelorMittal Saldanha Steel). AMSS is competing mainly on the export market and upward electricity cost pressure with high price competiveness in the international market has necessitated AMSS to actively control its cost drivers.

AMSS investigated an electricity generation option which would be cheaper than the regulated prices and which could introduce natural gas into the production process to unlock efficiency improvement not possible before due to the lack of available affordable fuel gas. Saldanha Steel widened its approach to include all possible electricity users and gas users to drive growth in the Saldanha Industrial Development Zone and surrounding areas. This enabled achieving an economy of scale to warrant investment into gas supply, landing, storage and regasification infrastructure at a pricing framework lower than open market forces. It also justified the construction and operation of a large enough power station of more than 1200 MW to provide security of supply in an area where Eskom experience high line losses of up to 25%.

The intention was to address shortages in supply to existing and potential new users in the area who are being restricted by the lack of secure supply for larger new connections at competitive Megaflex energy prices. The upgrading of Eskom supply infrastructure is planned until at least 2025, according to Eskom LT supply infrastructure planning document.

(1) ArcelorMittal implemented 15 energy projects which saw the plant reduce their LPR consumption by 40%. They were awarded an Eskom *eta* Award in 2013.

2.1.5 Regional Motivation

Eskom is currently operating an OCGT plant at close to 60 percent capacity with enormous associated cost of diesel (as a primary fuel). The proposed CCGT power plant in Saldanha will have efficiencies of over 62 percent and it will use natural gas as the fuel source. This will significantly reduce the cost of electricity. Furthermore, a study undertaken by Deloitte shows that the viability of importing LNG requires at least a 800 MW CCGT plant to be installed in the Western Cape in order to create a gas market and to lower the energy costs. The only source of base load power in the Western Cape comes from Koeberg, which is supplying 1940 MW to the grid. An additional 2050 MW is imported from Mpumalanga from coal fired power plants. Line losses have been reported at 20 percent, meaning that over 400 MW of electricity is lost during transport between Mpumalanga and the Western Cape.

The need to generate sustainable and affordable energy, given that the rapid rise in electricity prices is threatening the viability of many industries in South Africa. The lack of additional electricity capacity from Eskom is preventing new capital investment in all regions of South Africa. There is a need to generate energy that is clean and stable, while at the same time cost effective, so as not to impact the people of South Africa and to stimulate industrial and economic growth to create jobs. However, rising input costs particularly electricity tariffs and the falling Rand are placing enormous constraints on industrial and economic growth, where margins are spread thin with the decline in international economies.

There is a clear opportunity for increased power for the Saldana Bay region both from current businesses and also Eskom. The Power plant will go a long way to stabilize the Western Cape grid and afford Eskom an opportunity to address the current supply shortage. The location of the power plant will reduce electricity supply losses due to long transmission lines. Additional base load will enable connection of new Industries in the planned IDZ (Industrial Development Zone – currently being considered for transformation to a full SEZ). New load connections are currently unavailable, holding up direct investment opportunities into the IDZ.

2.1.6 Conclusion

The ArcelorMittal Saldanha Steel facility is the one steel plant that is currently profitable due to increased efficiencies and some global economic recovery. In fact, it is rated as one of ArcelorMittal's most productive plants world-wide. The current cost drivers of iron ore and electricity for the steel industry in South Africa pose too great a risk to the operation of Saldanha Steel and should alternative electricity and fuel sources not be found with more stable and predictable forward pricing mechanisms to bring cost under control the closure of the facility is a distinct possibility.

AMSS has partnered with an IPP, International Power Consortium South Africa (IPCSA), to supply electricity at a particular price affordable to AMSS and with a definite fixed forward price curve in order to sustain its operation long term.

3 PROJECT DESCRIPTION

3.1 PROJECT OVERVIEW

3.1.1 Project Background

The International Power Consortium South Africa (IPCSA), have developed a solution to ArcelorMittal Saldanha Steel's requirement for stable, economical electricity over the long term. The solution will supply baseload power and cater for a peaking demand up to 250MW and consists of a 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site (1). This will ensure the medium to long term sustainability of ArcelorMittal's Saldanha Steel as well as the surrounding economy it operates in.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the Bankable Feasibility Study (BFS) completion.

The Project is primarily a power supply project to the Saldanha Steel Plant as the anchor off taker. Additionally, the proposed power plant will either tie into the Department of Energy's (DoE) Gas to Power (G2P) programme (2) or the balance of power will be sold to large electricity users which will be determined in accordance with existing regulation.

The Project will support Liquefied Natural Gas (LNG) as its main fuel supply and will consume approximately 76 million Giga Joules of LNG per year (2 million tons of LNG per annum).

LNG will be supplied by ship to the Port of Saldanha, where it will be regasified and then offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha. Initial discussions have been held with Transnet National Ports Authority (TNPA) in Saldanha in this regard. (3)

The Project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160MW of base load energy, peaking up to 250MW) and excess electricity will

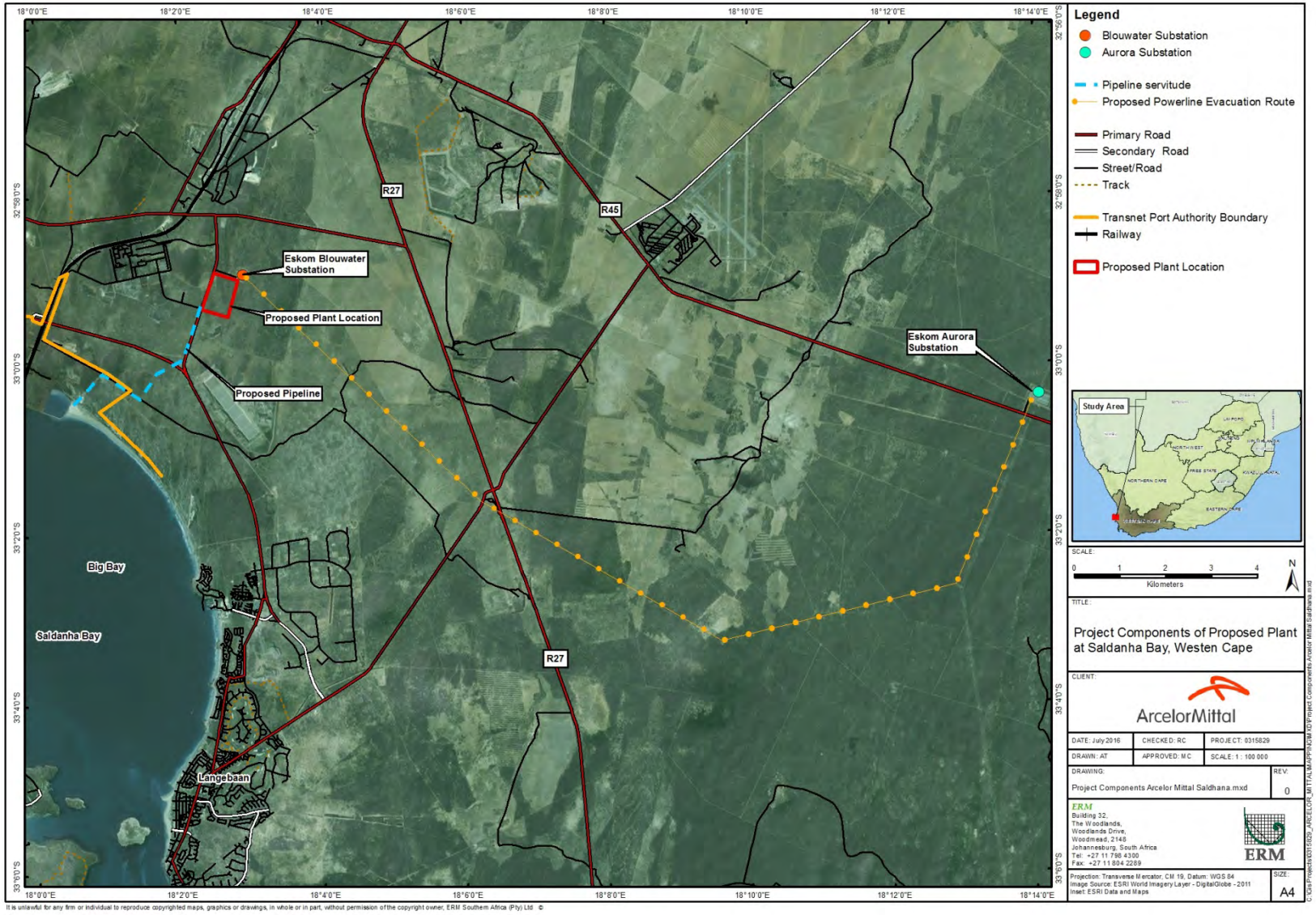
(1)In order for the solution to achieve the economy of scale required to allow for cost effective gas importation, it is designed as a 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant.
(2) In 2012, the Minister directed in her Determinations that new generation capacity should be procured from hydro, coal and gas sources to support the South Africa's base load energy mix and generation from gas and cogeneration as part of the medium-term risk mitigation project programme. The Determinations require that 3126MW of baseload and/or mid-merit energy generation capacity is needed from gas-fired power generation to contribute towards energy security. The gas required for such power generation will be from both imported and domestic gas resources. (https://www.ipp-gas.co.za/)
(3) It is anticipated that this project will connect to the Department of Energy's (DoE's) planned LNG import terminal. Should this not occur a separate EIA will be undertaken to permit the marine component of the import of LNG._

be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

3.1.2 Project Location

The Project is to be developed on a green field site owned by ArcelorMittal, approximately 5 km northeast of the Port of Saldanha (*Figure 3.1*). The site is located less than 1 km to the east of the existing ArcelorMittal Steelworks, immediately adjacent to the Blouwater substation. The site is located within an area identified for industrial development according the Saldanha Bay Municipal Spatial Development Framework (2011).

*Figure 3.1 Project location and key components**



*Note: 400kV transmission line is shown only for illustration purposes and is not included in the scope of this EIA.

3.1.3 *Land Ownership and Acquisition*

The two properties on which the proposed power plant site is located are detailed in *Table 3.1*.

Table 3.1 Properties which are intersected by the power plant footprint

Farm Name	Portion Number	Parcel Number	SG Code
Yzervarkensrug	129	Remaining Extent	W014C04600000000012900000
Jackels kloof	195	2	W014C04600000000019500002

The proposed pipeline corridor intersects with the properties as listed in *Table 3.2*.

Table 3.2 Properties which are intersected by the pipeline corridor

Farm Name	Portion Number	Parcel Number	SG Code
None	0	1185	W014C04600000000001185000000
STATE LAND 196	0	196	W014C04600000000000196000000
Farm 195	195	0	W014C04600000000000195000001
Farm 195	7	195	W014C04600000000000195000070
Farm 195	1	195	W014C04600000000000195000010
Jackals Kloof 195	2	195	W014C04600000000000195000020
None	0	1132	W014C04600000000001132000000
YZERVARKENSRUG 129	0	129	W014C04600000000000129000001

The proposed feeder transmission line from the power plant to ArcelorMittal Steel intersects with the properties as listed in *Table 3.3*.

Table 3.3 Properties which are intersected by proposed feeder transmission line from the power plant to ArcelorMittal Steel

Farm Name	Portion Number	Parcel Number	SG Code
YZERVARKENSRUG 129	0	129	W014C04600000000000129000001
YZERVARKENSRUG 129	3	129	W015C04600000000000129000030
None	0	1132	W014C04600000000001132000000

3.2 *PROJECT AREA OF INFLUENCE*

For the purposes of this impact assessment, the definition of the Area of Influence (AoI) encompasses:

- *'The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but*

predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.

- *Associated facilities are facilities that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.*

- *Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.'*

For the Project, the **direct** AOI is the spatial extent of the Project footprint and related facilities on the receiving environment. This encompasses:

- Power plant total surface area (area within the fence line);
- Pipeline construction (temporary) Right of Way (RoW); and
- 132kV feeder transmission line to ArcelorMittal RoW.

A breakdown of the surface areas for these components is provided in *Table 3.1* and is shown later in this section in *Figure 3.4*.

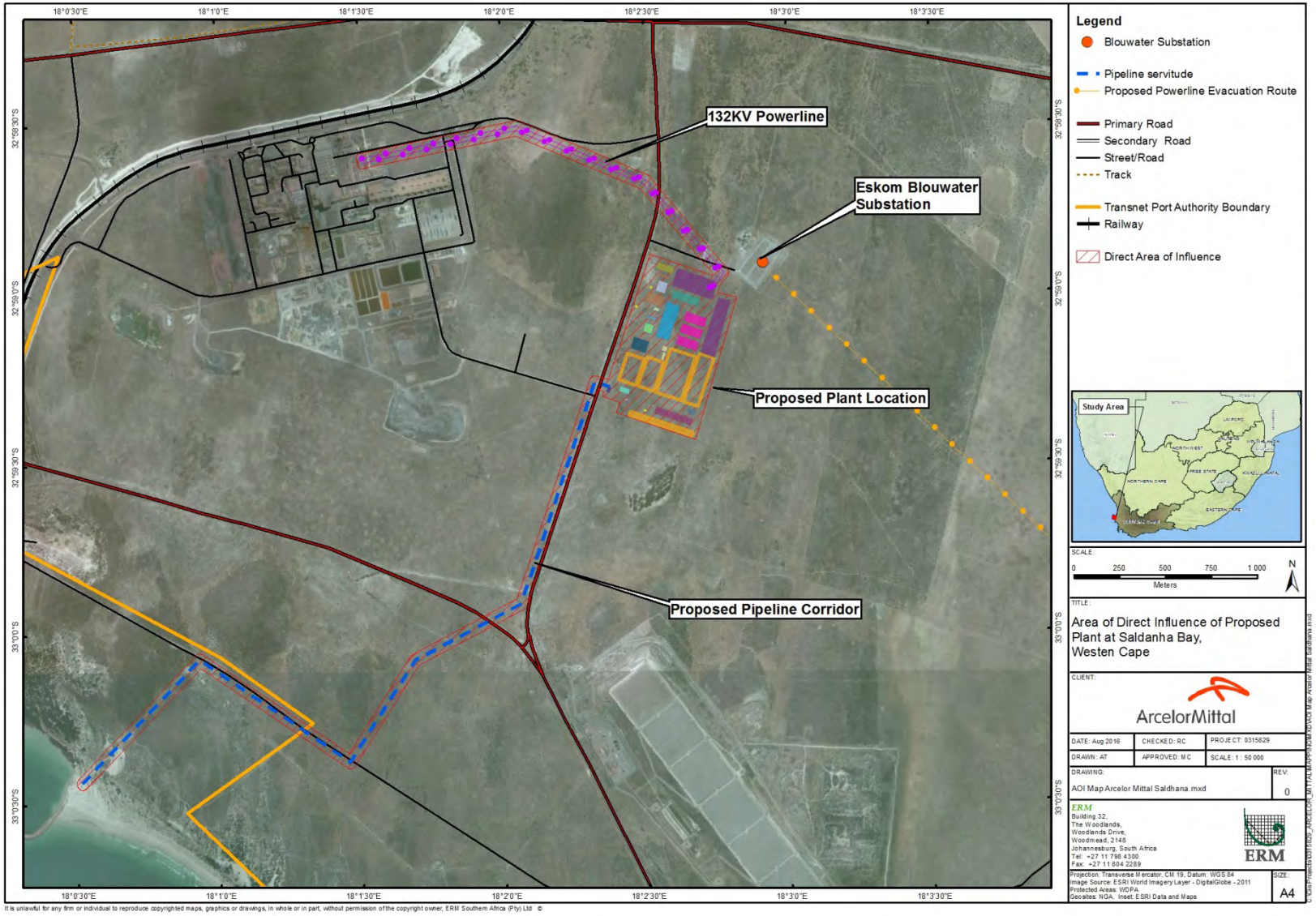
Table 3.4 Footprint of project components

Project Component	Area (ha)
Main Project Components	
Power plant total surface area (area within the fence line)	45.83
Pipeline construction (temporary) RoW	30.49
Pipeline permanent easement	2.76
132kV feeder transmission line to ArcelorMittal RoW	7.22
Components within the power plant site	
1.5 MW Generator	0.09
132KV Switchyard	2.40
440KV Switchyard	2.48
Admin, Control, Laboratory	0.25
Air-Cooled Condensers	1.56
Canteen, Changing Rooms, Ablutions	0.09
Clinic	0.01
Construction Changing Rooms & Ablution Block	0.18
Emergency Assembly Point	0.04
Gas Pipeline Receiving Area	0.18
Gas Turbine, Steam Turbine and HRSG Islands	1.89
Hard Standing Laydown Area	9.64
Laydown Area	0.69
Other	0.03
Pigging and Gas Metering Area	0.07
Reverse Osmosis, MSFD, Salt Residue	0.05
Sewerage Treatment Plant	0.12
Stormwater Collection Tanks	1.20
Trent Gas Turbines	0.73

Project Component	Area (ha)
Truck Staging & Laydown Area	0.36
Visitors and Training Centre	0.07
Water Filtration	0.02
Water Treatment, Raw Water Storage, Fire Fighting Water	0.59
Workshop Warehouse and Spares	0.33

The **indirect** AOI encompasses areas potentially affected by cumulative impacts as well as areas that could be impacted indirectly by Project activities. The indirect AOI will differ between various resources and receptors depending on the dependencies. For example, indirect impacts to soils would be likely limited to the immediate areas around the direct footprint. Indirect impact to social resources may however extend to nearby communities along the coast which may be affected by the Project.

Figure 3.2 *Project Area of Influence (AoI)*



3.3 PROJECT COMPONENTS

The key project components considered in this EIA are as follows:

- Pipeline;
- Power plant; and
- Power evacuation and connection to the grid (1).

These are discussed in detail in the sections below. The general surface areas for the project components are listed in *Table 3.5* below.

Table 3.5 Project components general surface areas and lengths

Project Component	Area / Length
Power Plant total surface area	45.83 ha
Length of pipeline	4.6km
Pipeline construction (temporary) RoW (36m width)	30.49 ha
Pipeline permanent easement (6m width)	2.76 ha
132kV feeder transmission line to ArcelorMittal length	2.4km
132kV feeder transmission line to ArcelorMittal RoW (30m width)	7.22 ha
Proximity to grid connection	150m

It is envisaged that LNG will be supplied by ship to the Port of Saldanha where it will likely be offloaded to a Floating Storage Regasification Unit (FSRU). The FSRU will regasify the LNG and pump it via a pipeline to the power plant. The supply of fuel and import facilities have not been considered in this EIA. The Department of Energy initiated a project in 2015 to permit the construction of an LNG import terminal at the Port of Saldanha, it was understood that individual developers were not required to undertake the EIA for this component. Should this information change, a separate EIA for the import of gas will be undertaken.

In this regard a preliminary assessment of different options for landing gas in Saldanha has been conducted. Each option will be examined in detail during a feasibility study, which will identify the preferred alternative location to land gas in Saldanha Bay. Impacts will be assessed and addressed in an EIA for the marine component of the project.

LNG will be transported to Saldanha using purpose built ships. Depending on the size of the vessel, the number of vessels required will range between 14 to 20 ships per annum.

Three gas offloading options will be considered during the feasibility study:

(1) Note: The transmission connection for Phase 1, i.e. the 132 kV connection to Saldanha Steel, is included in this EIA. The transmission connection for Phase 2, i.e. the 400 KV connection to Eskom's Aurora substation, will be considered in a separate EIA application. See Section 3.4 for details about the phases referred to here.

1. Land based storage and regasification: This is the preferred long term option which can be state owned, however, it is not financially feasibly without a developed downstream gas market. Other options (below) can, however, be disbanded and connected to the land based option upon commissioning.

2. Floating Storage and Regasification Unit (FSRU): The FSRU is typically a modified LNG vessel and combines LNG shipping, storage and regasification on one ocean going vessel. This alternative is widely used internationally and includes all the components needed to offload gas (storage, regasification, offloading terminal, buoy and mooring system) using a subsea pipeline.

3. Gravity Float Unit: This is a concrete based modular structure that acts as an artificial island for ships to dock and offload LNG.

3.3.1 Power Plant

General Configuration

Figure 3.4 shows the proposed plant layout. Current plans include six Trent 60 DLE (low NOx) 50 MW (installed gross capacity, refer to *Box 3.1*) gas turbines in open cycle and three identical but independent 435MW SCC5 4000F (installed gross capacity) single shaft generating trains in combined cycle. *Figure 3.3* shows the equipment configuration in a combined cycle system. With reference to *Figure 3.4* the corner points of the proposed power plant boundary are listed in *Table 3.6*.

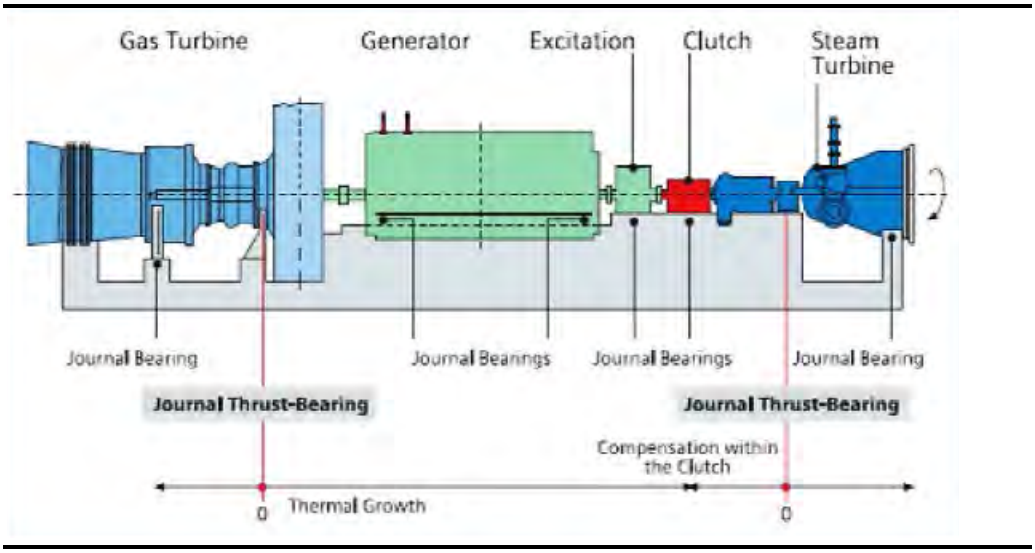
Box 3.1 Installed Gross Capacity vs Operating Capacity of the Power Plant

The Installed Gross Capacity is normally the plant generating capacity at 100% loading and ISO conditions. However, it is impossible to test ISO capacity performance in practice since the ISO conditions of temperature, humidity and pressure very seldom occur together for the purposes of testing. Installed gross capacity is the capacity at the generator terminals and is not the energy despatched from the plant.

In the project development environment, power plant engineers consider the power demand of the client and work backwards to design the plant with sufficient on-site capacity that will produce sufficient despatchable power that will fulfil demand. In addition, plant design will be based on site worst conditions, i.e. during summer at low barometric pressure and high humidity. This is known as the *Operating Capacity* of the power plant.

Therefore, a more meaningful expression of capacity is performance at site conditions. The Installed Gross Capacity of the proposed power plant is 1,605MW, and the Operating Capacity is 1,507MW. This report will thus refer to the *Operating capacity* of the power plant throughout, i.e. that of 1,507MW.

Figure 3.3 Combined Cycle Equipment Configuration



Source: Combined Cycle Process Description Flow, ArcelorMittal, 2015

The high temperature exhaust gases are captured at the outlet exhaust of each gas turbine. This is fed into each HRSG via a short section of ductwork at the exhaust outlet point. The HRSG is a triple pressure boiler comprising a high pressure steam system, a reheat/medium pressure steam system and a low pressure steam system. The hot exhaust gases will then transfer heat to water in the HRSG, creating steam in the form of superheated high pressure (HP) steam, reheat/medium pressure and low pressure (LP) steam. Steam from each pressure level will be admitted to the steam turbine. A condenser will convert exhaust steam from the steam turbines back into water.

The plant will have an air cooled condenser system behind each steam turbine.

Table 3.6 Co-ordinates of the corner points of the proposed power plant boundary.

Point	Longitude	Latitude
A	18° 2.521' E	32° 58.887' S
B	18° 2.755' E	32° 58.956' S
C	18° 2.765' E	32° 58.971' S
D	18° 2.759' E	32° 59.002' S
E	18° 2.823' E	32° 59.014' S
F	18° 2.675' E	32° 59.435' S
G	18° 2.398' E	32° 59.354' S
H	18° 2.410' E	32° 59.323' S
I	18° 2.350' E	32° 59.305' S

Figure 3.4 *Power plant functional layout*

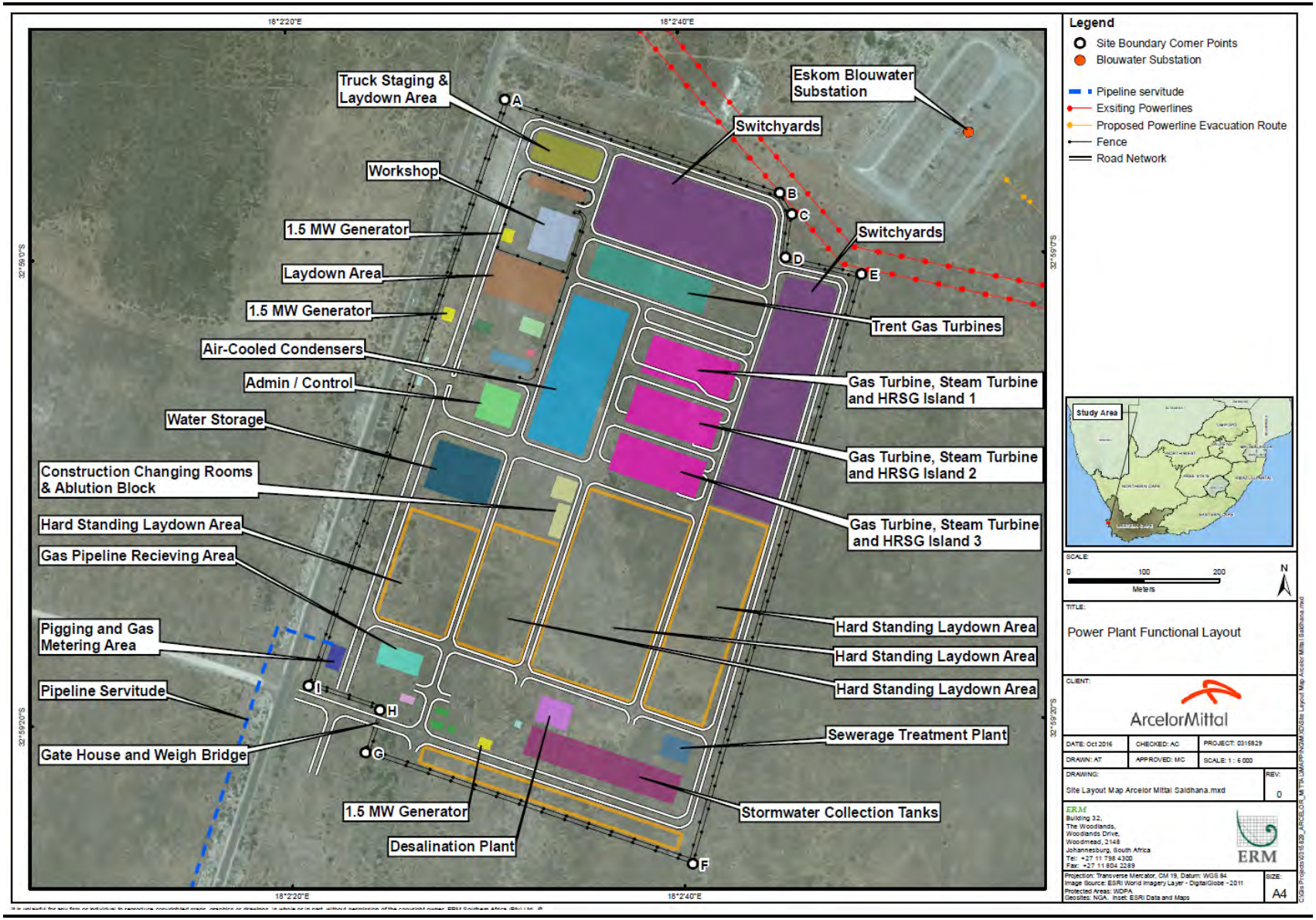


Table 3.7 Power Plant components and their respective footprint areas / lengths

Project Component	Area
1.5 MW Generator	0.09 ha
132KV Switchyard	2.4 ha
440KV Switchyard	2.48 ha
Admin, Control, Laboratory	0.25 ha
Air-Cooled Condensers	1.56 ha
Canteen, Changing Rooms, Ablutions	0.09 ha
Clinic	0.01 ha
Construction Changing Rooms & Ablution Block	0.18 ha
Emergency Assembly Point	0.04 ha
Gas Pipeline Receiving Area	0.18 ha
Gas Turbine, Steam Turbine and HRSG Island 1	1.89 ha
Hard Standing Laydown Area	9.64 ha
Laydown Area	0.69 ha
Other miscellaneous infrastructure	0.03 ha
Pigging and Gas Metering Area	0.07 ha
Reverse Osmosis, MSFD, Salt Residue	0.05 ha
Sewerage Treatment Plant	0.12 ha
Stormwater Collection Tanks	1.2 ha
Trent Gas Turbines	0.73 ha
Truck Staging & Laydown Area	0.36 ha
Visitors and Training Centre	0.07 ha
Water Filtration	0.02 ha
Water Treatment, Raw Water Storage, Fire Fighting Water	0.59 ha
Workshop Warehouse and Spares	0.33 ha
Road surface area (total)	6.9ha
Propane storage vessels	3
Propane storage volume on site (total)	30 m^2
Height of stacks	60m (max)

Project Component	Area
Capacity of on-site substation	132 KV substation for phase 1 400 KV substation for Phase 2
Type of perimeter fencing	ClearVu Reinforced
Perimeter fence length	2.8km
Perimeter fence height	3 m

Power generation equipment

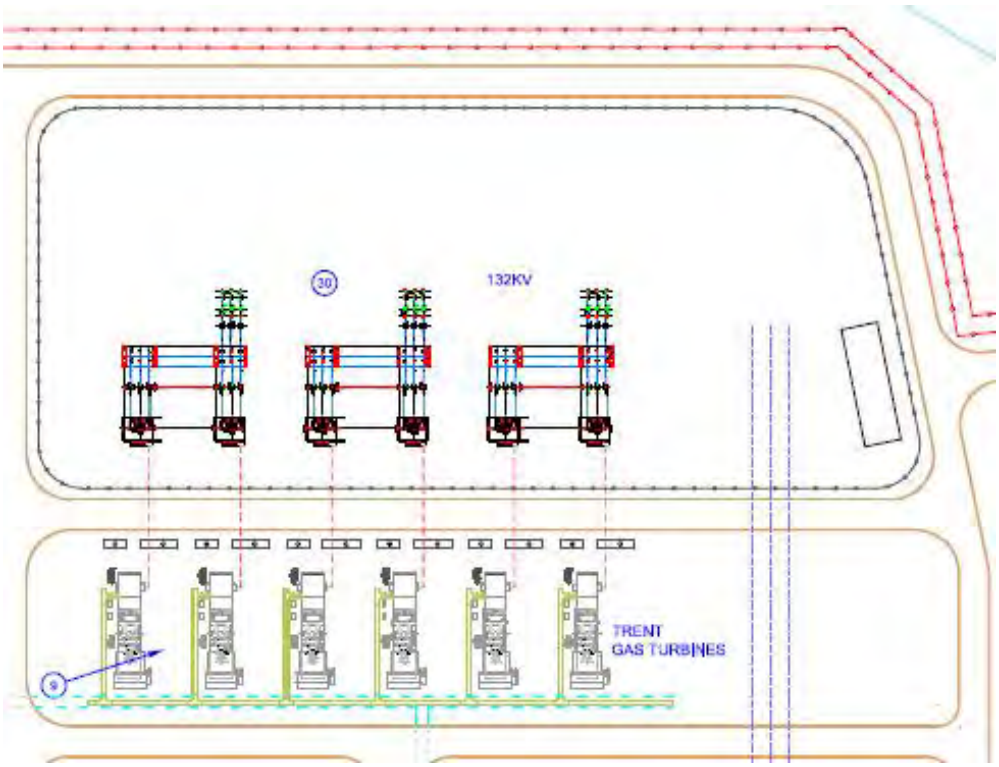
132 kV 300MWe Block

This consists of 6 x TRENT 60 DLE (low NOx) gas turbines. These will be the first units to be installed. They will operate on natural gas in open cycle and will be dedicated to supply ArcelorMittal. One gas turbine is a redundant unit to ensure continuous uninterrupted supply.

At a later stage, it would be possible to convert at least two units to combined cycle technology which would improve efficiency.

Figure 3.5 132kV, 300MWe Block layout (A) and 3D rendering (B)

A



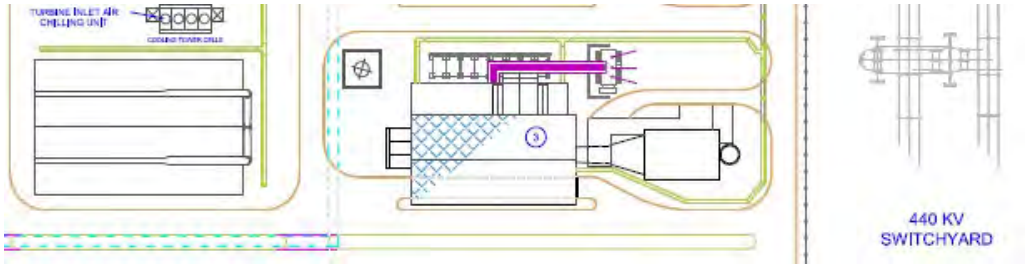
B

400kV 1200 MWe Block

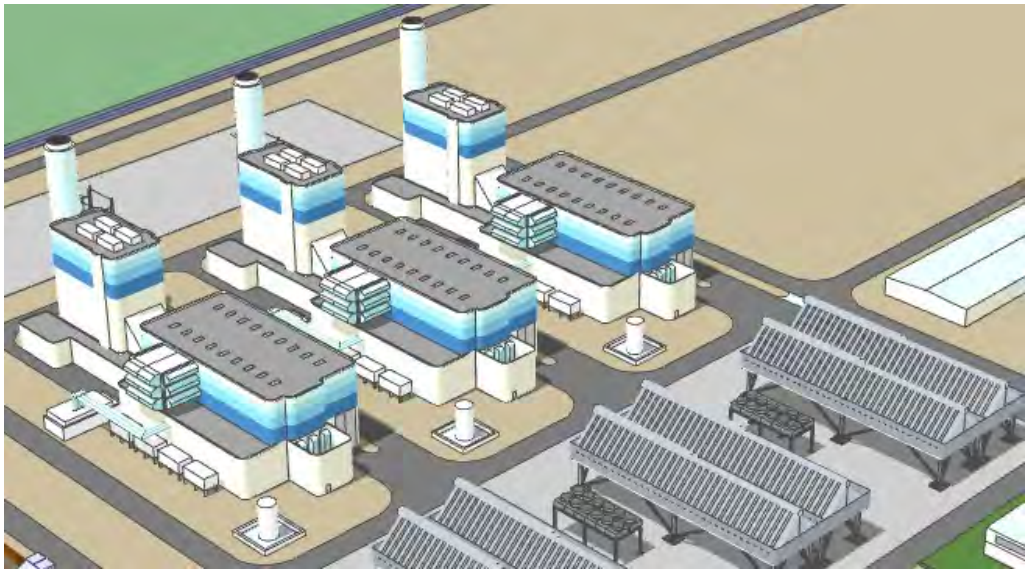
This consists of three identical but independent, SCC5-4000F single-shaft generating trains, each providing 439 MWe net output capacity at 22kV net in combined cycle configuration (1). The generated power will be stepped up to 400kV before being evacuated via the 400kV switchyard and through the national grid network. The steam turbine exhaust is condensed by ACCs and returned to the boiler feed storage tank in order to save on water consumption.

Figure 3.6 ***400kV 1200 MWe Block layout (A) and 3D rendering (B)***

A



B



Fuel is natural gas which will be piped up to the plant site at sufficient pressure for feeding directly to the gas turbines by underground pipeline. Emissions of CO2, NOx and CO are much reduced compared to coal-fired power plants.

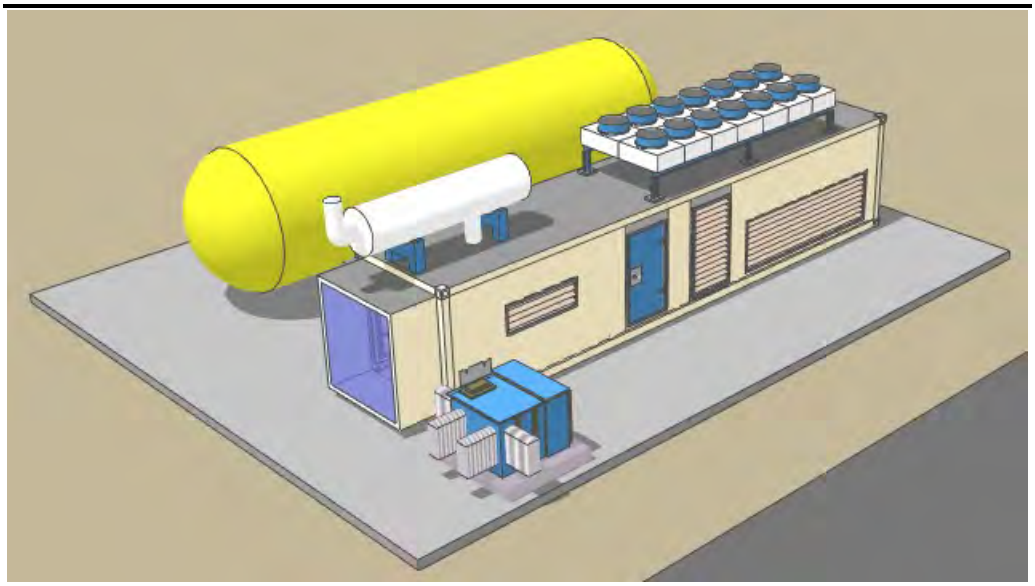
(1) Net gross capacity is 446 MW at ISO conditions 100% maximum continuous rating at average site conditions. The net power output, i.e. operational power at 100% loading is 439 MW at average site conditions.

Black-Start Power Generation

The construction phase will require electricity for security site lighting and for driving equipment such as air compressors, a cement batch plant, and lighting up site offices, water purification, isolation valves and safety instrumentation along the incoming sea-water and gas pipelines.

This initial electricity will be generated on site by three internal combustion generators running on liquid petroleum gas (LPG or propane) supplied by road tanker. The unit is shown in blue *Figure 3.7* below and the propane tanks are shown in yellow.

Figure 3.7 Black-start power generation



After the plant has been constructed, the same generators will play an important part in assisting in the start-up and commissioning of the main power plant units, TRENTS and SCC5-4000F trains. They will also be used as stand-by emergency black- start generators, or in the event that some balance-of- plant system, for example outdoor site lighting, or workshops and warehouse, become unserviceable due to a fault.

Other power generation

Buildings will be designed such that the roofs can be populated by solar PV panels. The integration of solar panels will be undertaken after the commissioning of the main plant. Available land area is limited for renewable power generation, as such the only viable option is a small capacity PV array. It is estimated that up to 500 kW of solar panels can be installed on building

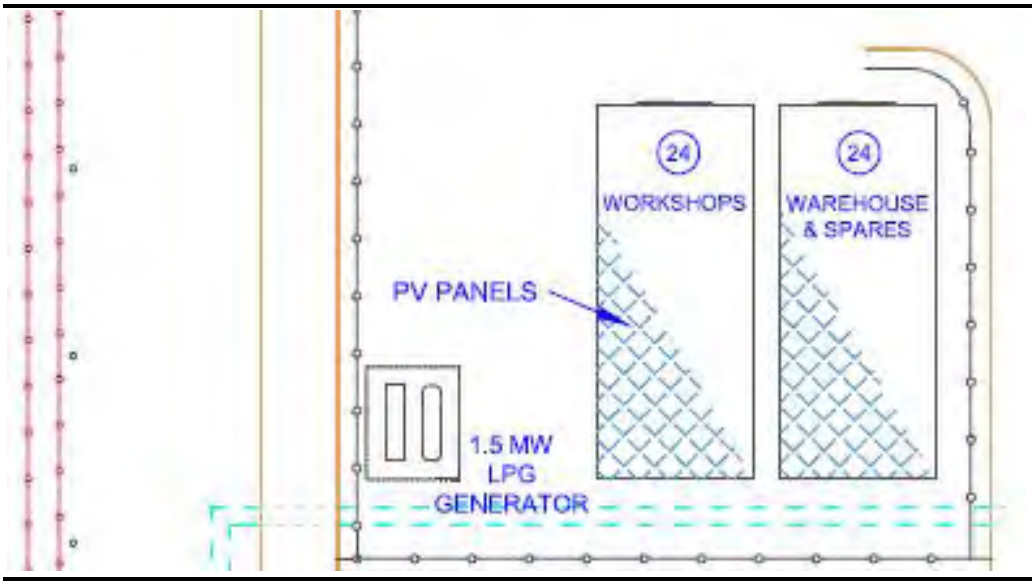
roofs, generating up to 800 MWh of solar power per year which will help dissipate the plant's parasitic loads (1) .

The excess solar power, not directly used on the plant, will be stored in the latest generation of vanadium redox flow batteries and will assist to keep the DC control and DC control back-up power system operational on a continuous basis.

Some of the renewable solar power generated will be utilised in the following facilities:

- Manufacture of hydrogen from sea water. Hydrogen is required on site for the cooling of the large SGT5 generators;
- Desalination of sea water;
- Powering of a site-wide local WiFi LAN system for information gathering and site- based communications;
- Powering of small local chemical dosing pumps;
- Main building LED lighting;
- Maintaining pressure of distributed potable water; and
- Charging the batteries of on-site electric personnel vehicles and cycles.

Figure 3.8 Example of the location of solar panels on building tops



Access routes and roads

The Project has accounted for certain road works, described below, deemed necessary for safety and compliance with regional legislative requirements. Permissions have not yet been sought for the proposed road works, the costs

(1) Parasitic load refers to the load generated by activities at the power plant which consume electricity, such as the office buildings, workshops, water treatment plants, etc.

of which will be borne by the project and executed according to local Council and/or Department of Roads and Traffic and/or Committee of Transport Officials (COTO) regulations, requirements and guidelines; in particular Road Infrastructure Strategic Framework for South Africa (RISFSA) of the South African Department of Transport (DOT, 2006)

Figure 3.9 below shows the main access to the ArcelorMittal site branching westwards off the R27. A secondary road crosses the access road and access to the power plant is then southwards proceeding under the HV powerlines from Blouwater substation to the southern entrance to the power plant site.

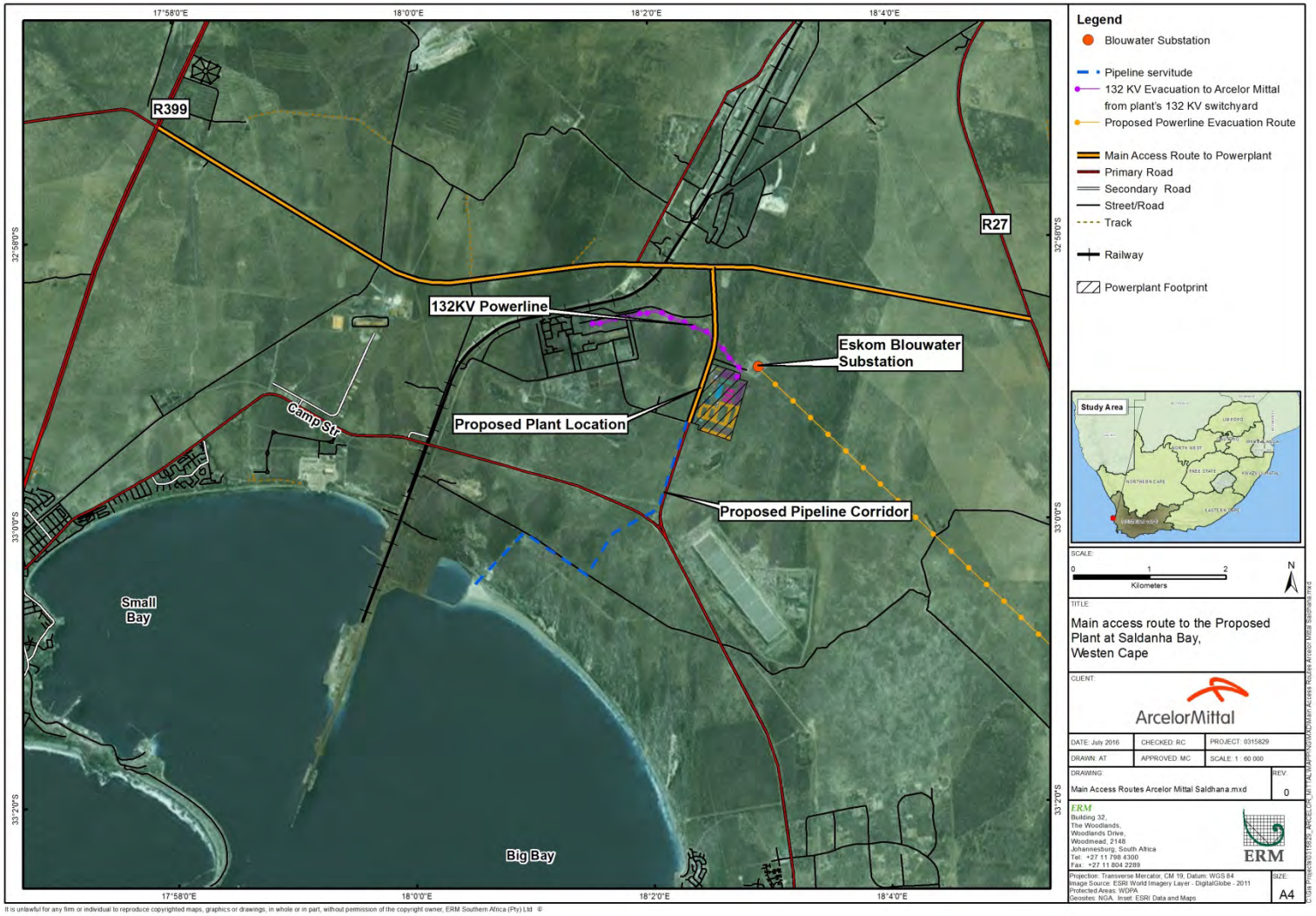
The access route indicated in *Figure 3.9* will be most affected by increased traffic, particularly from commencement of and during construction.

All of the approximately 6,900 m of road access on the 45.83 ha site will be concrete- paved. The total area of roads is 5.59 ha which represents approximately 12.4% of the fenced-in site area. Most roads are 8m width and others 12m. The 12m concrete-paved roads will be constructed early after commencement of construction works and will serve to carry heavy load traffic (mobile cranes, multi axle heavy equipment trailers, cement delivery trucks, etc.) during the early stages of construction.

All concreted roads will play an important role for rainwater harvesting, in addition to the concreted lay-down areas. The site's natural slope is towards the south where the raw water storage tanks will be situated. The east-west thoroughfares ('streets') will channel rainwater into the rain-water drains of the north-south thoroughfares ('avenues'). Rainwater will run southwards to the bulk water storage tanks.

The grid-like road system serves to provide a more precise local description as to the location of equipment, instrumentation or pipe-runs and a numbering system on the curb stones will aid in instrument position identification.

Figure 3.9 Main access to the power plant via the R27



Approach to the Power Plant

For road safety considerations and in light of the increased traffic (particularly during construction phase) the provincial road leading past the two power plant entrances will be widened from 11 m to a 20 m wide over-taking 4- lane section (*Figure 3.10*).

For the office and administration gate a wide entrance (12 m) and a 12 m radius bend into the power plant site and offices from the access road to the gate house is planned (*Figure 3.11*).

Figure 3.10 Illustration of widening of provincial road

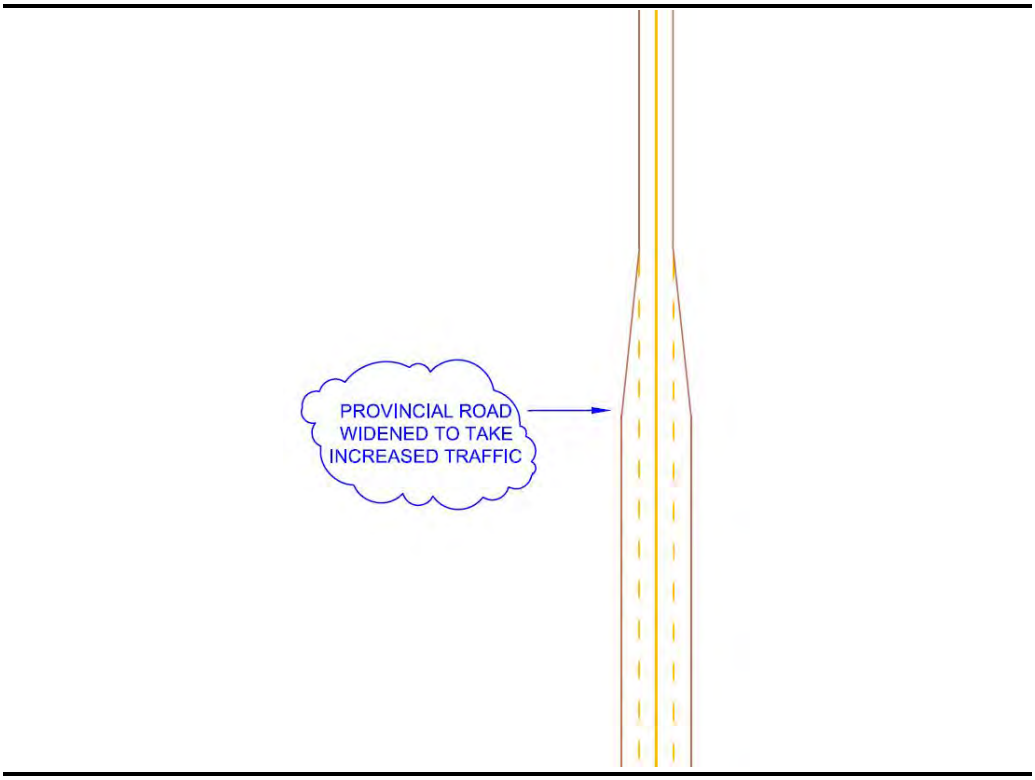
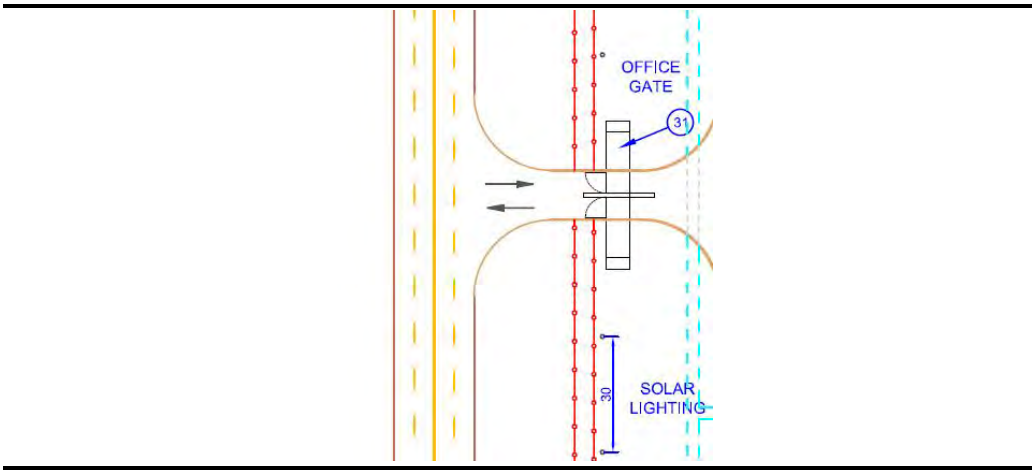


Figure 3.11 Illustration of office and administration entrance

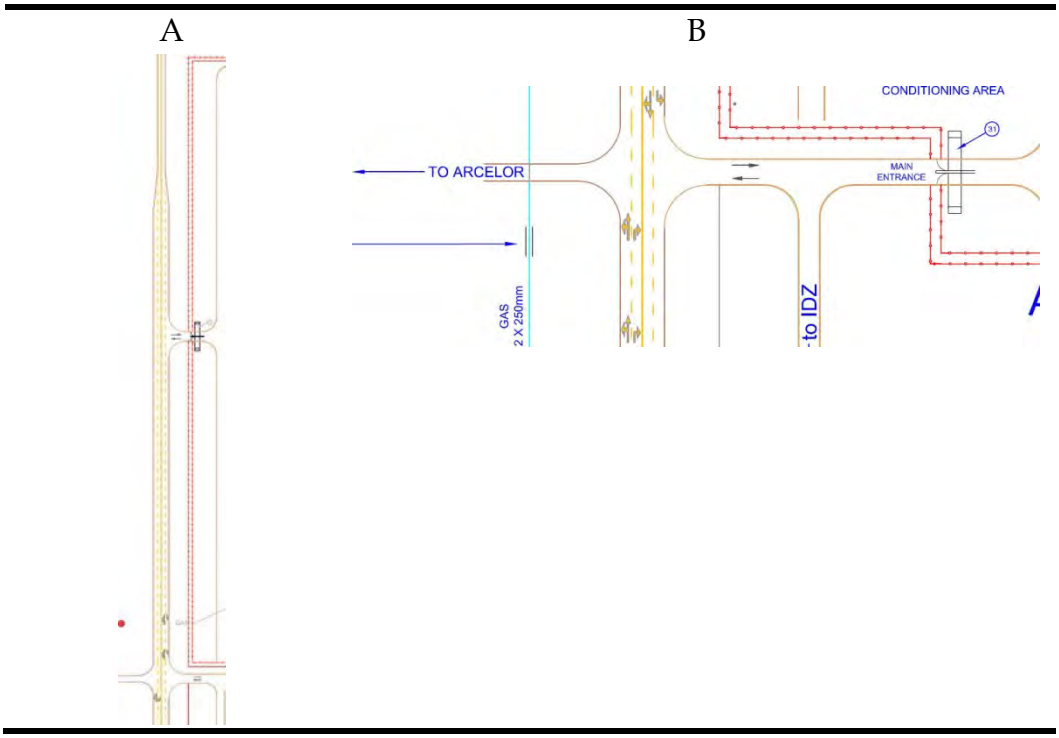


Main Goods and Construction Personnel Entrance

The widened provincial-road access approach, at full 12m width passes the administration office entrance and the southern main goods entrance, detailed below (*Figure 3.12 A*).

The drive-up from the main road to the site gate house is 135 m. A turnoff tees off southwards (*Figure 3.12 B*).

*Figure 3.12 **(A) Widened provincial-road access to the Power Plant and (B) Main entrance to Power Plant***



Incoming Goods Traffic

Incoming goods traffic will pass over a weigh-bridge and will then be directed to a temporary truck staging and laydown area for paper-work to be checked before being directed to area of installation or unloaded at temporary laydown area or in the event of electrical goods and instrumentation, transferred by site transport and conveyed to the warehouse or workshops at the north end of the site.

Admin /Office Building, DCS Control, Labs

With reference to *Figure 3.13*, plant administration offices housing (*Figure 3.14*), main Control Room, DCS marshalling panels, water laboratory, and two meeting rooms, will initially be used during construction to house the offices of construction managers and site engineers. Parking for up to 60 vehicles will be provided under shade.

Figure 3.13 Access to Admin/Office Building, DCS Control, and Labs

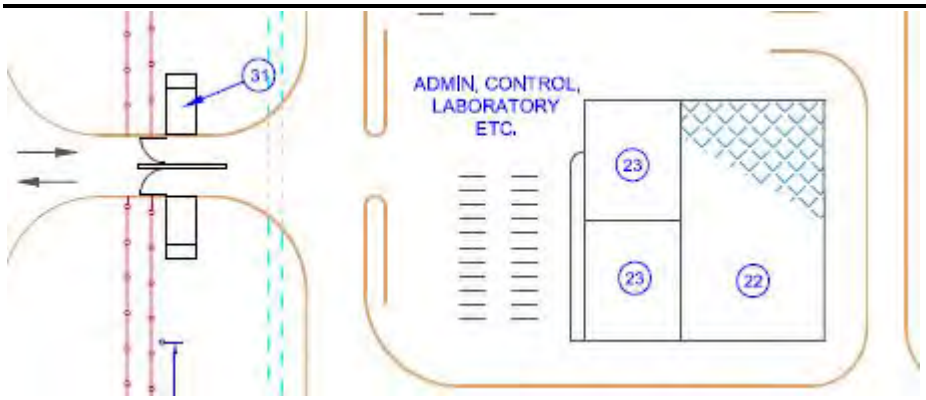


Figure 3.14 ***3D rendering illustrating the administration and office entrance with the permanent staff canteen and ablution block***

Roads within the power plant complex

Within the power plant complex there are five different sizes of roads. This are listed in *Table 3.8* along with the cumulative length and surface area of each road type.

Table 3.8 ***List of road types, lengths and surface areas within the power plant complex***

Roads within the Power Plant Complex	Length (m)	Surface Area (ha)
Road type: 8m wide	4652.2	3.7
Road type: 10m wide	148.5	0.1
Road type: 12m wide	1414.2	1.7
Road type: 20m wide	490.4	1.0
Road type: 32m wide	120.1	0.4

Ancillary Facilities

In addition, the project will include the following plant / machinery components:

- 132 KV Switchyard for 132 KV evacuation;
- 400KV Switchyard for 400 KV evacuation;
- Rain water treatment plant (Filtration);
- Sea-water treatment (filtration);
- Sea-water desalination / RO (Reverse Osmosis) plant, 50 m^3/hour;
- Post RO small –scale MSFD (Multi-Stage Flash Distillation) Fire Suppression system– water;
- Fire suppression - CO_2 gas storage Fire suppression – foam Instrument air compressors;

- Sewage treatment plant with water reclamation;
- Closed circuit air-cooling system (compressor-less);
- Miscellaneous treated and untreated water tanks:
    - Rain water storage tanks, total: 15,000 m^3
    - Demineralised water, total: 6,000 m^3
    - Fire water storage (raw untreated water): 500 m^3
    - Boiler water for demin polishing: 3 x 100 m^3
    - Reclaimed water tank: 1 x 500 m^3
    - Filtered sea-water buffer tank: 300 m^3
    - RO-treated water tanks: 2 x 1,200 m^3
- Other tanks
    - Concentrated sulphuric acid 98%: 1000 litres S/S
    - Dilute sulphuric acid: 1000 litres CS
    - Ethylene glycol: 50 m^3
    - Ammonia: 20 m^3
- Site security, fencing (*Figure 3.15*), surveillance and communications.

Figure 3.15 Illustration of the fencing that will be used ('Clear Vu', 3m high)

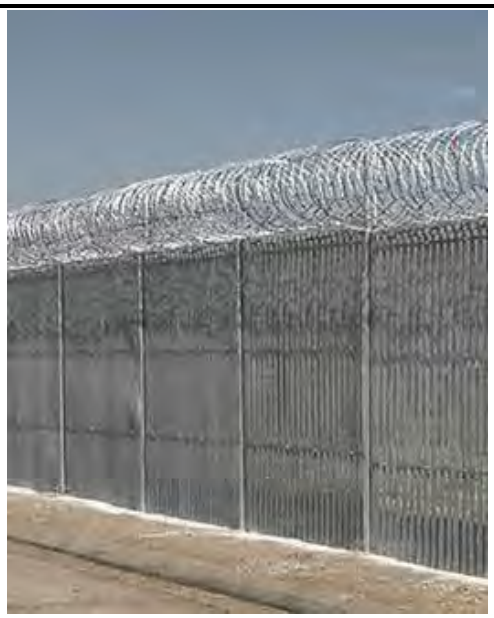


Table 3.9 List of buildings associated with the power plant

Building	**Dimensions**
Power generation buildings x 3	55m L x 30m W x 25m H
Main office and control Centre	footprint 2500 m2 , floor space 4,000 m2
Gate house x 2	Total area 156 m^2 at each gate Permanent staff Canteen, Kitchen Ablutions: 825 m^2
Workshop	1,500 m^2
Spares & warehouse	1,500 m^2
Chemical storage	200 m^2
Various SSB rooms (system and switch-boards)	(pending)

Building	Dimensions
Site electric vehicle charge center	(pending)
Training and visitor's center	300 m^2
Site first aid and medical clinic	120 m^2
132 KV switchyard control and instrumentation room	(pending)
400 KV switchyard control and instrumentation room	(pending)

Gate house

The gate house will be set back approximately 135 m from the edge of the road. The gate-house will be manned 24 hrs/day. The gate house, covering 50 m^2 on each side of the road, is fitted with a restroom, ablutions and a surveillance office. The gate house will be is fully equipped with video surveillance for a team of four persons per shift. A gate alarm at 30 m from the gate office will alert the gate staff of a vehicle approach.

Sewage Treatment

It is estimated that approximately 5.5 m^3 / day of sewage will be produced during the site preparation phase and 25 m^3 / day during the construction phase. During commissioning and operational phase it is estimated that 4 m^3 / day of sewage will be generated.

Hired 'portaloos' will be placed on site and used during the site preparation and construction phase. These will be collected and removed by a suitable contractor. Disposal and treatment will consist of partial dewatering and disposal of concentrated slurry to a company who will own and operate a proposed biogas facility in Saldanha.

It is anticipated that the project will utilise a compact, modular, factory-constructed sewerage treatment plant which will be approximately 0.12 ha in size. The treatment facility will operate automatically and will recover 85% of all the water that has been delivered with the sludge for treatment. The remaining fifteen percent of the incoming water remains with the almost dry, spent, inactive material. The powdered sludge from sewerage treatment and ablution and canteen washing areas would vary and would be delivered to a suitably licenced waste facility or provided to a biodigester. Typically the dried waste can be bagged and reaching a sizable load (3.5 ton) disposed at for e.g. Vissershok.

The permanent, stand-alone, packaged sewage-treatment plant on-site facility will incorporate the following factory-built process units housed in a bespoke building:

- Sewage holding tank/s
- Lamella plate separators
- Submerged aerated filters (SAFs)
- Robust Aerobic digestion System (RADs)

- Final polishing water recovery for re-use

Please refer to *Figure 3.19* for a schematic flow diagram showing the hybrid desalination and sewage treatment with water reclamation solution proposed.

For the operational phase a prefabricated ablution facilities will be erected on site for the main office/admin and workshops/warehouse building. This will be a closed circuit and sewage will be pumped to an on-site treatment plant designed to meet standards for biological oxygen demand (BOD), suspended solids and ammonia. It will be sized for the equivalent of 400 persons.

Water facilities

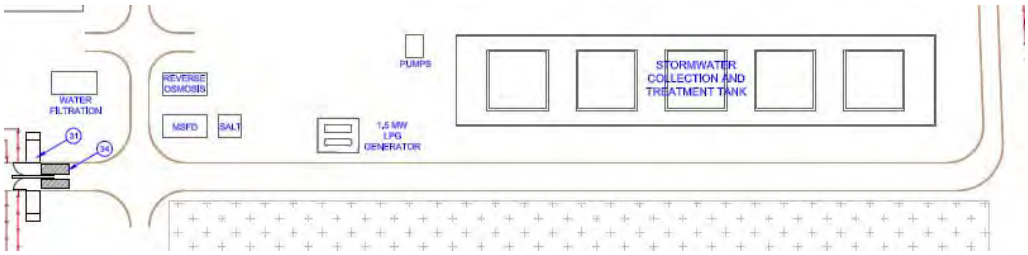
Water facilities will have a common source and consists of several discrete water systems. Two areas on the power plant site have been allocated to water treatment. The first area (*Figure 3.16*) is primarily for storage and treatment of raw rain water and is adjacent to the gas receiving station at the south end of the site.

This area receives:

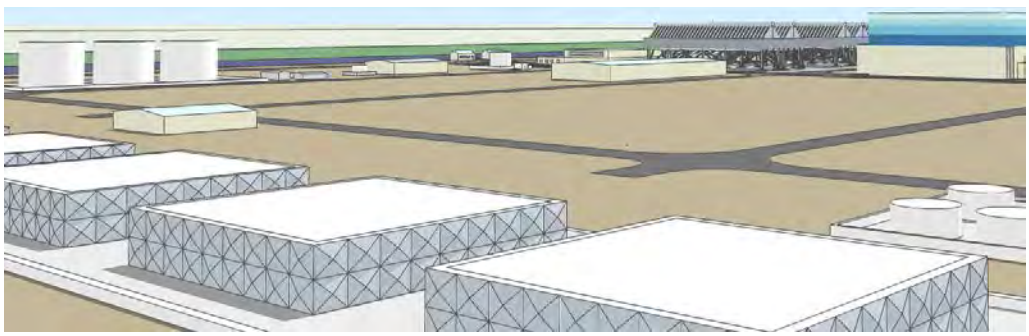
- Surface rain water which is stored in a series of five 2 000 m^3 interconnected water tanks;
- Fresh water (not necessarily municipal) brought onto site by road tanker;
- Sea-water to be used in the zero liquid discharge (ZLD) desalination or other process; and
- Reclaimed water from the site sewage plant.

Figure 3.16 Water storage tank layout (A) and 3D rendering (B)

A



B



Storm water will be the main source of rain water to be stored in the interconnected water tanks. The site has a natural north to south gradient of approximately 1%. The site will be slightly graded to form a symmetrical V-shaped slope. *Figure 3.17* illustrates the drainage pattern of an imaginary sheet of water draining down the ungraded slope of the site.

Internal roads will be contoured to channel precipitation towards storm-water drainage points along the road curb. Storm water will flow into a single enclosed duct which will dump the water into a grit- pit. From the grit-pit dual submersible pumps (actuated by level controllers) will pump the water through coarse filters into the five interconnected steel water tanks situated at the most southern boundary of the property.

The pumps and drain ducts will be sized to cope with the maximum anticipated flow of rain water.

A stone-filled emergency soak-away channel will be constructed along the southern-most boundary to channel excess storm water (in case of an unusual rainfall event) away from the site. The soak-away channel will dissipate the energy of the water to prevent soil erosion.

Figure 3.17 Surface Water Drainage

The second area is for final water treatment, demineralisation and storage of water for fire abatement. After being processed by reverse osmosis (RO), purified water is pumped to zone two (top left in *Figure 3.18*).

- In this area, water from RO is deionised, chemically treated and stored for boiler feed water condensed steam is deionised, re-treated, stored and reused as boiler feed;
- Deionised water is stored for the lube-oil cooling circuit;
- Deionised water is distributed to day tanks close to the boilers and generation plant;

- Water from the RO plant is stored as emergency fire water in the event of a fire outbreak; and
- Raw water can be pumped back along the sea-water pipeline to assist in extinguishing a veld-fire that has been initiated by a gas leak or pipe rupture.

The reverse osmosis plant will be a hybrid plant occupying an area of about 600 m^2, without tanks, and it will have a capacity of approximately 50 m^3/hour. The plant will use sea water that will be pumped from the coast (the pipeline will be installed in the same servitude as the gas pipeline). The reverse osmosis process will be a zero discharge process. The process will use a combination of multistage flash distillation and thermal crystallisation using intermittent waste heat from the gas turbine combined cycle heat recovery boilers (HRSGs). Dry salts resulting from the process will be disposed by a registered waste handling and disposal contractor, or alternatively, being derived from sea water, the salts may be utilised by a company already in the sea salt recovery sector. A schematic diagram of the plant can be seen in *Figure 3.18*. Purified water from the reverse osmosis plant will be pumped to water storage tanks. A description of the process is provided in Chapter 3.3.1 under *Water Facilities*.

Please refer to *Figure 3.19* for a schematic flow diagram showing the hybrid desalination and sewage treatment with water reclamation solution proposed.

Figure 3.18 Water treatment plant layout, zone 2

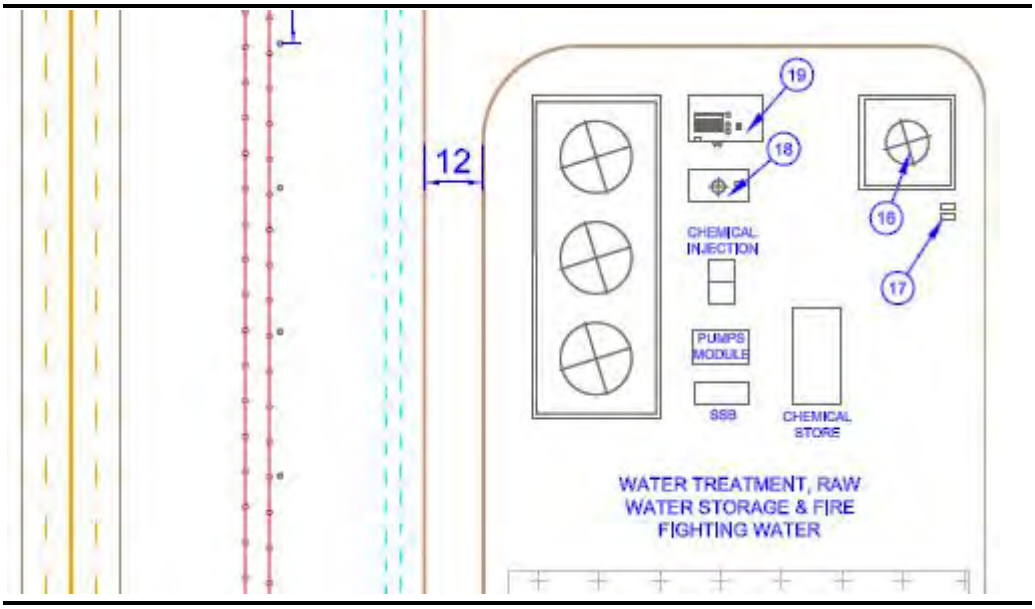
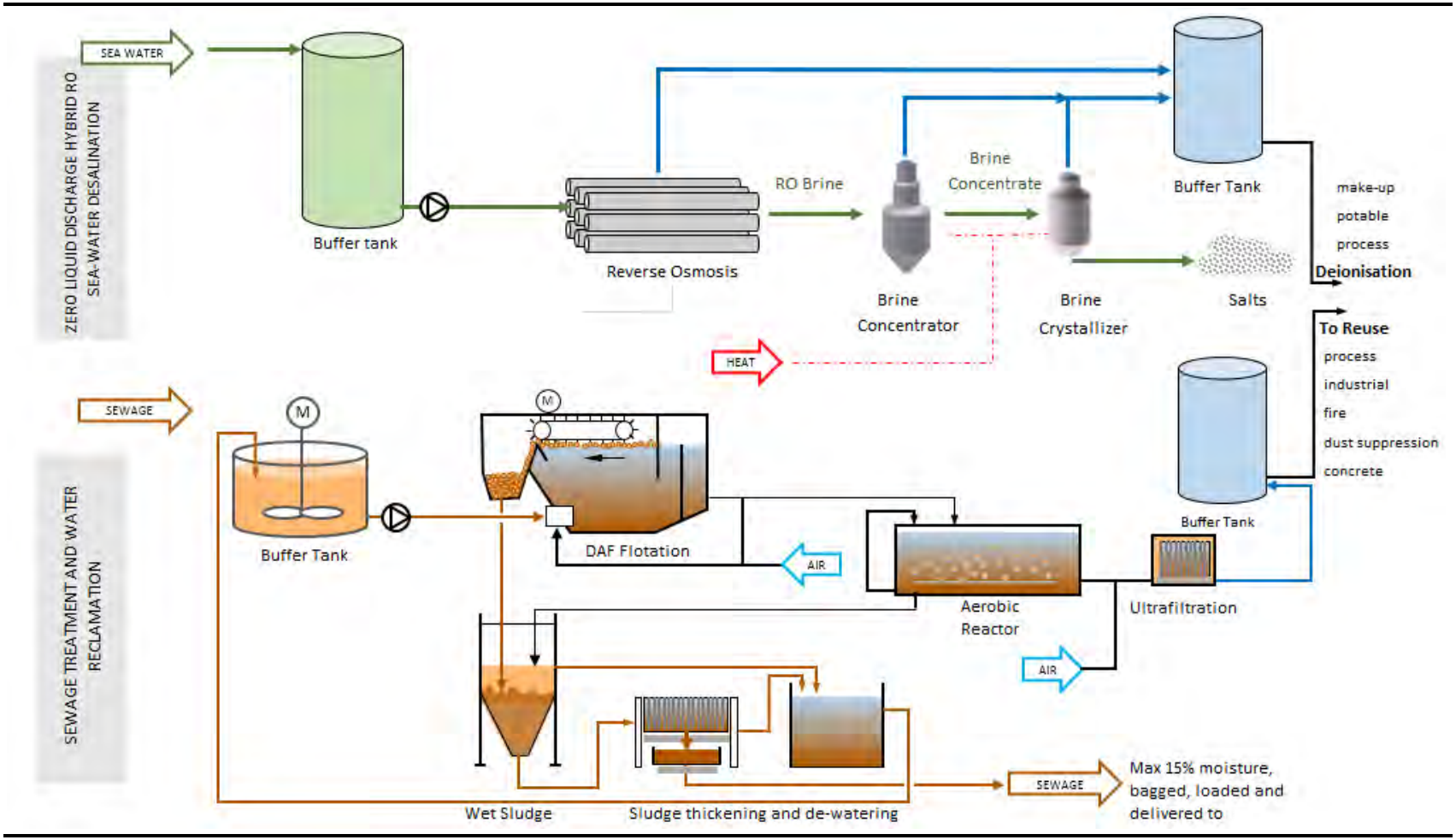


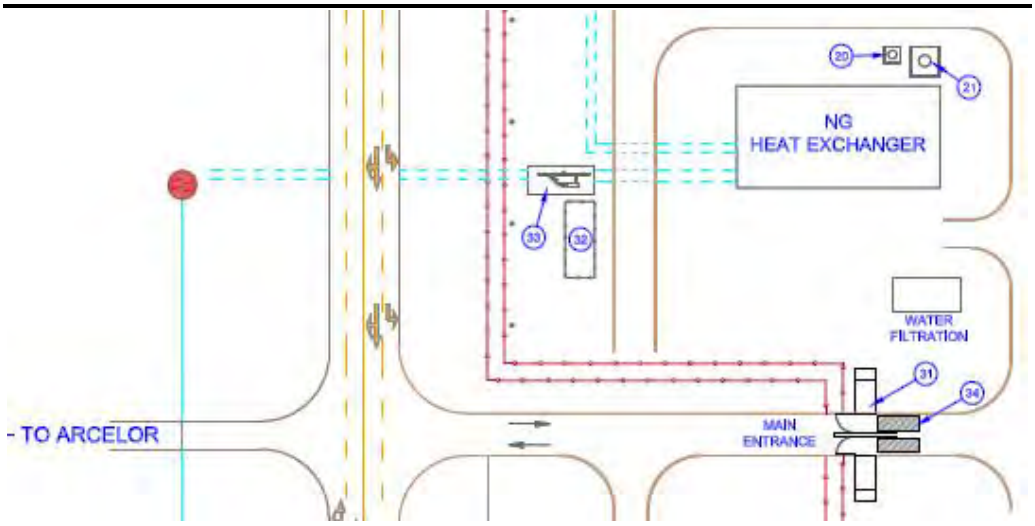
Figure 3.19 Hybrid desalination and sewage treatment with water reclamation



Natural Gas

This EIA is for the CCGT gas-fired power plant and gas pipeline only and does not include the import of gas and therefore a marine component (1). The project operating company will take possession of the natural gas at the point where it comes on shore and enters the on-shore gas pipeline to the plant site. Natural gas will be piped to the power plant through a twin, 250 mm Ø nominal gas pipeline at entry gas pipeline-pressure of 90 barg and at a maximum rate of 60 kgs / sec and a temperature of -20°C. The gas flow will follow the power demand load.

Figure 3.20 Gas pipeline entry to the power plant site



The red dot in the *Figure 3.20* indicates where the gas pipeline is diverted towards the plant site boundary. At a pressure ranging between 45 barg and 60 barg the gas traverses under the newly widened access road, passing under the double security fence and surfacing aboveground as it proceeds to the gas receiving area above the main entrance gate.

At about -20 °C, the gas is heated to near ambient by cooling a 30 % glycol solution to -15 °C before being piped to the gas turbines for combustion.

(1) It is anticipated that potential impact on the marine environment will be considered as part of the Department of Energy gas to power project. The Department of Energy (DoE) has developed a 20-year energy plan for South Africa, the Integrated Resources Plan 2010-2030 (IRP 2010), which encourages the participation of independent power producers (IPPs) in electricity generation in South Africa. The Independent Power Producers (IPP) Office was established by the DoE, the National Treasury and the Development Bank of Southern Africa (DBSA) to facilitate the involvement of IPPs in the generation of electricity. It is currently intended that 3126 MW of new generation capacity will be generated from natural gas. For the Gas IPP Procurement Programme, the DoE through the IPP Office has, in collaboration with Transnet, developed an approach to facilitate the import of LNG to allow for the development of medium- to long-term gas power plants outside of the port boundaries. This EIA therefore forms a separate application by a private company for gas power plants and related infrastructure near the Port.

Propane

As discussed above, three 1.5 MW gensets are proposed. These will be situated near the workshops in the north of the site, near the air condensers in the middle of the site and near the water storage facility near the south of the site. LPG (Propane) will be trucked on to site by road tanker and stored in three tanks cumulatively not exceeding 30 m^3 in volume.

3.3.2 Pipeline

General

The pipeline transport system from the point of arrival on-shore to the power plant site will consist of the following:

- A gas and sea-water forwarding station at the start of the land-based pipeline system;
- A dual, parallel gas pipeline for security of gas supply;
- A 120mm diameter seawater pipeline to provide the power plant with sea water for desalination (rated maximum flow rate will be 14 litres per second);
- A power cable to provide motive power for a projected air compressor and actuated isolation valves and instrumentation along the pipeline route; and
- A gas and seawater receiving station at the power plant.

The LNG pipeline (regasified gas) and sea-water supply servitude will run from the pipeline entry point connecting to the power plant boundary. The gas pipeline will be buried to a depth of 3 to 4 m, cover a servitude width of approximately 15 – 20 m and be approximately 4600 m in length.

The gas and sea-water supply pipelines commence from the routing point #1, where the regasified LNG arrives on shore and enters the land-based servitude section of the supply line to the 1507 MW power plant. (1)

The pipeline will run along the indicated servitude approximately 4600 m to the gas receiving station within the power plant boundary. Over the 4600 m the pipeline will not intersect with any water courses.

The gas-carrying capacity of the pipeline for the envisaged 1507 MW power plant will be designed for 75,100 Nm^3 /hr or approximately 65 Kg/sec of regasified LNG (regasification of LNG will take place offshore). The management and operation of the gas pipeline will be in accordance with ASME B31.BS code of practice. The proposed pipeline system will be buried

(1) It should be noted that the gas pipeline through Transnets land has been excluded from this EIA based on the DoE EIA extending to the Transnet boundary. This portion of pipeline will be permitting in the

underground with the pipeline servitude extending 6m on either side of the pipeline trench.

Where the pipeline passes through sensitive areas the temporary RoW will be kept to between 20-2 5m in order to minimise impacts.

Table 3.10 Co-ordinates of the proposed pipeline

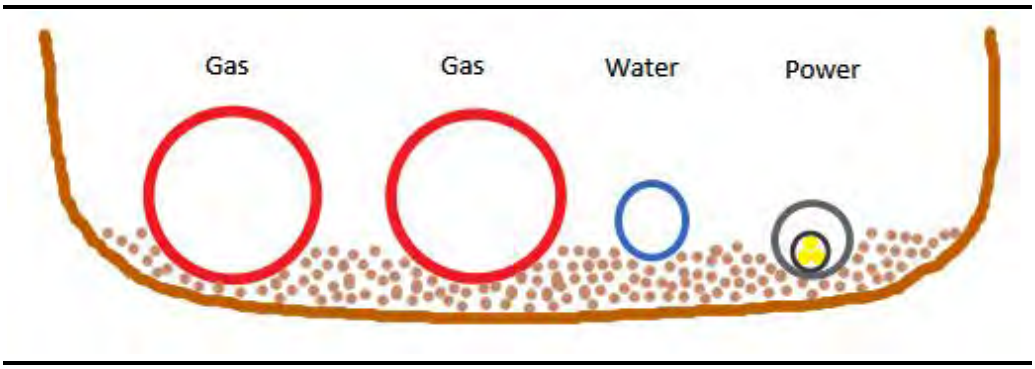
Point Number	South	East
#1	33° 0.075'S	18° 0.932'E
#2	33° 0.378'S	18° 1.457'E
#3	33° 0.379'S	18° 1.687'E
#4	33° 0.079'S	18° 1.687'E
#5	32° 59.912'S	18° 2.059'E
#6	32° 59.264'S	18° 2.325'E
#7	32° 59.278'S	18° 2.382'E

Pipeline arrangement concept

The pipeline arrangement (*Figure 3.21*) will consist of the following elements:

- Two steel gas pipelines with a clearance of 0.3m (as per EN 1594:2000);
- One steel water pipeline; and
- One electrical conduit (plastic compound).

Figure 3.21 Illustration of the pipeline arrangement concept



Design parameters

The main design parameters for the pipeline are listed in *Table 3.11* below.

Table 3.11 Gas pipeline main design parameters

Design Parameter	Specification
General safety rules	49CFR parts 191, 192, 193 and
General design code	ASME B31.8

Design Parameter	Specification
Pipeline material	API 5L, ISO 3183, ISO 1208, (sch. 40) or EN equivalent
Pipeline nom. Diameter, D	2 x 300 mm
Wall-thickness	10.31 mm
Operating design press.	90 bar
Pipe max. allowable stress	78,540 bar
No. of bends	5
Minimum pipe bend radius	6 x D (centreline)
No. of under-road crossings	4
Placement	Under-ground
Buried Depth	≥ 1.0 m (to be decided at detailed design stage)
Inner pipe coating	yes, to increase smoothness
External pipe coating	Yes, with fusion bonded epoxy, to prevent corrosion
No. of shut-off valves	min. 4, full bore
Overall location class	1
In-line inspection	According to NACE 35100 and RP0102-2002
Pipeline design working pressure	90 barg
Pipeline Design formula	CFR 192.105, ISO 13623:2000, EN 1594:2000
Pig launcher	1 off, design code ASME B31.8
Pig receiver	1 off, with drain lines, design code ASME B32.8
Gas/Liquid separator	1 off, design pressure 100 barg, ASME Class 600.
Pig Tracking equipment	YES, AGM type.
Width of pipeline servitude	30 m – 36 m
Cathodic protection	yes

Pipeline intersection with roads

There are four (4) road crossings, all of which will pass under the road through means of reinforced concrete road culvert. The co-ordinates of the road crossings are listed in *Table 3.12* and each of the road crossings are illustrated in *Figure 3.24.*

Table 3.12 Co-ordinates of where the pipeline intersects with roads

Road Crossings	South	East
Crossing 1	33° 00.375'S	18° 01.460'E
Crossing 2	32° 59.964'S	18° 01.947'E
Crossing 3	32° 59.300'S	18° 02.307'E
Crossing 4	32° 59.271'S	18° 02.344'E

At under-road crossings the gas pipelines will be encased in a second pipeline with maximum allowable stress at least equal to the gas pipeline itself.

Valves and pigging

A 'pig (1) launcher' and 'pig receiver' will be situated at each end of the pipeline as well as ATEX-rated remotely operable isolation valves ('plugs'). Location of the 'plugs' will be decided by the pipeline designer/contractor.

(1) Pigging in the context of pipelines refers to the practice of using devices known as "pigs" to perform various maintenance operations. This is done without stopping the flow of the product in the pipeline. These operations include but are not limited to cleaning and inspecting the pipeline.

Gas pipeline bends will be manufactured with a radius to the pipeline centreline of 6 x pipeline diameter (D) in order to facilitate 'pigging' and hence pipeline maintenance.

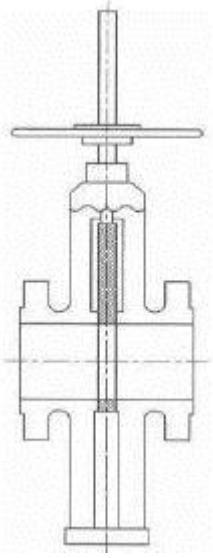
Isolation valves for the gas pipelines will be carefully selected from a range of appropriate through-conduit gate valves, wedge gate or parallel slide valves in order to accommodate and not obstruct the passage of the 'pig'. Check vales, if required in the gas pipeline, require that the flow area within the valve body be larger than the pipe inside diameter. The valves will be remotely actuated. Applicable standards are API, ASTM, ANSI/ASME, and in particular, for design and hazard analysis, API RP14J and API RP14C.

The gas pipeline being only 4600 m in length will have isolation valves positioned at the start of each pipeline, in the middle and at the receiving end (these are in addition to the isolation valves at the pigging stations). The valves will be automatically actuated as programmed by the pipeline designer/EPC contractor.

Valves and non-return valves for the sea-water pipeline will be manufactured from specialist alloys and will also be through-conduit. Valves for sea-water application will be in accordance with API, ANSI/ASME or ISO specifications. The sea-water pipeline will also be designed for 'pig' functionality.

On gas transmission pipelines, the pig design and all valves will be selected by the pipeline EPC contractor from main-stream renowned manufacturers in accordance with pipeline flow conditions, pressure, and velocity and pig functionality (*Figure 3.22*). There being two gas pipelines there will be two sets of pig launchers and pig receivers.

Figure 3.22 Example of a shut off valve



Pressure testing and water use

There are two testing procedures available in order to test how well the pipeline holds pressure. These are either hydraulic or pneumatic (ASME Section B31.1). From a technical perspective the hydraulic method is preferred because it has a lower level of potential energy than the pneumatic method thus it is safer. However, hydraulic testing will require 2,100 m^3 of fresh water per pipeline. However, after use, this can be pumped to the power plant water reservoir through the sea-water pipeline.

The pneumatic test, while not requiring water, requires multiple compressors to pressurise the pipeline and a high power feed or considerable diesel fuel for the compressors. The method of pipeline pressure testing will be decided upon by the EPC contractors based upon an analysis of the pros and cons of each method.

Cathodic protection and corrosion monitoring

Cathodic Protection (CP) is a technique used to control the corrosion of a metal pipeline by making it the cathode of an electrochemical cell. A simple method of protection connects the metal to be protected to a more easily corroded "sacrificial metal" to act as the anode.

CP requires the highest priority and most appropriate protection system for gas pipelines. The guidelines for this protection are provided by NACE International, the worldwide Corrosion Authority and will be implemented by the pipeline EPC contractor who will be guided by specialised consultancies.

Along a pipeline the corrosion protection system will be monitored after the selected corrosion system has been installed in order to obtain early warning of corrosion issues and maintain pipeline integrity. Therefore, an online, real-time corrosion monitoring system will be installed. The online, real time corrosion monitoring data sensors and measurement devices will be installed at strategic points along the pipeline. These strategic points are in turn identified by ICDA (Internal Corrosion Direct Assessment) methods.

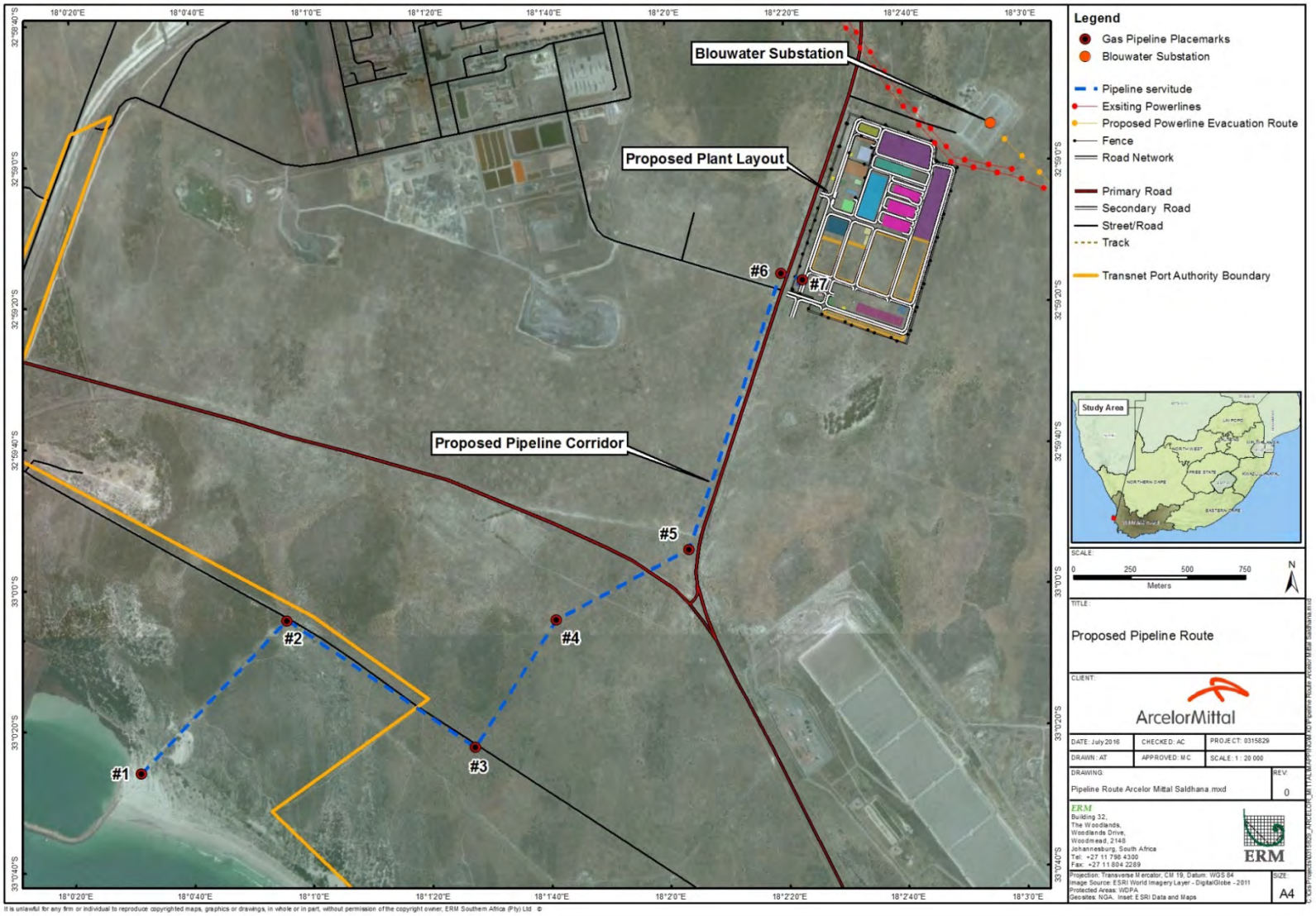
Because the natural gas that will be utilised by the power plant derives from regasification of LNG, water content in the gas is zero (regasified LNG does not contain any moisture). This is also evidenced by the analysis of the LNG that will be supplied under contract to the project (*Table 3.13*). Therefore the effects of corrosion on the inside of the pipe due to the presence of water in the gas stream can effectively be discounted. In addition, the Inner pipeline surface will be coated with a protective epoxy layer.

Table 3.13 Analysis of contracted gas supply

Component	Mole %

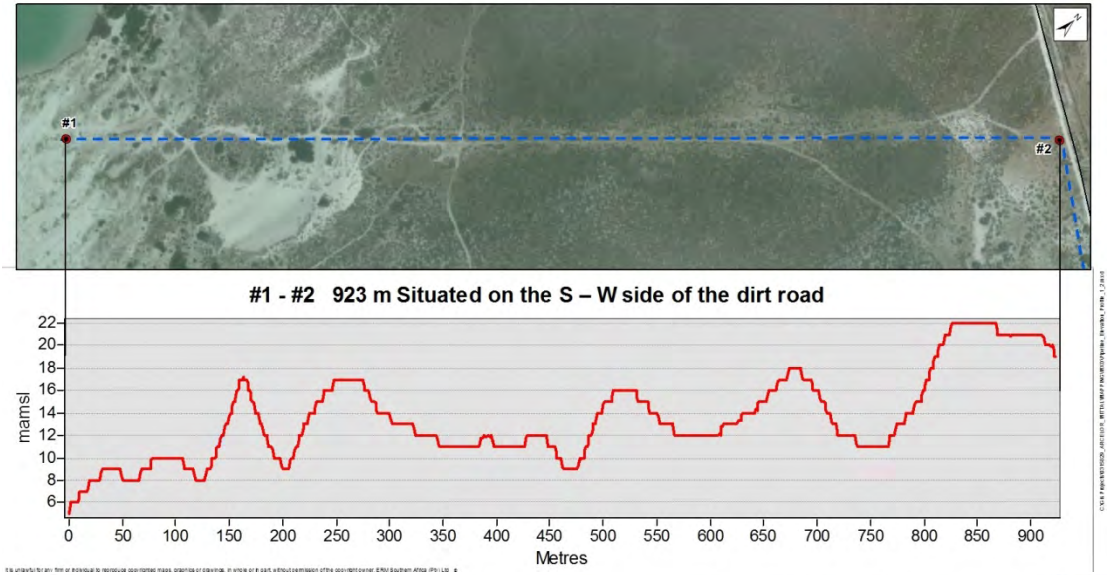
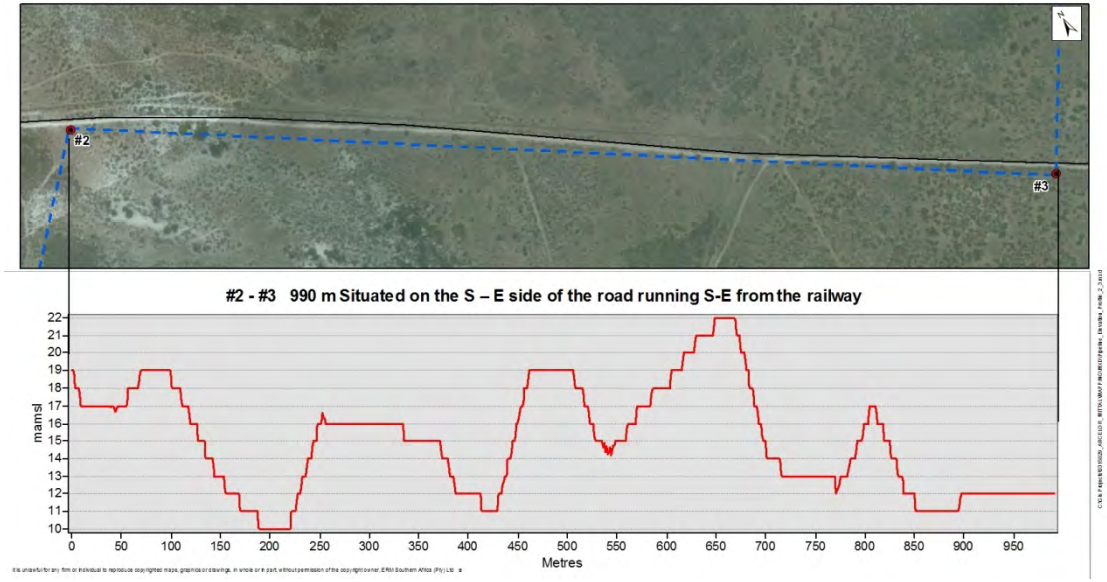
Component	Mole %			
	Original Dry		Normalised	
	Compn.	+ / -	Dry	Wet
Methane	96.109		96.109	95.53
Ethane	1.807		1.807	1.796
Propane	0.164		0.164	0.163
iso-Butane	0.028		0.028	0.028
n-Butane	0.028		0.028	0.028
iso-Pentane	0.011		0.011	0.011
n-Pentane	0.007		0.007	0.007
n-Hexane	0.008		0.008	0.008
n-Heptane	0.013		0.013	0.013
Nitrogen	0.357		0.357	0.355
Carbon Dioxide	1.468		1.468	1.459
Water				0.603

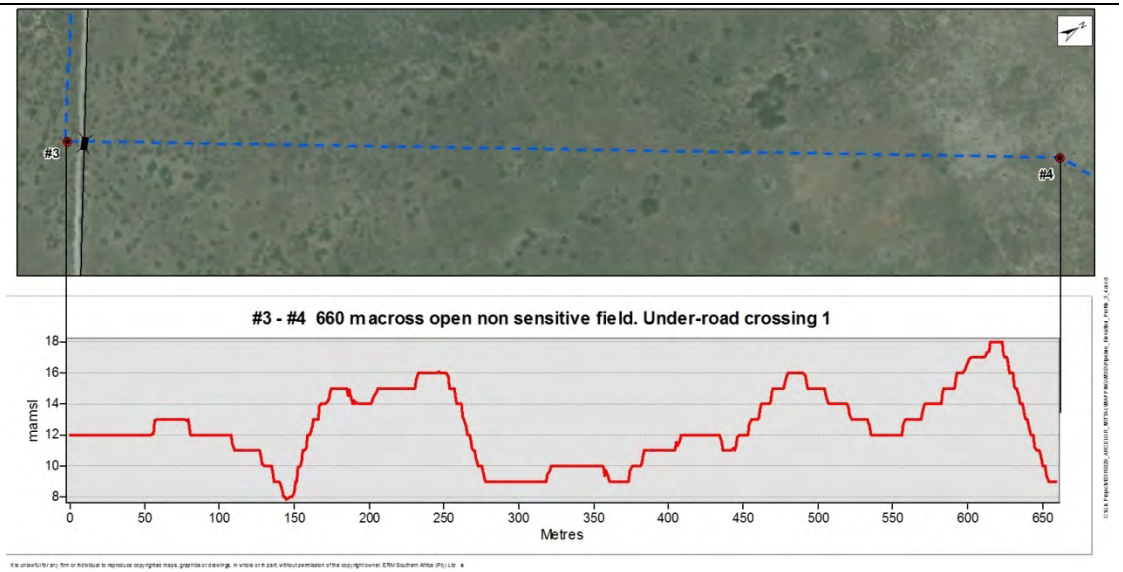
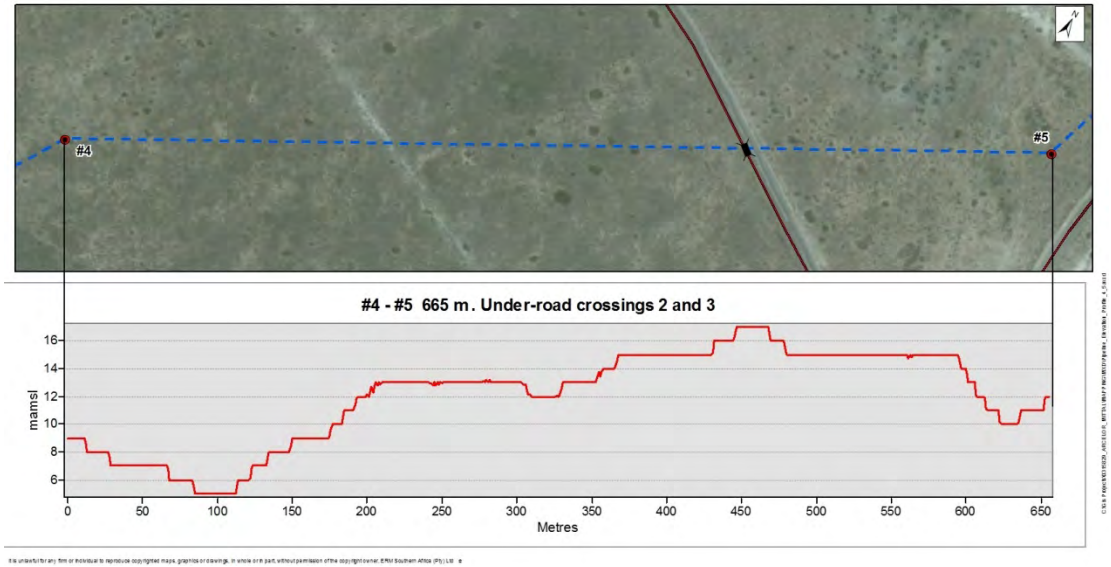
Figure 3.23 Pipeline Route



Note: The pipeline route depicted through Transnets land is for the seawater abstraction pipeline only as it has been indicated by the DoE that the LNG pipeline will be permitted along with the LNG Import Terminal.

Table 3.14 Servitude sections and elevation profiles

Servitude Section Description	Servitude Section Illustration
#1 - #2: 923 m Situated on the S – W side of the dirt road. Pig-Launching station is located at point #1 *Note: that the LNG pipeline through Transnet land will be permitted separately. AMSS will liaise with Transnet to ensure that a coordinated approach will be followed.*	
#2 - #3: 990 m Situated on the S – E side of the road running S-E	

Servitude Section Description	Servitude Section Illustration
#3 - #4: 660 m across open non sensitive field. Under-road crossing 1	
#4 - #5: 665 m Under-road crossings 2 and 3.	

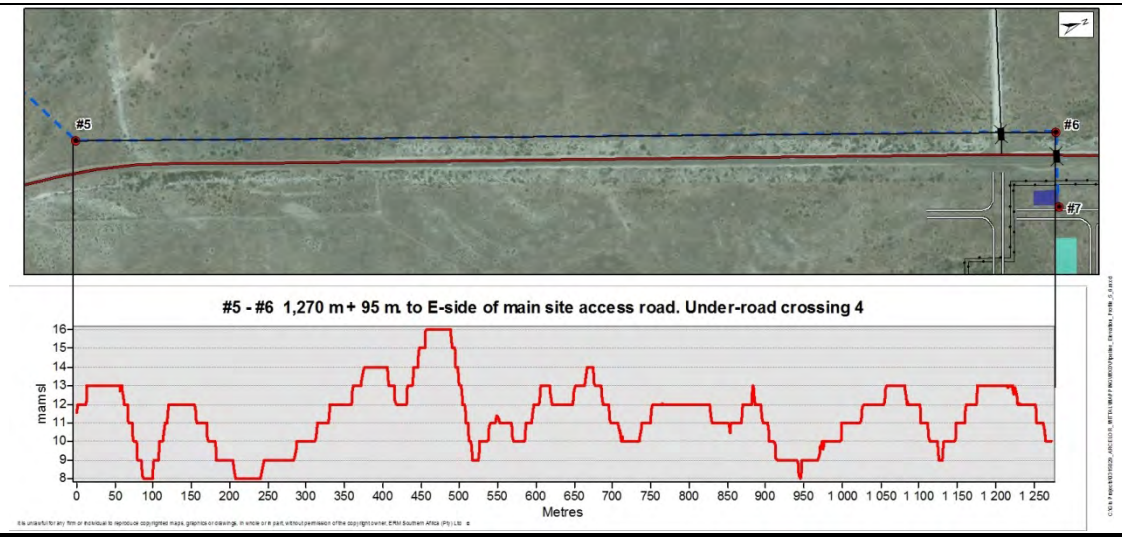
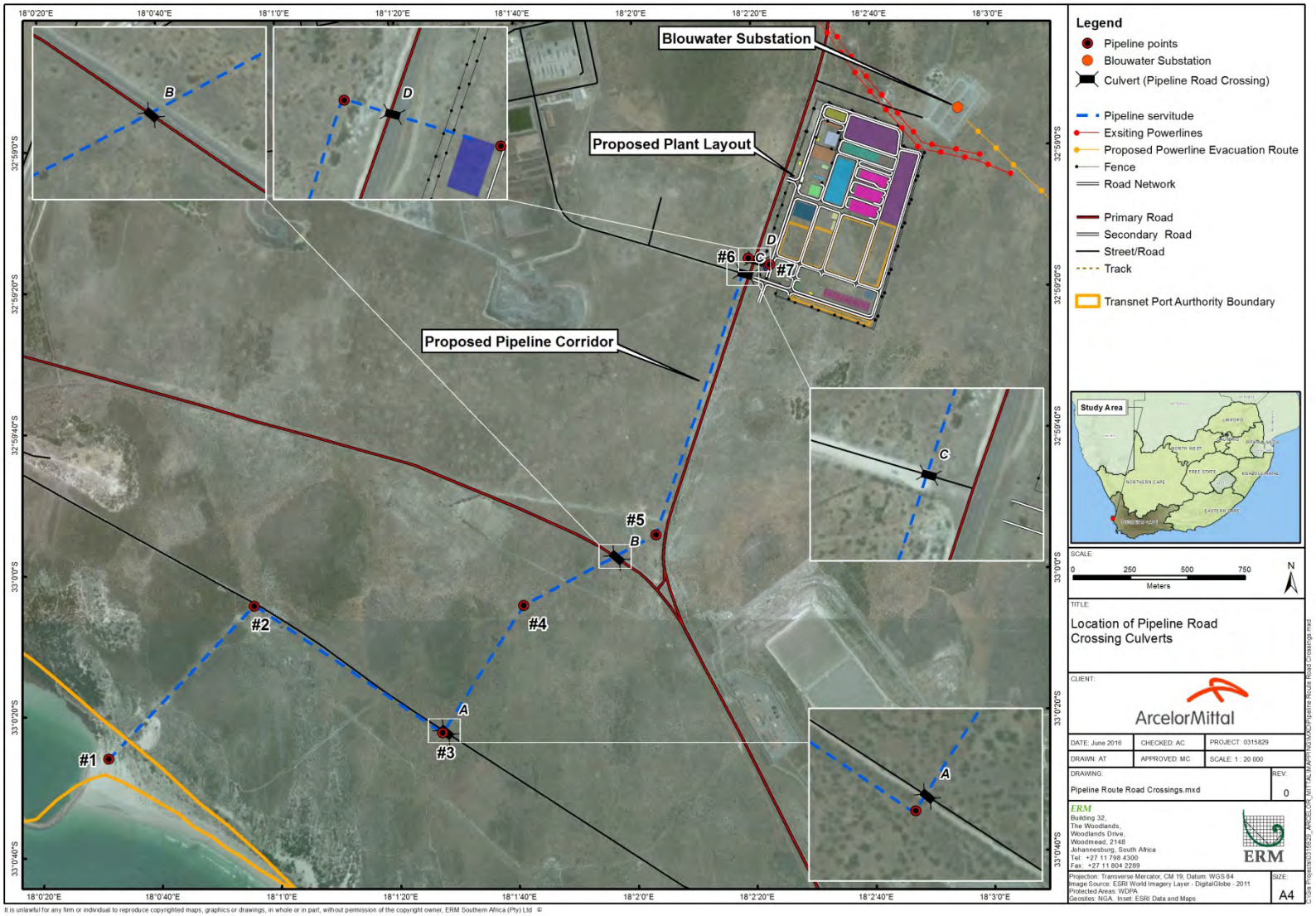
Servitude Section Description	Servitude Section Illustration
#5 - #6: 1,270 m + 95 m. to E-side of main site access road. Under-road crossing 4 Pig-receiving station is located at point #1	

Figure 3.24 Location of the pipeline road crossings



3.3.3 Power Evacuation and Connection to the Grid

132 kV Feeder line to ArcelorMittal Steel Works

The feeder power line for the initial 160 MW base load (peaking to 250 MW) from the power plant to the ArcelorMittal Steel Works will be the first priority. This 132 kV feeder line will be sized for a capacity of 400 MW. The proposed routing of the transmission line is illustrated in *Figure 3.25*, and the coordinates of the vertices for this transmission line are presented in *Table 3.15*.

The proposed Project plans on utilising the existing 132 KV lines; towers and conductors. The 132 kV plant substation would join directly on to these existing lines. It is noted that there are currently no observed bird deterrent measures on the existing lines. This may need to be introduced; however this would need to be determined between IPCSA and Eskom.

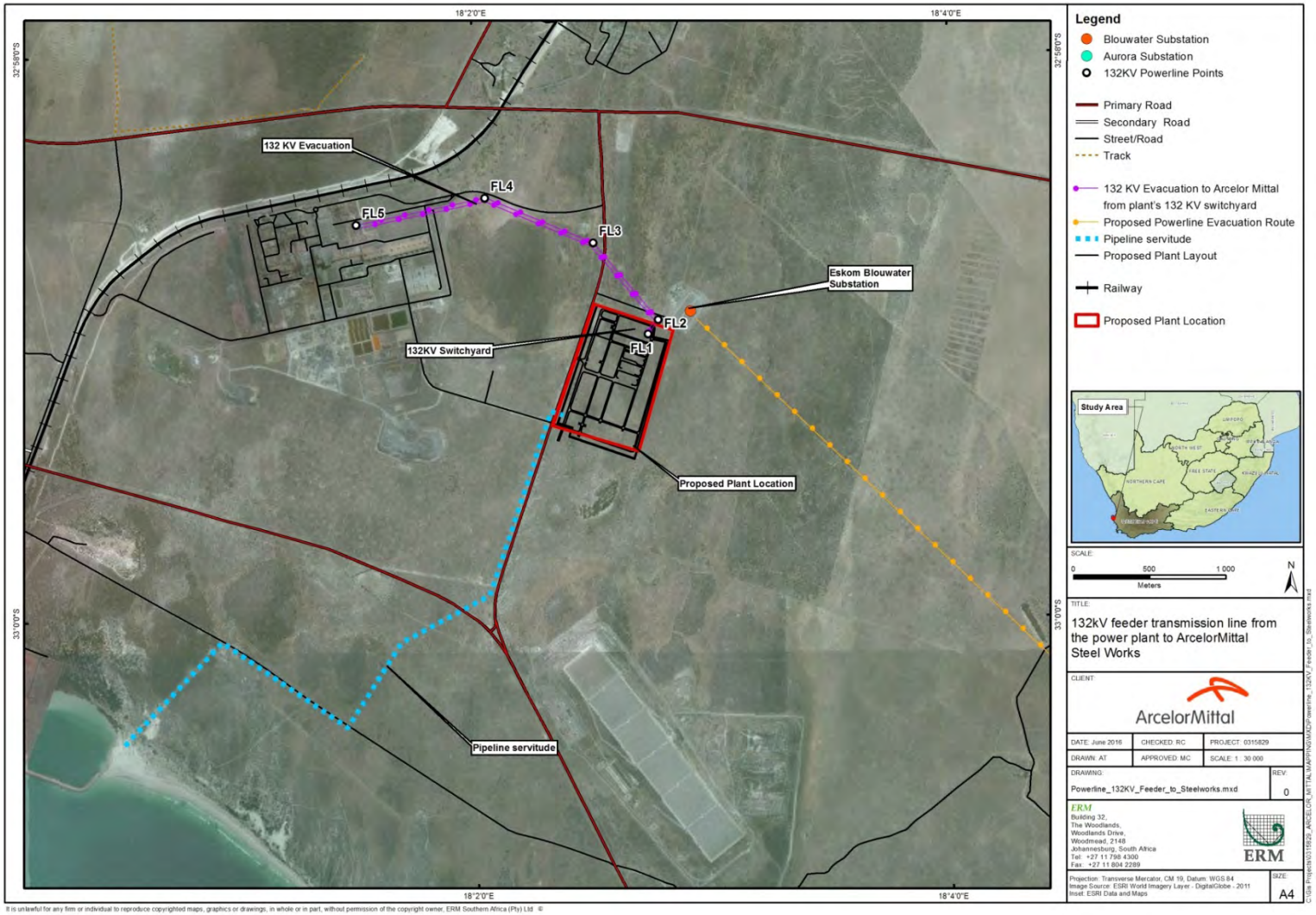
Table 3.15 Coordinates of the vertices for the proposed transmission line from the power plant to the ArcelorMittal Steel Plant

Point	Longitude	Latitude
FL1	18° 2.736' E	32° 58.992' S
FL2	18° 2.780' E	32° 58.943' S
FL3	18° 2.508' E	32° 58.667' S
FL4	18° 2.054' E	32° 58.506' S
FL5	18° 1.512' E	32° 58.598' S

400 kV Transmission line to Aurora Substation

The additional 1103MW (1400MVA) of power generated at the plant will be evacuated through the construction of a new 22 km High Voltage (HV) 400 kilo Volt (kV) line from the power plants own switch yard to the existing Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude. This transmission line in not considered as part of this EIA process and will be considered in a separate EIA process in coordination with Eskom.

Figure 3.25 132kV feeder transmission line from the power plant to ArcelorMittal Steel Works



3.4 PROJECT PHASING AND SCHEDULE

The proposed project will be implemented in two phases. Phase 1 and 2 combined will produce approximately 1500 MW net out-put.

Phase 1 and 2 will consist of six Siemens Trent60 50 MW nominal (Installed Gross capacity) gas turbines in open cycle (labelled T1 through to T6) and three Siemens SCC5-4000F 435 MW (Installed Gross capacity) nominal combined cycle plants, labelled UNIT 1, UNIT 2 and UNIT 3 respectively, and will be erected on three self-contained power 'islands' each approximately 150 m long x 60m wide.

3.4.1 *Phase 1*

Phase 1 of the project will constitute the following components:

- Site entrance with truck staging areas, hard standing areas;
- Offices and control room;
- Warehouse areas and workshops;
- Installation of six open cycle Siemens Industrial Trent 60 gas turbines (T1, T2, T3, T4, T5 and T6), one of which will be a redundant unit to ensure uninterrupted supply;
- Associated step-up transformers for every generating unit;
- 132KV and 400 kV switchyard;
- Site drainage;
- Gas receiving, conditioning and forwarding;
- Waste-Water treatment and water reclamation plant; and
- Storm water collection reservoir (25,000 m^3) and water treatment plant.

Construction period: 15 -18 months
On-site labour: 90 - 200
Completion Phase 1: September 2019 commercial operation

3.4.2 *Phase 2*

Construction of Phase 2 of the project will include the following components:

- Installation of complete UNIT 1, UNIT 2 and UNIT 3 open cycle Siemens SCC5-4000F gas turbine (total approx. 1,305 MW nominal (Installed Gross capacity) combined cycle plants);

- Associated step-up transformers, and station switchyard.

Construction period: 18 - 20 months
On-site labour: 200 - 450
Completion Phase 2: Mid- 2020 - Early 2021

3.5 PROJECT IMPLEMENTATION

The project will be undertaken in a number of stages, commencing with development (i.e. the work undertaken directly by IPCSA up to bankable feasibility which will also include a Front End Engineering Design) with up to-20 full-time staff at most. All other collaborators will be contracted third-party engineers, accountants and draughtsmen as well as various OEM staff and legal advisors. Thereafter the site preparation activities will be undertaken, as described below.

3.5.1 Site Preparation

Site clearance activities include clearing the land of vegetation, fencing the project boundary and site levelling. Internal site roads will be constructed as the site levelling will require a number of heavy trucks to bring infill to the site and remove unnecessary material.

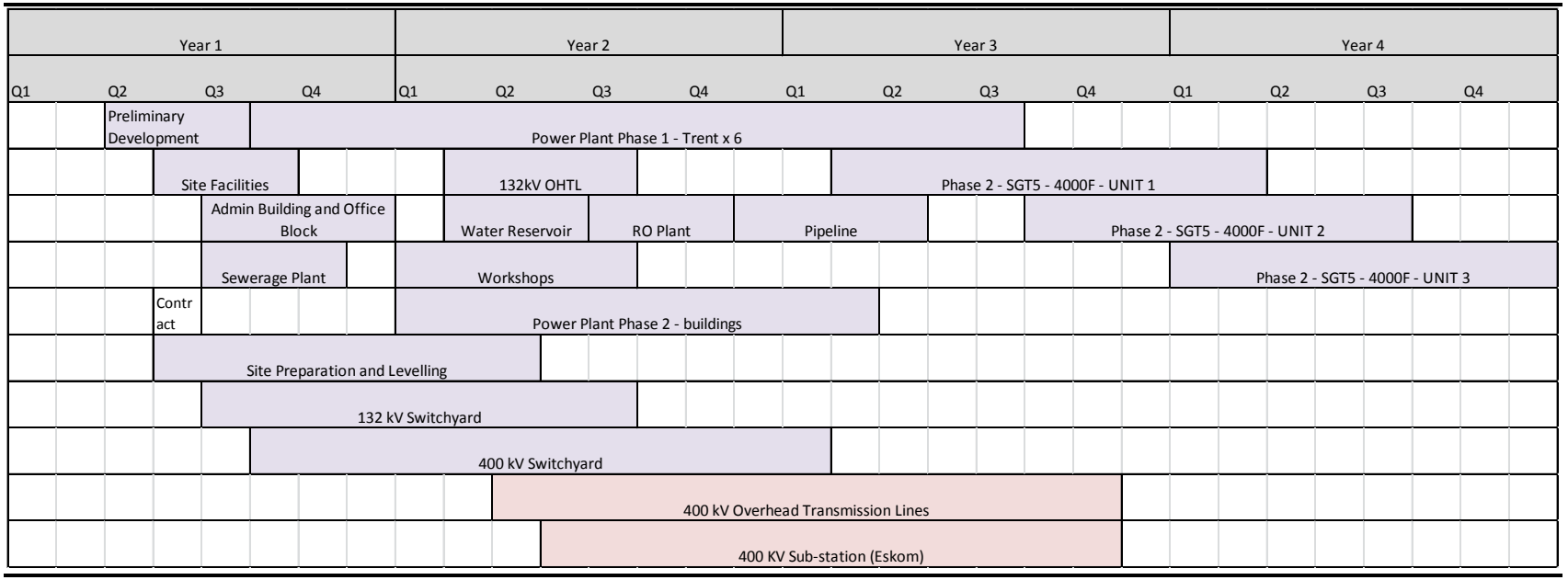
3.5.2 Construction Phase

Site roads constructed during the site preparation phase will be used to transport the heavy plant equipment required during the construction phase. In addition, earthworks will follow the site clearance earthworks and include the excavations necessary to achieve the works (e.g. for foundations) and the backfilling after completion of these works.

Construction schedule

The Project development will take approximately four years to complete. This is illustrated in *Figure 3.26* below.

Figure 3.26 High level Project development schedule



Water requirements

During the construction phase the main water requirement will be for the concrete batching plant. It is estimated that 30 000m^3 of water will be required for the concrete batching.

During the commissioning phase the following water will be required:

- 2,000 – 5,000 m^3 for blow-out of the steam piping (Testing/commissioning);
- 2,000 – 5,000 m^3 for blow out and chemical clean of the Benson boilers; and
- 23 000 m^3 (approximately) for pipeline cleaning and hydraulic pressure testing.

Initially water will be trucked in 30m^3 loads from local farms (ground and surface water sources) (1). It will be transferred to a temporary stainless-steel tank for immediate use in preparing concrete for a small lay-down area and foundations for the first permanent raw-water storage tanks.

Power plant

Foundations and Piling

Piling of the foundations (if required) for the first six Siemens Industrial Trent 60 gas turbines (T1 through to T6), the other gas turbines (Siemens SCC5-4000F, UNIT 1 to 3) and large main equipment items, will last for approximately 10 months until the foundations for the last item of equipment have been completed. Once the piles are in place, concrete slabs will be constructed and turbine pedestals constructed which will involve some large pours of concrete. At this stage the gas turbine main building will be constructed which will be the first visible building associated with the power plant. The Siemens Industrial Trent 60 gas turbines will not be enclosed in buildings.

Site hard standing

The construction phase will require substantial laydown hard-standing area for temporary placement of equipment and materials delivered to site. Several areas are demarcated as 'laydown areas' (*Figure 3.4*) but will used as such only during the construction phase. Laydown areas will be concreted to aid in rain-water harvesting.

After commissioning is completed, the hard-standing areas will be rehabilitated and available for any plant expansion which may be subject to additional EIA application.

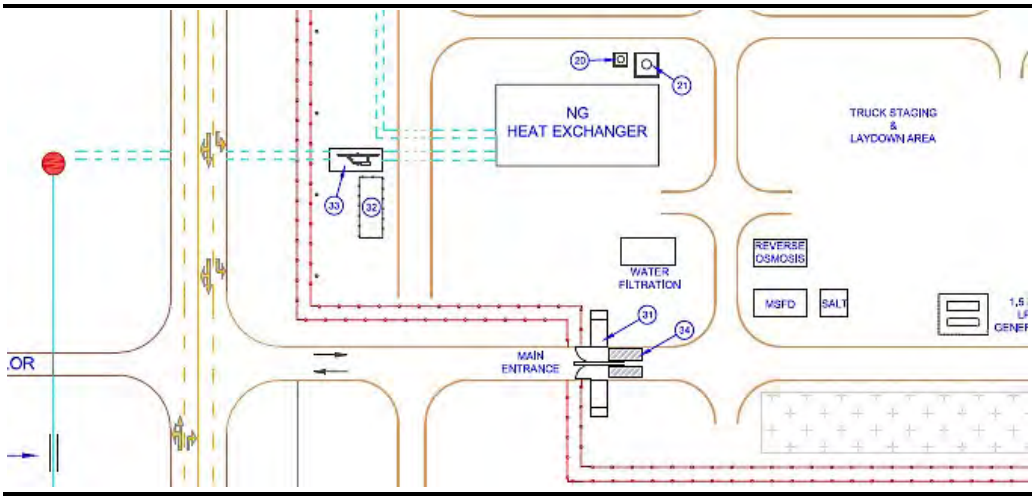
(1) Agreements with land owners are currently in the process of being developed.

Total hardstanding area is approximately 10.7 ha representing approximately 23.6 percent of the total site area. All hard-standing areas will drain into the rain-water collection system. Concreting over the hard-standing area will reduce dust especially during construction and will play a major role in rain water harvesting after the plant is in commercial operation.

Traffic

Approximately 35,000 tons of bulk cement and concrete aggregate, 800 tons re-bar steel, and 6,500 tons equipment and structural steel will need to be transported to the construction site.

Figure 3.27 Access during construction period

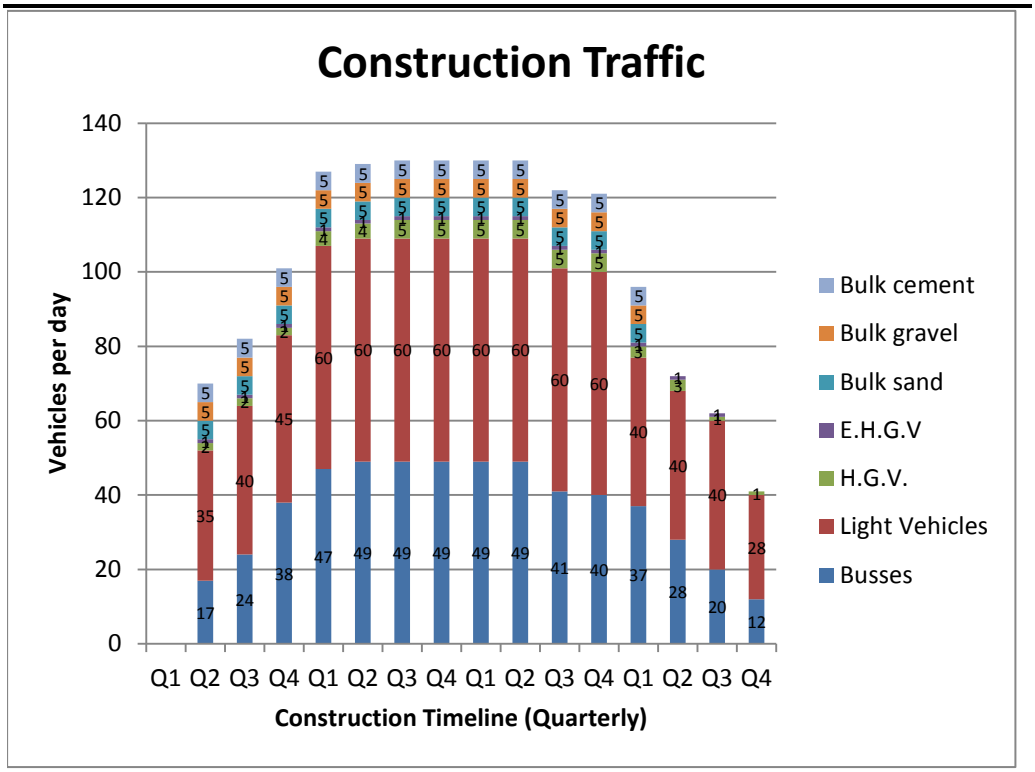


It is envisaged that construction staff, up to a maximum of 350 persons, would be bussed to site in 8-seater or 10- seater mini busses and pass through this gate; about 40 - 50 busses per day, twice a day. Light vehicle traffic due to construction will start at around 35 vehicles per day and increase rapidly to 60 per day where it will remain for the bulk of the construction period.

There will be an expected 5 vehicles per day of HGV's, bulk gravel, bulk sand, and bulk cement respectively for the duration of the construction phase right up to Q1 of year 4, after which it tails off rapidly.

The gas turbines and other heavy equipment will be delivered via truck. This will involve some abnormal loads being moved on the roads during this time.

Figure 3.28 Predicted traffic loads during the construction phase



Employment

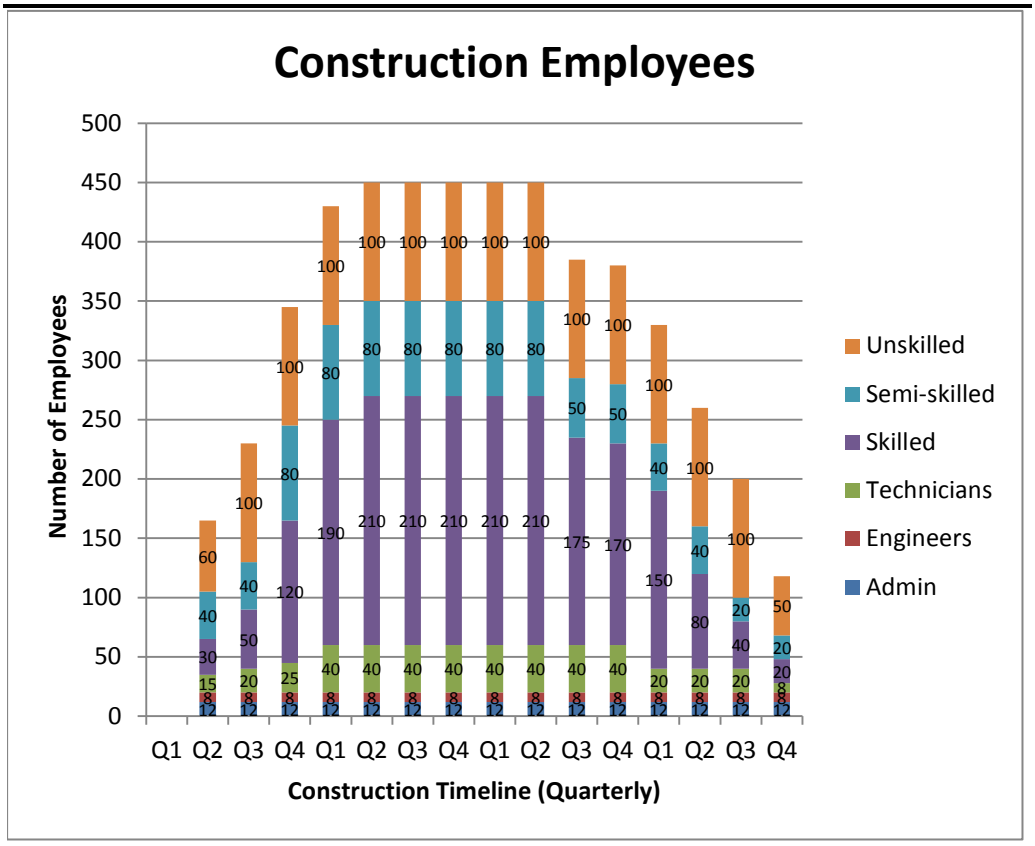
During peak construction activity, it is expected that up to approximately 450 workers will be directly employed (*Figure 3.29*). Most of this workforce will be employed by the engineering, procurement and construction (EPC) contractor and will consist in semi-skilled to skilled workforce.

The breakdown of skills required during the construction phase will be as follows:

- Skilled labour: 58 percent;
- Semi-skilled labour: 20 percent; and
- Unskilled labour: 22 percent.

It is understood that there will be no worker accommodation on site during construction. The unskilled workforce will, as far as possible be employed from the local community, reducing the need to the provision of accommodation. The skilled and semi-skilled workforce from outside the area will be housed within Saldanha Bay Local Municipality.

Figure 3.29 Employment requirements during the construction phase



Commissioning

After approximately 28 month's general site activity will decrease as the project moves into full commissioning where there will be a relatively small group of highly skilled engineers and technicians checking, testing, starting-up and finally commissioning the power plant.

Phase 1:

- The first Siemens Industrial Trent 60 gas turbine units (300 MW) will be commissioned within twelve to fourteen months from financial close.

Phase 2:

- The three Siemens SCC5-4000F units (UNIT 1, UNIT 2 and UNIT 3) will be commissioned twelve to fourteen months after Phase 1.

The current timeline estimates 48 months construction for Phase 1 and Phase 2 combined.

Pipeline Installation

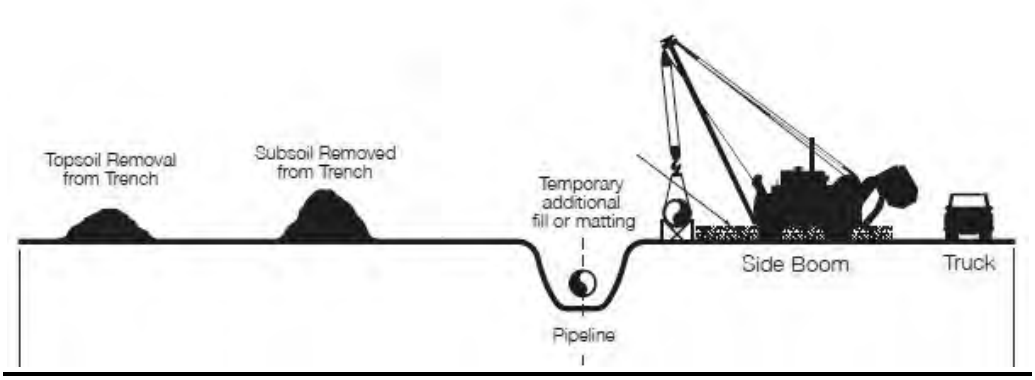
Pipelines will be installed underground, and this implies the opening of a working strip along the right of way of the pipeline. During construction, the excavated trench will be clearly indicated and access and passage through the

area will be restricted. The servitude is expected to 36 m in width (1) (including width of the pipe trench itself). *Figure 3.30* provides an overview of an indicative working strip for pipe laying.

The centreline of the trench need not coincide with the centreline of the servitude space requirement during construction, but may be situated closer to one side or the other of the servitude, depending on traffic and access, excavation programme and volume of topsoil and excavated soil. The pipeline trench is likely to have a width of 2 meters and a depth of between 1.5 m – 2 m (2). Generally speaking the deeper the trench, the more work space will be required.

The boundaries of the servitude route will be clearly marked, flagged, or posted, such that each mark will be clearly visible from each mark on either side of it along the route. Markings on each flag or post along the route will be consistent with best management practice and may emphasise specific location warnings or conditions. Traffic through active work areas along the route will be strictly controlled.

Figure 3.30 Indicative working strip



Source: ERM (2015) (drawing not to scale)

Table 3.16 provides a step by step description and illustration of the pipeline construction process. Prior to construction of the pipeline commencing surveying of the pipeline route will take place. Based on the information gathered during the surveying process which takes into account, amongst other things, environmental, developmental and local issues, a final route is developed.

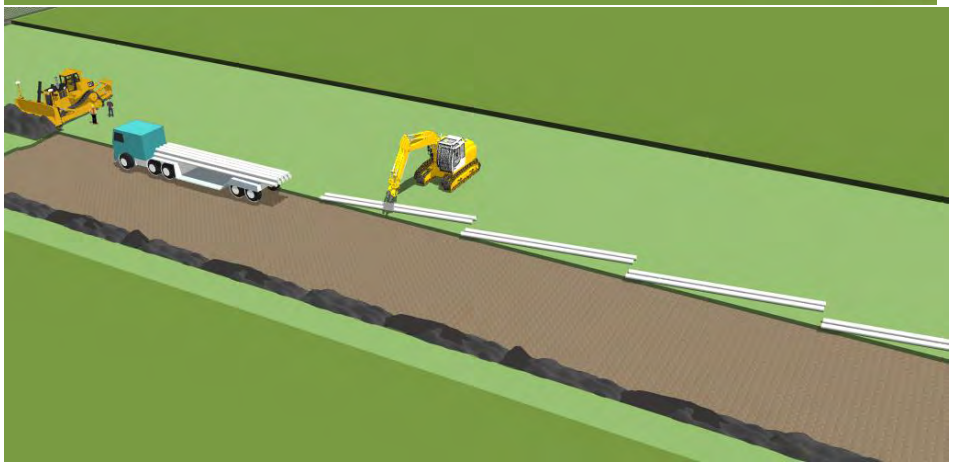
The EPC contractor will ultimately decide on the construction method to be used and is typically dependant on subsurface ground characteristics. Excavated sub-surface soil will be stored separately from the top-soil and large rocks, if any, may be removed and added later during the padding and back-fill stage. The slope and depth of the ditch will be in accordance with

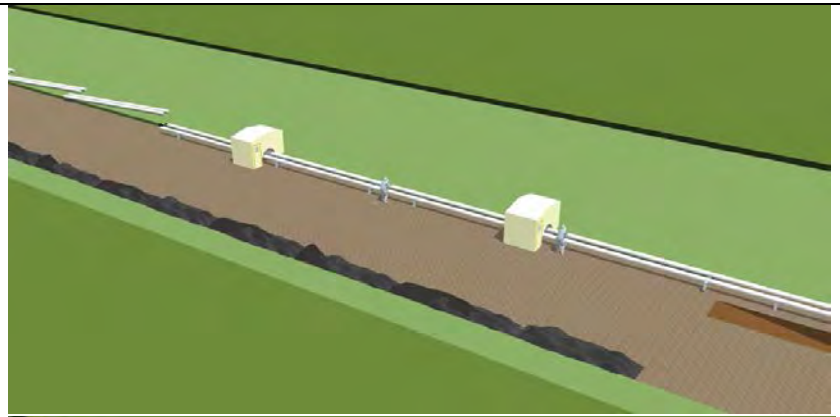
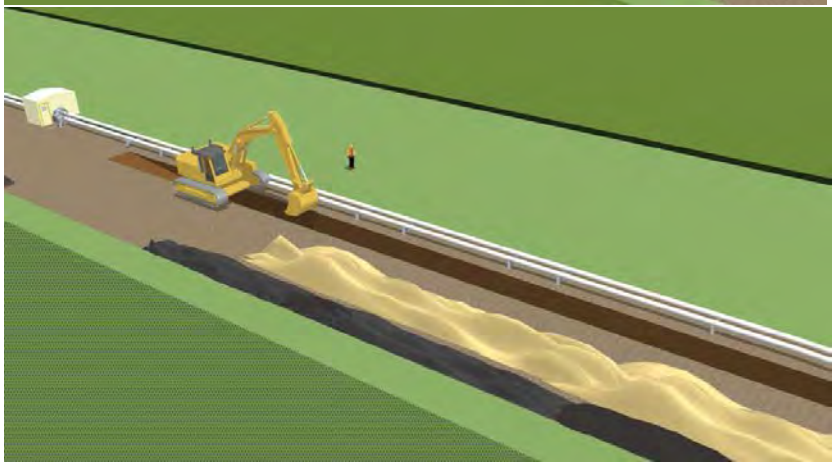
(1) The precise width will be determined by the EPC contractor after taking into account local ground and flora conditions and his projected site traffic estimates during construction
(2) Exact dimensions will be determined by the EPC contractor after geotechnical investigations.

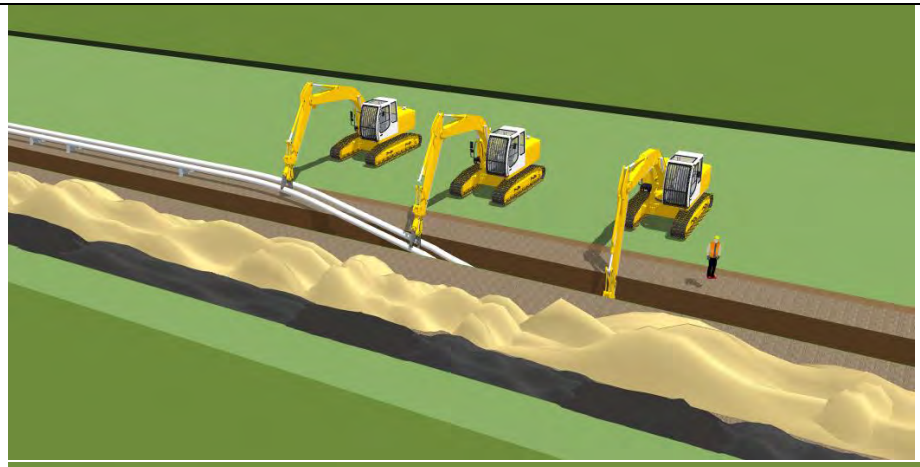
stipulated safety requirements which the EPC contractor will be acquainted with. From preliminary charting studies, blasting will not be required.

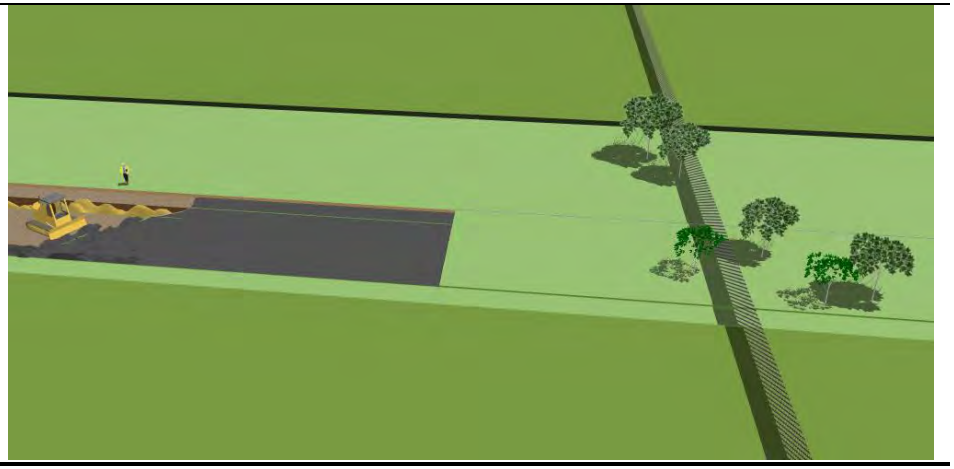
Road crossings will be designed by the EPC contractor according to ASME B31.4 and API RP 1102 or EN equivalent or as dictated by the Roads Authority. However, asphalt road crossings are usually carried out by a 'boring' method and crossings of gravel roads are typically by an 'open cut' method depending on traffic conditions and local regulations. Separate boring will be required for the sea-water pipeline and for the electrical cable conduit.

Table 3.16 Illustration of the pipeline construction process

Process Description	Illustration
Grading of the Right-of-Way: The topsoil along the right-of-way is stripped and stored for replacement following the installation of the pipeline.	
Laying out the pipe: Crews then re-stake the centre of the trench area and lay-out sections of the pipe along the right-of-way.	

Process Description	Illustration
Pipe preparation: Crews weld the sections of pipe into longer sections that follow the planned route. Individual sections have already been coated to prevent corrosion. Crews weld the sections of the pipe in mobile welding cabins to prevent wind and dust from compromising weld integrity. Each weld is inspected by X-ray and then coated again.	
Trench digging & soil separation: Once this process is complete, a trench is dug for the pipe run. The topsoil and subsoil are stored separately.	

Process Description	Illustration
Lowering the pipe: The pipe coating is inspected one more time before the pipe is lowered into the trench onto padding (sifted subsoil or sand).	
Backfilling, Grading & Testing: The trench is then carefully backfilled with sand, subsoil and preserved topsoil after the pipeline has been hydraulically pressure-tested.	

Process Description	Illustration
Clean-up & Restoration: The right-of-way and work area is regraded and vegetation is restored according to local requirements. A narrow compacted gravel track may be maintained along the pipeline route for access to monitoring equipment.	

Note: The above pictures are for illustration purposes only and do not take into account specific construction and restoration techniques which may differ depending on the area of operations.
Source: Client document: #1026.1.5 PCSA EIA/Gas Pipeline

Welding of the pipeline requires electric power. Power for the welding of the gas pipeline sections will be provided by a mobile diesel generator deployed to the pipeline construction site. The diesel will be supplied by mobile tankers on a daily basis. The interred power cable will eventually serve to operate seawater pumping and filtration plant at the coastline and located close to the "pigging" send-out station.

3.5.3 Operational Phase

Power Plant

The power plant will be operated on a 24 hour, 7 days a week basis. The number of workers on site during operations will be about 95 operational employees. These will include plant management and maintenance staff, skilled mechanical and electrical technicians, drivers, medical, quality control, and cleaning staff and a number of experienced plant operators who will operate and maintain the plant, and who are expected to be a mix of expatriate and local staff.

During commercial operations there will be some traffic bringing supplies and spares to the power plant. This will increase during shutdowns and periods of major maintenance.

Maintenance activities will be undertaken by an Operations and Maintenance (O&M) contractor.

Water requirements

Water requirements during the operational phase are estimated as follows:

- Combined Cycle circuit, replacement feed water: 1 500 m^3/y
- Potable water: 200 m^3/y
- Water for ablutions during construction 25 m^3/day: 1 250 m^3/y
- Vacuum system and steam seal evaporative water loss: 500 m^3/y
- Sundry cooling system evaporative losses: 250 m^3/y
- Water/glycol cooling circuit losses: 1 500 m^3/y
- Other evaporative losses PV system washing):1,500 m^3/y

It has been estimated that a provision of 25 000 m^3/year of water would be sufficient for operation of Phase 1 and Phase 2 of the power plant, it is currently envisaged that this water would be sourced as follows:

- Trucking from local farms during the construction phase;
- Collection of annual precipitation in 5 x 2000m^3 storage tanks – it is estimated that approximately 5 000m^3/y could be collected climate dependent;
- A Reverse Osmosis plant on site using sea water that will be pumped up from the coast along the gas pipeline servitude. 20 - 45 m^3/day, potable,

up to 14 000 m^3/y. The RO process will be a zero liquid discharge process; and
- Water recovery by condensation from the gas turbine exhaust.

Water during construction will be required for the following activities:

- Off-site dust control: Post treatment recycled water will be used for dust control on unsurfaced roads where required during high traffic periods and during construction. Estimated temporary provision of 5,000 m^3 per annum in 2017 and 2018.

- Domestic purposes by on site workers: Maximum water usage during peak construction period (600 site personnel) is estimated to be 60 m^3/day. This peak requirement is estimated to be needed for approximately 2 years – 2017 and/ 2019.

- Construction and on-site dust control: Water is required for the manufacture of concrete during construction. The power plant will require approximately 80,000 – 90,000 m^3 of concrete for foundations, road works, hard standing and other site works. Estimated temporary provision of 5,800 m^3 per annum - 2017 and/ 2019.

Water during operation of Phase 1 and Phase 2 will be required for the following activities:

Motive steam for the combined cycle (1): Estimated annual provision 1500 m^3.

- Annual Cooling water for condensation of steam from steam turbine seals and vacuum plant seals: Estimated annual provision of 500 m^3 (Phase 1 and Phase 2).

- Cooling of lubrication oil for gas turbine, alternators and steam turbine generator, gas compressor air: Estimated annual provision of 500 m^3per year.

- As water/glycol for combustion air inlet cooling: A cooled water closed-loop is used to cool down the inlet combustion air to as close to 15 °C as possible. Estimated annual provision of 1500 m^3 per year.

- Make-up water for treated water replacement in event of any boiler blow-down requirement: Estimated annual provision of 1000 m^3 per year.

- Fire abatement: Estimated storage provision of 3000 m^3.

(1) The Benson boiler does not consume water, in that there is no water discharge to out of battery limits, the quantity indicated here is a provision over and above what may be used for startup

Table 3.17 Summary Total Water Usage excluding Fire Contingency

Project Stage	Year 1	Year 2	Year 3	Year 4 Operation Phase 1 and 2	Year 5 Operation Phase 1 and 2
Construction (m^3)	20,000	20,500	16,500	0	16,500
Operation (m^3)	3,000	3,000	5,000	12,000	12,000

This will be confirmed as the design details for the plant are progressed through the BFS.

Utilities and materials

Table 3.18 presents a preliminary list of the incoming utilities and materials to the power plant site.

Table 3.18 Preliminary list of incoming utilities and materials

Utility	Notes
Natural Gas	Brought in by pipeline
LPG	Brought in by truck
Sea water	Brought in by pipeline
Process Materials	Brought in by truck
Hydrogen	Brought in cylinders for generator cooling
Ethylene Glycol	Brought in in steel drums for cooling water treatment & process chemicals
Ammonia	Brought in drums, by truck
Water treatment & process chemicals	
Ammonia	Brought in drums, by truck
Sulphuric acid	Brought in drums, by truck
Demineralizing resins	Brought in drums, by truck
Carbon dioxide,	Gas cylinders, brought in by truck
Sewage treatment chemicals (Organic)	
Workshop consumables	Fluxes, welding rods, gaskets, etc.
Maintenance consumables	
Paint	Brought in metal cans
Lubricating greases	Brought in metal cans
Fire-extinguishing foam	Standard gas/foam cylinders
Canteen food	Brought in by truck
Office consumables	
Construction Aggregates	Sand, gravel, cement, brought in by truck

Table 3.19 provides a preliminary list of the outgoing utilities and materials form the power plant.

Table 3.19 Preliminary list of outgoing utilities and materials

Outgoing Utility / Material	Estimated Quantity
Electricity	max. 34,800 MWhe/day
Potable water	max. 30,000 l/d
Waste lube oil	max. 15 tons/year

Outgoing Utility / Material	Estimated Quantity
Solid desalination salt residue:	approximately 900 kg/day
Canteen waste -food products	100 kgs/day
Dewatered solids from waste water treatment	max. 50 Kg/day
Spent anti-fire agent cylinders	
Waste, non-oil maintenance materials	est. max. 5 tons/y
Spent consumables and cleaning products.	est. max. 5 tons/y

Services

The following services will be provided by the project itself, managed by a services department on site or contracted to a third party:

- Electricity;
- Gas;
- Raw water treatment, including filtration RO and demineralisation;
- Water recovery from waste water;
- Sewage treatment;
- Boiler feed water;
- Boiler blow-down recovery;
- Condensate;
- Fire water;
- Cooling water;
- Hydrogen generator cooling system;
- CO2 fire abatement system; and
- Compressed air.

Emissions

Emissions from the plant will result from a number of sources and depend on the fuel used to generate power. It should be noted that propane will only be used for emergency black starts.

Phase 1
The likely emissions, at maximum continuous rating (MCR)(1), that can be expected during Phase 1 of the Project are shown in *Table 3.1.*

Table 3.20 Estimated Emissions from the Project – Phase 1**

Emitter	UNIT NUMBER	Capacity MWe at MCR	Stack Flow Kgs/sec	SOx	CO Mg/Nm³	NOx Mg/Nm³	CO² Kg/hr
Trent 60 DLE *	T1	48	152		46	50	27.161
Trent 60 DLE *	T2	48	152		46	50	27.161
Trent 60 DLE *	T3	48	152		46	50	27.161
Trent 60 DLE *	T4	48	152		46	50	27.161

(1) Maximum continuous rating (MCR) is defined as the maximum output (MW) that an electric power generating station is capable of producing continuously under normal conditions over a year.

Emitter	UNIT NUMBER	Capacity MWe at MCR	Stack Flow Kgs/sec	SOx	CO Mg/Nm³	NOx Mg/Nm³	CO² Kg/hr
Trent 60 DLE *	T5	48	152		46	50	27.161

*Open Cycle at site conditions 25°C, 20m, 65%RH
#Open cycle, nominal rating
**The 6th Trent 60 DLE unit is not included in this table as it is redundant.

Table 3.21 Exhaust Gas Emission Rate and Temperature

Emitter	UNIT NUMBER	Stack Height	Rate Kg/sec	Temperature °C
Trent 60 DLE *	T1 through T6	40 m	152	439

*Open Cycle at site conditions 25°C, 20m, 65%RH
#Open cycle, nominal rating

Phase 2

The likely emissions, at maximum continuous rating (MCR)(1), that can be expected during Phase 2 of the project are shown in *Table 3.1.*

Table 3.22 Estimated Emissions from the Project – Phase 2

Emitter	UNIT NUMBER	Capacity MWe at MCR	Stack Flow Kgs/sec	SOx	CO Mg/Nm³	NOx Mg/Nm³	CO² Kg/hr
SCC5-4000F 1S	UNIT 2	435	680	0	35	<20	152,200
SCC5-4000F 1S	UNIT 3	435	680	0	35	<20	152,200
SCC5-4000F 1S	UNIT 1	435	680	0	35	<20	152,200

*Combined Cycle at site conditions 25°C, 20m, 65%RH

Table 3.23 Exhaust Gas Emission Rate and Temperature

Emitter	UNIT NUMBER	Stack Height	Rate Kg/sec	Temperature °C
SCC5-4000F 1S	UNIT 2	60 m	675	90 - 110
SCC5-4000F 1S	UNIT 3	60 m	675	90 - 110
SCC5-4000F 1S	UNIT 1	60 m	675	90 - 110

*Combined Cycle

Waste Generation

Construction wastes will comprise general domestic waste including sanitary and food waste, office waste, organic material, small volumes of wastes

(1) Maximum continuous rating (MCR) is defined as the maximum output (MW) that an electric power generating station is capable of producing continuously under normal conditions over a year.

arising from mobile plant, chiefly waste lubricating oil and packing materials (e.g. crates).

Operational phase waste streams are as follows:

- Used generator and turbine lube oil (collected in a tank on site and then removed off-site in drums for controlled disposal);
- Occasional oily sludge recovered from on-site collected road surface or hard-standing surface water treatment;
- Spent gas turbine fabric air filter cartridges;
- Spent gas turbine lube-oil filter cartridges;
- Dried powdered sludge from sewerage treatment and ablution and canteen washing areas;
- Spent office consumables (paper, printer cartridges etc.);
- Organic waste food from canteen operations and organic cooking oil waste from canteen operations;
- Glass waste and metal can waste from canteen operations;
- Scrap steel and copper from irreparable mechanical equipment;
- Scrap plastics from equipment packaging;
- Dry solids (mineral salts) recovered from zero discharge reverse osmosis process;
- Spent resins from water demineralisation;
- Waste solvents and grease from workshop equipment cleaning operations; and
- Spent laboratory chemicals from water testing and water treatment.

No waste material will remain on site.

Potentially hazardous chemicals will be neutralised (if acidic) and then separately hermetically packed and labelled prior to disposal.

The disposal of waste will be carried out in accordance with the relevant legislation. All solid wastes generated will be disposed of at licensed landfill sites, for general and/ or hazardous waste streams.

The combined cycle circuit will generate steam through a Benson type boiler. This is a drum-less boiler that although there is a much diminished blow-down, compared to a conventional drum boiler, the blowdown water is recuperated and re-used.

Pipeline

Pipeline operation, marking and monitoring

The position and location of the buried gas pipeline will be indicated above-ground by special marker beacons laid above the pipeline in line-of-sight of each other along the pipeline servitude route (*Figure 3.31*). The markers will be able to collect and transmit essential pipeline information by means of telemetry, as described below.

Figure 3.31 Example of a marker indicating pipeline below ground

The pipeline is expected to operate continuously, for 8760 hours per year, only the flow rate will vary. The pipeline operating conditions are listed in *Table 3.24.*

Table 3.24 Pipeline operating conditions

Parameter	Operating Condition
Gas temperature	20 C (insulated pipeline)
Flow rate	25 – 65 kg/sec

Parameter	Operating Condition
Working pressure	max. 90 barg, min 45 barg, average 67 barg
Pipeline maximum allowable stress	78,500 barg (7854 Mpa)

Solar-powered data collection nodes along the pipeline route will constantly collect and retransmit pipeline operational statistics, cathodic or anodic protection performance or alarms to the power plant's control room. Pipeline gas flow interruption during maintenance interventions could also interrupt power generation, thus sophisticated measures will be put in place to pre-empt the need to shut off gas flow at any time.

Several leak detection technologies are available and will be incorporated by EPC contractor. Those currently available are as follows:

- In – pipeline instrumentation based on acoustic sensors
- In – pipeline condition assessment with pigging.
- Above-ground air sampling along the pipeline route (Unmanned Aerial Vehicle UAV or manually operated);
- Detection of tracer chemical introduced into the gas pipeline and detected above ground;
- Automatic solar-powered leak detection sensors capable to trigger control room alarm;
- Radio/WiFi instrumentation information transmitted to control room/pipeline operator; and
- Pipeline monitoring data collected regularly by plant operated security Unmanned Aerial Vehicle (UAV).

Emergency shut-down and emergency response

Whilst the emphasis for pipeline operation is continuous operability, the pipeline can be shut down in case of emergency. The pipeline can be isolated at three locations, namely at the LNG degasifier that feeds the pipeline with gas, and closing the two pipeline isolation valves either from the plant control room or manually. These valves are located at the despatch pigging station at the beginning of the land-based pipeline. The pipeline will be allowed to depressurise via a small gas flare at the pig-receiving station and residual gas will be expelled by a spherical 'pig'.

The prime risk associated with the pipeline emanates from undetected gas leaks from:

- Pipeline or valve rupture due to excessive pressure and failed welds;
- Pipeline or valve rupture due to sub-surface geological or subsoil instability; and
- Pipeline or valve rupture plus break-down of all leak detection and alarm systems.

The impact of an undetected gas leak can result in:

- Fire, or in the worst case, a high energy explosion of the ruptured gas pipeline;
- Setting alight surrounding flora and any habitation; and
- Hydrocarbon contamination of the natural environment.

Emergency response measures in the event of a sudden catastrophic rupture of the pipeline will be put in place, including:

- Reliable and immediate shut-off capability of all valves along the pipe-line route, including sea-water feed-valve and mid-route water isolation valve. Where the automatic valve actuators have been incapacitated, the pipeline will be isolated manually by a trained rapid response team;
- The underground power-cable will have been isolated automatically through loss of gas pipeline pressure;
- Immediate shut-down of the regasification facility;
- Immediate start-up of fresh water fire pump feeding the water pipeline;
- Rapid response fire response team;
- Shutting off all roads that have a pipeline crossing;
- Controlled shutdown of the power plant;
- Dissemination of information and knowledge of the pipeline location and hazards to local fire authorities; and
- Being a Class 1 location installation, personnel or habitation or buildings close to the pipeline will be minimal/non-existent. Nevertheless the plant medical team and fire response team will have access along the pipeline route.

Employment

The following information has been provided in the social impact assessment chapter, but is repeated here for ease of reference.

The number of workers on site during operations will be about 107 operational employees and up to 70 part-time employees. These will include plant management and maintenance staff, skilled mechanical and electrical technicians, drivers, medical, quality control, and cleaning staff and a number of experienced plant operators who will operate and maintain the plant, and who are expected to be a mix of expatriate and local staff.
As the plant will operate 24 hours a day, three full-time shifts will be created per day, and the breakdown of the skills required will be as follows:

- Skilled labour: 65 - 70 percent;
- Semi-skilled labour: 15 - 20 percent; and
- Unskilled labour: 10 - 15 percent.

A further breakdown of the employment opportunities is provided in *Table 3.25*.

Table 3.25 Estimated Employment Positions Available During Operation

Position	Number of Positions Available
Admin	4
Security	15
Warehouse and Stores	6
Medical	6
Plant Control	15
Engineers	9
Technicians	9
Skilled	9
Unskilled	9
Tuition and Training	4
Quality Control, Water	3
Canteen	6
Total	**95**

It is understood that there will be no worker accommodation on site during operation. The unskilled workforce will, as far as possible be employed from the local community, reducing the need to the provision of accommodation. The skilled and semi-skilled workforce from outside the area will be housed within Saldanha Bay Local Municipality.

3.5.4 Decommissioning Phase

Decommissioning is the term used to describe all stages involved in the closure and rehabilitation of the power plant site. The process can generally be categorised into the three key phases as follows:

- Pre decommissioning activities: includes the detailed planning (development of a Decommissioning Plan, Site Closure and Restoration Plan) and approval facilities;

- Decommissioning activities: removal of all infrastructure (including the cables and pylons for the connection to the existing transmission line). Machinery, steel and dismantled materials will be recycled where possible and disposed of at licensed disposal sites; and

- Post decommissioning activities: site survey, close out report and field monitoring as necessary.

It is likely that the project facilities will only be decommissioned once the gas supply has been exhausted, when it is no longer economical to continue operation, or the plant is rendered redundant or is no longer required for various reasons, or is unsafe to operate. As the development process of the site is yet to fully begin, detailed decommissioning plans have not yet been formulated; however, the initial plant life will be designed for 25 to 30 years. Upgrades during the life of the plant can increase the design life to 50 years.

A Decommissioning Plan will only be developed during the latter stages of the production life of the facilities. The assessment of the significance of the environmental and social impacts associated with decommissioning will need to be conducted once the Decommissioning Plan is finalised.

3.6 ASSUMPTIONS

The following assumptions have been made with respect to the project description chapter:

1. There will be a permanent easement above the pipeline of 3m either side of the centre line;
2. There will be a temporary Right of Way (RoW) of 36m (18m either side of the centre line) of the pipeline during the construction phase;
3. There will be a permanent 30m servitude for the feeder 132kV power line from the power plant to the ArcelorMittal Steel Works (15m either side if the centre line)
4. The site access arrangements illustrated in this section are conceptual and have been engineered and costed as they are represented using generic data from various contractors with past experience. Special requirements that may be requested in addition to the to-date assumptions and findings have not been taken into account in this report.

4 PROJECT ALTERNATIVES

4.1 PROCESS FOLLOWED TO REACH THE PREFERRED PROJECT ALTERNATIVES

One of the objectives of an EIA is to investigate alternatives to the Project. In relation to a proposed activity **"alternatives"** means different ways of meeting the general purposes and requirements of the proposed activity. This section presents the alternatives considered as part of the development plans for the Project and describes the process followed to reach the preferred alternative.

Chapter 3 of the Scoping Report presented the process followed to reach the preferred alternative, including as required in terms of Appendix 2 of the EIA Regulations 2014, the identification and assessment of impacts and risks associated with alternative locations and technologies. For the sake of completeness, the assessments done at the Scoping Stage have been included here in *Section 4.1.2* and *Section 4.1.3*. As indicated in the Scoping Report the result of the Scoping alternatives assessment was that the **preferred alternative** for the generation of power for use by AMSS is an air-cooled, CCGT gas-fired power plant (with OCGT in Phase 1) located at Site B. This is the alternative that has been assessed in this EIA report. For the sake of completeness the description of how this preferred alternative was reached is included below. Additional information regarding the selection of Saldanha as the preferred location in South Africa and the water source alternatives is also provided.

4.1.1 *Activity Alternatives*

Alternative power generation options are discussed in *Section 2, Need and desirability of the Project, Section 2.12* and assessed in this Section of the Report.

Criteria that were considered in the assessment were:

- Cost per MW hour;
- Baseload power requirement;
- Time to first power;
- Difficultly of obtaining regulatory approval.

The results thereof are detailed in *Table 4.1.*

Table 4.1 ***Comparative Assessment of Power Generation Options against Four Key Criteria***

	Generation type					
Assessment Criteria	Nuclear	Coal	Renewables	Liquid fuels	Heat recovery	Gas
Cost per MW hour;						
Baseload power requirement;						
Time to first power;						
Difficultly of obtaining regulatory approval.						

High
Medium
Low

When assessed against the four criteria and compared to the other power generation options, it is apparent that a gas-fired power plant meets all the required criteria. While renewable options can be implemented in a similar time frame as gas options, and are similar in terms of regulatory approval processes, renewables cannot offer a baseload option that is required without being outside of the cost parameters that make the project viable.

4.1.2 Location Alternatives

Arcelor Mittal has considered the placement of the power plant in Saldanha Bay for the following reasons:

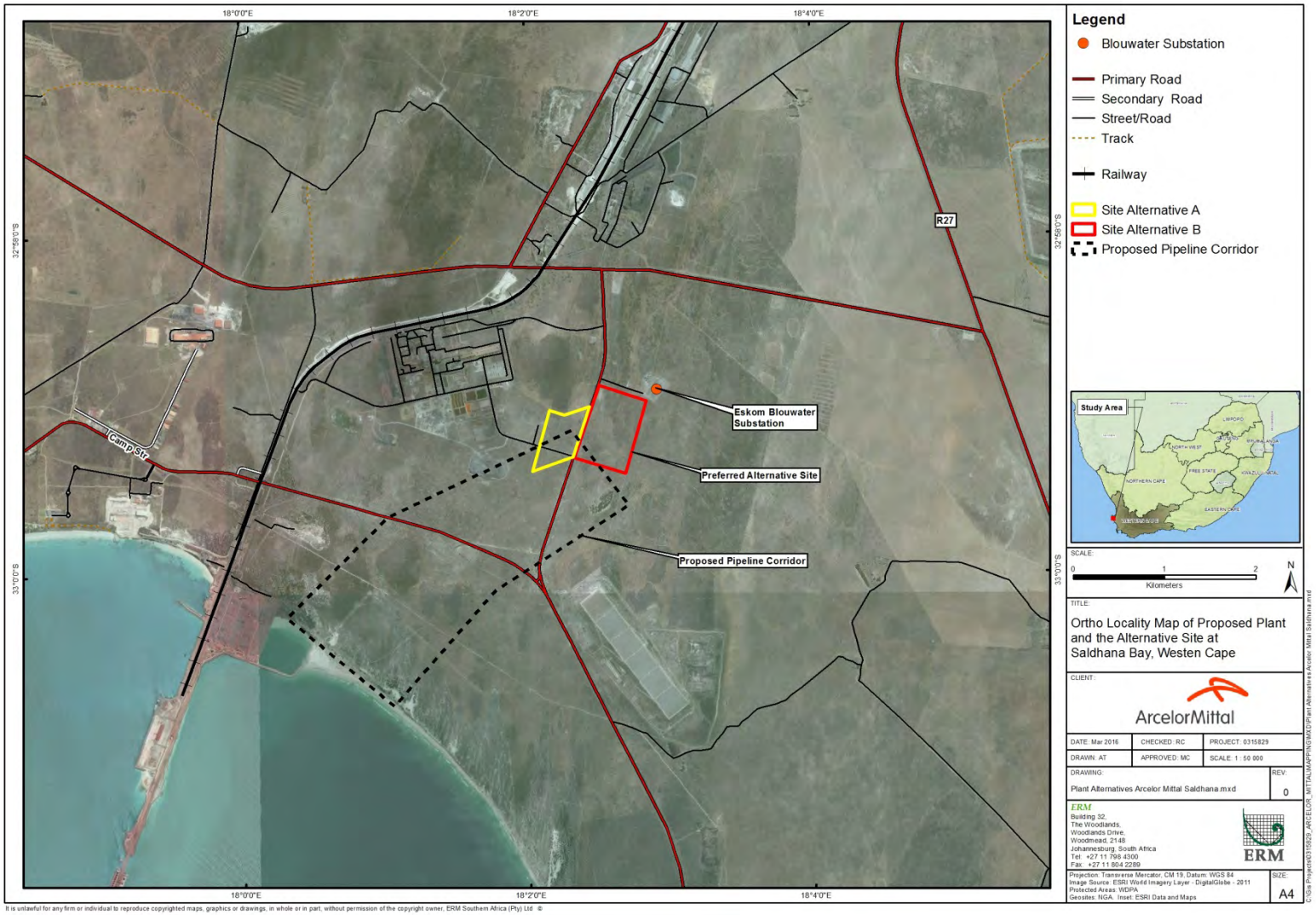
- The current Saldanha Steel Plant is in Saldanha and requires a more cost effective power to continue its operations;
- Need to reduce transmission line distance between the plant and Saldanha Steel;
- Proximity to the Port of Saldanha and anticipated link up to the LNG Import Facility which may be developed there by the Department of Energy and Transnet (1) ; and
- Demand from other industrial developments in the area for power.

In Saldanha Bay specifically, ArcelorMittal considered two alternative sites for the development of the gas-fired power plant based on proximity to the existing ArcelorMittal Steel Works site. Other considerations included land availability and zoning status, distance from the existing power transmission infrastructure, vegetation sensitivity, access to the site and proximity to residential areas.

The alternative sites considered are shown in *Figure 4.1*.

(1) Should this not be the case a separate EIA will be undertaken for the import of LNG into the Port of Saldanha.

Figure 4.1 Alternative Sites Considered by ArcelorMittal



A risk identification process was undertaken by AMSA in order to identify the preferred location. A summarised version of this assessment is provided below.

Table 4.2 Risk Identification

Topic	Site A (AMSS Site, adjacent to Saldanha Steel Facility)	Site B (AMSA-owned Land, across the road from AMSS)
Legal		
Rezoning	This site is zoned as industrial, so re-zoning is not required. Potential consent use is required from the municipality.	Rezoning of previously agricultural land will be required. This could add an additional 6 months to the permit and approvals phase of the project (prior to commencement of construction).
Access to site	Existing access to the site is available, however with some potential complications particularly during construction.	Site B has no existing access and an application to the provincial roads engineer for approval will be required. This will also include a traffic impact study. Land use approval will only be obtained after approval from Roads engineer. The additional approval can impact on time line.
Permitting complications	Risk of complications arising in the Atmospheric Emission License process due to existing AEL for AMSS and additional license requirement for this facility.	No permitting complications as power plant located off the AMSS facility site.
Location		
Proximity to substation	Marginally further away from Aurora substation.	Directly adjacent to Blouwater substation and marginally closer to Aurora substation.
Potential for expansion	The 1500MW facility fits onto the proposed Site A on AMSS site, however this does not allow for any future expansion which would then not be possible.	Space available for future expansion.
Proximity to AMSS facility for provision of power	Located adjacent to the AMSS facility so easier connection for power generation.	Located further away from the AMSS facility so connection more difficult.
Additional revenue streams		
Use of waste gas from AMSS operations	This is possible and would potential reduce carbon emissions and carbon tax.	Remains possible but additional cost associated with this option over Site A.
Use of LNG in AMSS operations	This is possible and would reduce costs as the currently used LPG is significantly more expensive than the LNG proposed.	Remains possible but additional cost associated with this option over Site A.

Topic	Site A (AMSS Site, adjacent to Saldanha Steel Facility)	Site B (AMSA-owned Land, across the road from AMSS)
Environmental Considerations (1)		
Botanical/CBA	Both sites have disturbed indigenous vegetation on site. Botanical survey showed sites have similar low botanical sensitivities. Despite the low sensitivity of the flora on site the entire site is a declared CBA.	During the botanical site survey a portion of the original Site B was identified as being highly sensitive from a botanical perspective. This portion has subsequently been excluded for this reason from the proposed site. Despite the low sensitivity of the flora on site, approximately 43 percent of the site is a declared CBA.
Visual	The visual impact associated with this site is likely to be less than that of Site B given the backdrop of the AMSS facility.	The visual impact of the site is potentially greater given as it is located on the other side of the road to the AMSS facility. However it remains in very close proximity to the facility which is very dominant in the landscape and is unlikely to significantly change the character or sense of place of the area.

*Key

	Definition
	Low risk to project development.
	Medium risk to project development.
	High risk to project development.

Impacts Associated with the Viable Location Alternatives Identified

As required in terms of the EIA Regulations, 2014 impacts associated with the viable alternatives have been identified and the nature, significance, consequence, extent, duration and probability thereof investigated. Identification of mitigation measures and the ease with which these can be implemented is also indicated, along with a preliminary rating of significance post mitigation.

A shortened version of ERM's EIA methodology was used to establish these criteria and ratings. Please see *Chapter 9* for a more detailed description of the methodology.

Please note that the table below was developed during the Scoping Phase to assess the location alternatives (Site A and Site B). Site B was selected as the preferred alternative location and as such the Impact Assessment in *Chapter 10* of this report focuses on Site B.

(1) More detail is provided in Section 7 with regards to the potential environmental impacts associated with Sites A and B.

Table 4.3 Location Alternatives: Environmental Impact Identification and Preliminary Assessment

Key Environmental Impacts Identified	Alternative	Nature	Description of Preliminary Assessment	Mitigation
Air Quality	This impact is consistent between Site A and Site B.	This will include construction related impacts such as dust, as well as the release of pollutants during operation of the power plant.	This impact is likely to occur, is considered regional in extent and long-term in duration. The significance of this impact is likely to be moderate without mitigation given the sensitivity of the airshed.	Standard mitigation measures are available to reduce emissions. Specialist input is required in order to confirm the mitigation measures and ratings.
Noise	This impact is consistent between Site A and Site B.	Noise from construction of power plant, pipeline and transmission line may have an impact on sensitive receptors. Noise from power plant operation may have an impact on sensitive receptors. Noise and vibration from construction and operation traffic along main transport/access routes.	This impact is likely to occur, is considered local in extent and long-term in duration. The significance of this impact is likely to be moderate without mitigation given the existing noise in the area and the minimal sensitive receptors.	Standard and inbuilt mitigation measures are available to reduce emissions. Specialist input is required in order to confirm the mitigation measures and ratings.
Flora and Fauna	Site A	Clearance of vegetation for the construction of the power plant and associated infrastructure will lead to an impact on terrestrial ecosystems. Site A is classified as a Critical Biodiversity Area (CBA), although a botanical site screening undertaken on the site has shown that the vegetation on site is in fact of low sensitivity as it has been previously disturbed.	The impact rating is likely to be the same for both sites. This impact is likely to occur, is considered national in extent (due to the loss of CBA) and permanent in duration. Based on the sensitivity of the environment the impact is likely to be moderate in significance.	Mitigation including minimising the area required to be cleared, avoidance and demarcation of particularly sensitive vegetation is possible and may reduce the significance of the impact, however given the loss of CBA the significance of the impact may not be able to be reduced. Additional specialist input is required in order to confirm the mitigation measures and ratings.

Key Environmental Impacts Identified	Alternative	Nature	Description of Preliminary Assessment	Mitigation
	Site B	Clearance of vegetation for the construction of the power plant and associated infrastructure will lead to an impact on terrestrial ecosystems. During the botanical site survey a portion of the original Site B was identified as being highly sensitive from a botanical perspective. This portion has subsequently been excluded for this reason from the proposed site. Despite the low sensitivity of the flora on site, approximately 43percent of the site is a declared CBA.		
Socio-economic	This impact is consistent between Site A and Site B.	***Community Health Safety and Security*** Equipment and activities will create noise and vibration and changes to air quality during construction, operations and demolition that could impact human health; Movement of materials and workers during construction, operation and demolition could impact public safety; and The presence of workers and opportunistic workers in the project area could result in a change in the disease profile of the local population in particular vector borne diseases, communicable diseases and sexually transmitted infections.	This impact is likely to occur, will be regional in scale and long-term in duration. The significance of the impact is likely to be moderate without mitigation.	Adhere to the national/ and provincial noise regulations. Adherence to national/ and provincial air quality regulations and standards. Additional specialist input is required in order to confirm the mitigation measures and ratings. This is a stakeholder perceived impact and it's not anticipated to actually occur; however, should it occur, the project proponent, should, in collaborate with local/ and provincial health services to monitor changes in health outbreaks. Should such be observed – disease or illness specific measures will be developed and implemented.

Key Environmental Impacts Identified	Alternative	Nature	Description of Preliminary Assessment	Mitigation
	This impact is consistent between Site A and Site B.	***Worker Health & Safety*** Hazardous construction operational or decommissioning activities could impact worker health and safety; and Handling of hazardous materials could impact worker health and safety.	The impact is unlikely to occur, would be local in scale and temporary in duration should they occur. Significance prior to mitigation is likely to be moderate.	Standard mitigation measures are available for the prevention of health and safety incidents. Adherence to the Occupational Health and Safety Act (Act No. 85 of 1993) will be required. Additional specialist input is required in order to confirm the mitigation measures and ratings.
	This impact is consistent between Site A and Site B.	***Local Community Demographics*** Influx of workers looking for opportunities and the presence of a construction workforce from outside of the local Project area will result in a change in demographics of the local communities.	This impact is likely to occur, will be regional in scale and long-term in duration. The significance of the impact is likely to be moderate without mitigation.	Working with local government (specifically Ward Councilors), the project proponent will carry out monitoring of settlements to determine patterns of in-migration, understand the origins, characteristics and motivations of in-migrants, and identify the impacts of in-migration, and will use the results to develop an in-migration management plan should it be required. Additional specialist input is required in order to confirm the mitigation measures and ratings.
	This impact is consistent between Site A and Site B.	***Local and Macro Economy*** Procurement of goods and services required by the Project during construction, operation and decommissioning of the Project and the presence of workers in the area may enhance the local economy both directly and indirectly.	This positive impact will occur, will be regional in scale and long-term.	Mitigation measures include utilisation of local labour and sourcing of local materials as far as possible. Additional specialist input is required in order to confirm the mitigation measures and ratings.
	This impact is consistent between Site A and Site B.	*Traffic* Transport of materials and equipment and waste during the construction, operation and decommissioning stages could impact traffic patterns.	This impact is likely to occur, will be local in scale and long-term in duration. The impact is likely to be minor without mitigation.	Large construction vehicles to not utilise public roads during peak hours. Damage to public roads caused by large construction vehicles must be repaired immediately.

Key Environmental Impacts Identified	Alternative	Nature	Description of Preliminary Assessment	Mitigation
	This impact is consistent between Site A and Site B.	*Cultural/Heritage Resources* Construction activities could have an impact on local cultural sites (paleontological); and The presence of workers in the Project area, transportation of materials and equipment to the construction sites may impact on cultural areas.	This impact is possible, would be regional in extent should finds occur and permanent in duration should they be damaged. Significance prior to mitigation is likely to be minor/moderate.	Standard mitigation measures such as chance finds procedures, demarcation of heritage sites are easily implementable and will be identified during the specialist study.
Waste and waste-water	This impact is consistent between Site A and Site B.	Non-hazardous and hazardous wastes will be generated that will require to be transported and disposed of in a manner protective of the natural and human environment. Improper storage, handling and transport of solid and liquid wastes at the power plant can lead to loss of containment and spillages which could give rise to soil and ground water contamination.	This impact will occur, would be local in scale and long-term in duration. Significance prior to mitigation is likely to be minor.	Standard, easily implementable, mitigation measures are available for the management of wastes.
Climate Change	This impact is consistent between Site A and Site B.	The greenhouse effect causes a change to the global climate regime on a continuous basis.	This impact will occur, but would be felt at a global scale in the longer term. Significance is considered minor prior to mitigation.	Considerations of alternative fuels and the development and implementation of a GHG management plan.

Key Environmental Impacts Identified	Alternative	Nature	Description of Preliminary Assessment	Mitigation
Risk (Non-Routine Impacts)	This impact is consistent between Site A and Site B.	The power plant will be fuelled by natural gas, which will be supplied as required via pipeline. Only a small quantity of natural gas will be stored on site. Additional storage of dangerous goods on site will include diesel for construction and operation related activities. Leaks or accidental releases of diesel or chemicals during construction and operation activities could impact on soil and groundwater. Accidental release of natural gas during transportation via pipeline could be a risk to surrounding receptors.	The impact is unlikely to occur, would be local in scale and temporary in duration should they occur. Significance prior to mitigation is likely to be moderate.	Standard mitigation measures are available for the prevention of accidental releases during transportation and storage of dangerous goods. An emergency response plan will be required for the project.

Selection of the Preferred Alternative Site Location

Based on the risks and opportunities identified in *Table 4.2* and the fact that there are very limited differences in environmental and social impact between Site A and B, Site B was selected by the Project team as the preferred site alternative. The potential permitting risks combined with the risk of being unable to expand the facility in future linked to Site A outweighed the potential time delays and increased costs associated with infrastructure development to access additional revenue streams/benefits linked to Site B. As such Site B was selected as the preferred alternative.

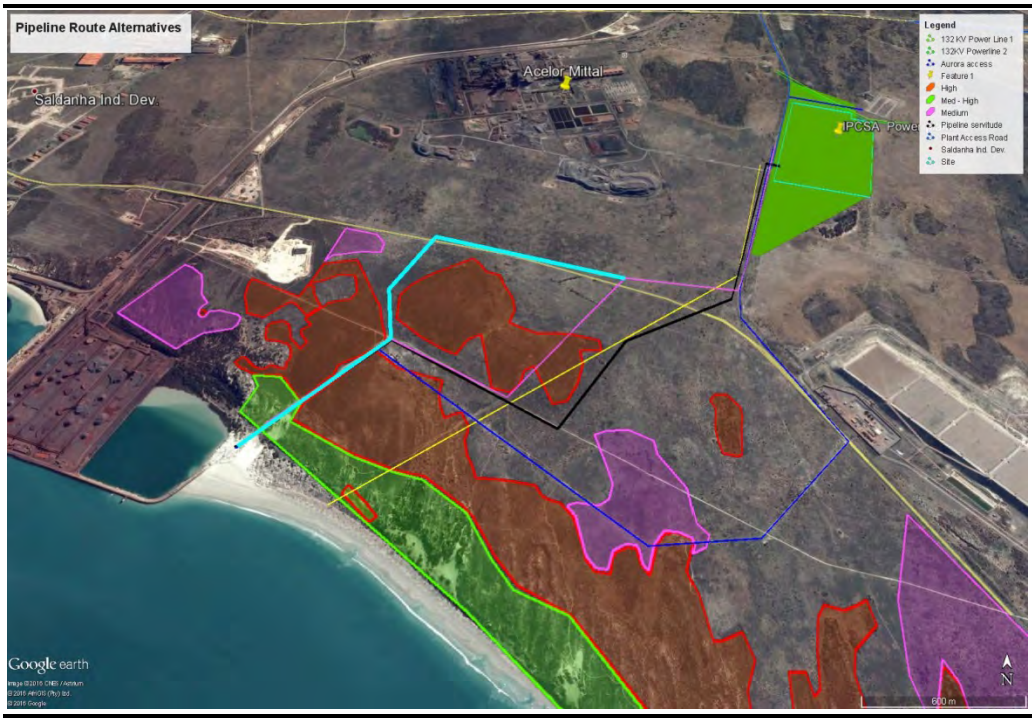
Location of the Facility within the preferred Site Alternative

As indicated, Site B was chosen as the preferred site alternative. The facility has been located within this site based on a number of factors including botanical sensitivity (see discussion in *Table 4.3*), proximity to the Blouwater substation and proximity to the road. The layout plans can be seen in *Chapter 3* and *Annex C*.

Pipeline Routing

A number of alternative pipeline routes were considered for the supply of natural gas to the power plant. A number of factors were considered, including the likely starting point of the pipeline linked to the import facility, land ownership, technical feasibility and botanical sensitivity. The preferred pipeline route was largely selected to avoid sensitive areas from a botanical perspective, with technical feasibility taken into consideration. See *Figure 4.2*.

Figure 4.2 ***Alternative Pipeline Routes Considered. Preferred Alternative shown in Black.***



Source: Google Earth with input from Nick Helme, 2015

4.1.3 Technology Alternatives

Power generation technology alternatives are related to the available fuels, site location and ambient conditions. Different makes of similar equipment categories were not considered as alternative technologies. At an early stage it was decided that renewable energy sources were not viable and that the plant would be fuelled by natural gas as described above. This selection established the technology type. The next step was the selection of the equipment mix that utilised natural gas and best suited the overall power demand profile of the combined mix of power off-takers.

Open-cycle vs Combined-cycle Gas Turbines

There are two types of gas-fired power plants, open-cycle gas turbine (OCGT) plants and combined-cycle gas turbine (CCGT) plants.

Open-cycle Gas Turbine (OCGT)

OCGT plants consist of a single compressor/gas turbine that is connected to an electricity generator via a shaft. They are generally used to meet peak-load demand and offer moderate electrical efficiency of between 35% and 42% (lower heating value, LHV) at full load. (1) OCGT plants can be constructed significantly faster than CCGT plants.

(1) Sourced from: http://www.iea-etsap.org/web/e-techds/pdf/e02-gas_fired_power-gs-ad-gct.pdf

Combined-cycle Gas Turbine (CCGT)

CCGT plants have basic components the same as the OCGT plants but the heat associated to the gas turbine exhaust is used in a heat recovery steam generator (HRSG) to produce steam that drives a steam turbine and generates additional electric power. Large CCGT plants may have more than one gas turbine. In mature natural gas markets which are endowed with vast natural gas infrastructure systems, CCGT is the dominant technology for flexible and base-load power generation. The CCGT thermodynamic efficiency is currently approximately 52–60% (LHV). CCGT plants have the potential to offer flexible operation, depending on natural gas supply and gas infrastructure assumptions. They are designed to respond relatively quickly to changes in electricity demand and may be operated at 50% of the nominal capacity with a moderate reduction in efficiency.

It is intended to develop a gas-fired power plant operating as an OCGT only initially (in order to obtain power to supply AMSS in the fastest possible time), followed by the addition of a three CCGT turbines in Phase 2 (to take advantage of the efficiencies this technology offers).

Other activity alternatives were not assessed any further by AMSS since they were considered unviable for this Project.

Cooling system

A key consideration for thermal power plants is the method of cooling to be utilised. The alternative cooling options include:

- Once through system;
- Wet cooling; and
- Dry/Air cooling.

Each of these alternatives is discussed in the table below and the environmental impact assessed.

Table 4.4 Cooling Technology Options

Cooling Method	Description	Advantages	Key Impacts/Risks	Rating	Mitigation
Once-through system	Once-through systems take water from nearby sources (e.g., rivers, lakes, aquifers, or the ocean), circulates it through pipes to absorb heat from the steam in systems called condensers, and discharge the now warmer water to the local source.	Advantages include simplicity and low cost. Disadvantages include disruptions to local ecosystems from the significant water withdrawals involved and the release of warmer water back into the ecosystem.	• Impact to marine ecology due to water abstraction and release of heated water into the environment. • Distance and cost of pipeline from the shoreline to the power plant.	A likely, regional impact would occur for the duration of the operation of the facility. The impact is likely to be of high significance (given the sensitivity of the marine environment) without mitigation but further specialist work would be required in order to provide a quantification of this.	Mitigation measures are available for the dispersion of released heated water include pipeline diffusers and longer pipeline releasing the water further out into the ocean. Should hot water be released into Saldanha Bay, the impact is likely to remain medium-high even with mitigation. If it is feasible to build a pipeline to release the water into the open ocean, then the marine impacts are likely to be low. However, this would need to be balanced with the additional terrestrial impacts as a result of the longer pipeline. Based on the sensitivity of the terrestrial environment in the greater Saldanha Bay area, the impact on terrestrial habitat is likely to the moderate to high.

Cooling Method	Description	Advantages	Key Impacts/Risks	Rating	Mitigation
Wet-cooling	Wet-recirculating or closed-loop systems reuse cooling water in a second cycle rather than immediately discharging it back to the original water source. Most commonly, wet-recirculating systems use cooling towers to expose water to ambient air. Some of the water evaporates; the rest is then sent back to the condenser in the power plant. Large quantities of desalinated water would be required for this alternative due to scarce water resources available in the area.	Advantages include lower water withdrawal than once-through system (water only withdrawn to replace any water that is lost through evaporation in the cooling tower).	• Impact to marine ecology due to the release of saline water into the marine environment. • Difficulty of sourcing water in a water scarce area.	A likely, regional impact would occur for the duration of the operation of the facility. The impact is likely to be of high significance (given the sensitivity of the marine environment) without mitigation but further specialist work would be required in order to provide a quantification of this.	Mitigation measures are available for the dispersion of released saline water include pipeline diffusers and longer pipeline releasing the water further out into the ocean. Should saline water be released into Saldanha Bay, the impact is likely to remain medium-high even with mitigation. If it is feasible to build a pipeline to release the water into the open ocean, then the marine impacts are likely to be low. However, this would need to be balanced with the additional terrestrial impacts as a result of the longer pipeline. Based on the sensitivity of the terrestrial environment in the greater Saldanha Bay area, the impact on terrestrial habitat is likely to the moderate to high.

Cooling Method	Description	Advantages	Key Impacts/Risks	Rating	Mitigation
Dry/Air Cooling	Dry-cooling systems use air instead of water to cool the steam exiting a turbine.	Advantages include no water use for cooling and can decrease total power plant water consumption by more than 90 percent.	Disadvantages include higher costs and lower efficiencies. In power plants, lower efficiencies mean more fuel is needed per unit of electricity. Impacts related to this can include: • Increased air pollution; and • Environmental impacts from mining, processing, and transporting the additional fuel.	The increase in impact to air quality associated with this option is unlikely to be significant, however specialist input is required in order to quantify the impact.	Additional potential mitigation may be required to reduce air pollution, however specialist input is required in order to identify these measures.

Due to the large quantities of water required for both once-through and water cooling options coupled with the water scarce nature of the Saldanha area and the impacts associated with emissions of heated or saline water into the Saldanha Bay, dry/air-cooling is the preferred technology and will be carried through into the more detail design of the Project.

Water Supply

Although the preferred cooling alternative selected (air cooling) requires less water than the other alternatives, water is still required during construction and operation activities. Annually it is estimated that a maximum of approximately 25 000 m^3/year of water will be required during operation.

The Project has indicated that the bulk of water required will be sourced from rainwater, however given the water scarce nature of the area and the unpredictability of rainfall, other options for water sources have been investigated, including:

- Ground and surface water abstraction. Due to the lack of surface water in proximity to the Project and limited groundwater resources, water abstraction is not considered feasible.
- Municipal water. It is understood that currently municipal supply is insufficient for the additional industrial facilities proposed in the area. The Municipality is therefore investigating options to increase municipal supply, including a large scale desalination plant; and an additional waste-water treatment facility purifying grey water. To our knowledge these Projects have not as yet commenced.
- Desalination. This involves a small, project specific, seawater pipeline following the same servitude as the natural gas pipelines. A zero liquid discharge reverse osmosis process (where effluent will be evaporated until the dissolved solids precipitate as crystals) is proposed for the supply of up to 14 000 m^3/year of water to the power plant.
- Recovery by vapour condensation in gas turbine exhaust. This is an additional patented process currently being assessed by the Project which could decrease the demand for external water.

Based on the above it is anticipated that the majority of water required will be supplied by rainwater harvesting. In order to supplement the rain water a small sea-water pipeline and onsite desalination facility is considered to be the preferred option for additional water supply. Should the municipal supply and vapour recovery become feasible options during the Project development these will be considered.

4.1.4 No-go Alternative

The no-go alternative would mean that the project does not go ahead. In this case there would not be any impact associated with the Project (air, noise, flora, fauna and others), however, in this case the no-go alternative would

almost certainly mean that Saldanha Steel would no longer be financially viable and would have to shut down. Saldanha Steel shutting down would have major negative socio-economic consequences to both the Saldanha area and the wider Western Cape and South Africa.

4.1.5 Summary

In summary and as described, the **preferred alternative** for the generation of power for use by AMSS is an air-cooled, CCGT gas-fired power plant (with OCGT in Phase 1) located at Site B.

5 ADMINISTRATIVE AND LEGAL FRAMEWORK

5.1 INTRODUCTION

This section provides an overview of legislation, policies, guidelines and information documents that have informed the scope and content of this report and the approach to the EIA process.

5.2 ENVIRONMENTAL AUTHORISATION LEGISLATIVE PROCESS

The Environmental Authorisation process in South Africa is governed by the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, and the Environmental Impact Assessment (EIA) Regulations of 2014 promulgated under NEMA. The relevance of this legislation is summarised below.

5.2.1 NEMA Environmental Authorisation

Chapter 5 of NEMA, as amended, outlines the general objectives and implementation of Integrated Environmental Management. This provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals that are likely to have a detrimental effect on the environment. Whilst Section 23 sets out the basic objectives and principles of the IEM procedure, Section 24 sets out how these objectives and principles are to be accomplished.

Regulations governing the environmental authorisation process have been promulgated in terms of NEMA and include the following:

- Environmental Impact Assessment Regulations (GNR R982/2014);
- Environmental Impact Assessment Regulations Listing Notice 1 (GNR 983/2014);
- Environmental Impact Assessment Regulations Listing Notice 2 (GNR 984/2014); and
- Environmental Impact Assessment Regulations Listing Notice 3 (GNR 985/2014).

Activities that trigger GNR 983 and GNR 985 require a Basic Assessment Report (BAR) process to be undertaken, whereas activities identified in terms of GNR 984 will require a full Scoping and Environmental Impact Report (S&EIR) process. GNR 982 sets out the general procedure to follow when conducting either a BAR or S&EIR process.

Numerous trigger activities have been identified for this Project in terms of all the listing notices (refer to *Table 5.1*). In such instances where all the listing

notices are triggered, GNR 984 requirements will take precedent and the Project will be subject to a full S&EIR process prior to commencement of any of the associated activities.

The Project location falls within the Western Cape Province and the competent authority would therefore generally be the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), however, the National Department of Environmental Affairs (DEA) has been identified as the competent authority because this power generation project could be considered of national interest and it could also have implications for other provinces if power is evacuated in future. ArcelorMittal Saldanha Steel will be required to obtain environmental authorisation from the DEA prior to commencement of any of these proposed activities.

Table 5.1 lists the permitting requirements for the Environmental Impact Assessment Regulations Listing Notices 1, 2, and 3 of 2014 from NEMA.

Table 5.1 Environmental Permit Requirements from NEMA Listing Notices

Permit	Listed Activity	Project Trigger
Basic Assessment EIA Regulations Listing Notice 1 of 2014 (GNR R983 of 2014)	11) The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	The upgrade of existing 132 kV transmission lines currently supplying ArcelorMittal Saldanha Steel with electricity from Blouwater substation. The 400 kV line required for Phase 2 of the Project, to connect the power plant to Eskom's Aurora substation, will be permitted separately, based on discussions with Eskom.
Basic Assessment EIA Regulations Listing Notice 1 of 2014 (GNR R983 of 2014)	14) The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The development/construction of steel fuel tanks for the storage of up to 50 m^3 of diesel for use during construction and operation activities. A maximum of 30 m^3 of LPG (Propane) will be stored on site to fuel three generators during the operational phase. Waste (change-out) lube oil and hydraulic oil will be held temporarily in steel holding tanks (5 m^3 each). The waste oil will be transported by tanker and disposed of by a registered waste handling and disposal contractor.
Basic Assessment EIA Regulations Listing Notice 1 of 2014 (GNR R983 of 2014)	15) The development of structures in the coastal public property where the development footprint is bigger than 50 square metres, excluding (i) the development of structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (ii) the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (iii) the development of temporary structures within the beach zone where such structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared; or (iv) activities listed in activity 14 in Listing Notice 2 of 2014, in which case that activity applies.	The development of the terrestrial natural gas pipeline within the coastal public property.

Permit	Listed Activity	Project Trigger
Basic Assessment EIA Regulations Listing Notice 1 of 2014 (GNR R983 of 2014)	24) The development of- (ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Construction of onsite roads and the access off from the OP7644. Access roads and the onsite roads will vary between 8m and 12m wide.
Basic Assessment EIA Regulations Listing Notice 1 of 2014 (GNR R983 of 2014)	28) Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	Development of the CCGT Power Plant will be considered an industrial development with a footprint of approximately 45 ha. The development will occur on land previously used for agriculture (grazing).
Basic Assessment EIA Regulations Listing Notice 1 of 2014 (GNR R983 of 2014)	56) The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	For road safety considerations and in light of the increased traffic (particularly during construction phase) the provincial road OP7644 leading past the two power plant entrances will be widened from 11 m to a 20 m wide over-taking 4- lane section.
Full Scoping and EIR EIA Regulations Listing Notice 2 of 2014 (GNR 984 of 2014)	2) The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more.	The proposed CCGT Power Plant will consist of the construction and operation of an approximately 1507 MW gas-fired power plant. The power plant will be fuelled by natural gas.
Full Scoping and EIR	6) The development of facilities and infrastructure for an process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent,	Development of a 1507 MW gas-fired power plant which will require and Atmospheric Emission Licence (AEL) for the release of atmospheric emissions related to the use of natural gas in the power generation process. An application for an AEL will be submitted in the future in order to receive a provisional AEL prior to the commencement of commissioning and operations.

Permit	Listed Activity	Project Trigger
Full Scoping and EIR EIA Regulations Listing Notice 2 of 2014 (GNR 984 of 2014)	7) The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods- (i) in gas form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 700 tons per day; (ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 50 cubic metres per day; or (iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons day.	Development and operation of natural gas pipelines (approximately 4600 m in length) from the shore (or border of Transnet's land) to the power plant site.
Full Scoping and EIR EIA Regulations Listing Notice 2 of 2014 (GNR 984 of 2014)	15) The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of 45 ha of disturbed indigenous vegetation for the construction of the power plant and associated infrastructure and laydown areas.
Full Scoping and EIR EIA Regulations Listing Notice 2 of 2014 (GNR 984 of 2014)	28) Commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), excluding - (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less.	The development of the 1507 MW CCGT gas-fired power plant and potentially the storage of LPG will require an Air Emission Licence (AEL) in terms of the National Environmental Management: Air Quality Act. The likely listed activities in terms of NEM: AQA are Liquid Fuel Combustion Installations' (Subcategory 1.2), 'Gas Combustion Installations' (Subcategory 1.4), as well as the storage and handling of petroleum products (Subcategory 2.4).
Basic Assessment EIA Regulations Listing Notice 3 of 2014 (GNR 985 of 2014)	2) The development of reservoirs for bulk water supply with a capacity of more than 250 cubic metres. (f) In Western Cape: I. All areas outside urban areas; or ii. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose, within urban areas.	Development of modular bulk water storage reservoirs with a capacity of 25,000 cubic metres. Five modules are envisaged for collection of rain water. No water supply from the local municipality is envisaged. Groundwater from surrounding farms will be used, in addition to rain water harvesting.

Permit	Listed Activity	Project Trigger
Basic Assessment EIA Regulations Listing Notice 3 of 2014 (GNR 985 of 2014)	4) The development of a road wider than 4 metres with a reserve less than 13, 5 metres. (f) In Western Cape: i. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or ii. In urban areas: (cc) Areas zoned for conservation use; or (dd) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	Upgrading of access road OP7644 to the site. Construction of onsite roads and the access off from the OP7644. Access roads and the onsite roads will vary between 8m and 12m wide.

The following listed activities have been removed subsequent to the Scoping Report submission. A revised application will be submitted to the DEA.

EIA Regulations Listing Notice 2 of 2014 (GNR 984 of 2014)

9) The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.

This has been removed as the 400 kV transmission line to Aurora will be permitted separately based on discussions with Eskom.

EIA Regulations Listing Notice 3 of 2014 (GNR 985 of 2014)

12) The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

(a) In Western Cape:
i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
ii. Within critical biodiversity areas identified in bioregional plans;
iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or
iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.

As confirmed by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) in their comments on the draft Scoping Report the proposed development is not mapped as having any critically endangered or endangered ecosystems listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): National List of Ecosystems that are threatened and in need of protection (Government Gazette No. 34809 of 9 December 2011). As such this listed activity has been removed.

5.2.2 Consolidated Permitting Requirements

Due to nature of the Project, a suite of environmental legislation other than that derived from NEMA is also applicable. In order to meet the various legislative requirements, ERM has run a single integrated EIA process, which has met the requirements in terms of the following laws:

- National Environmental Management: Waste Act (No. 59 of 2008) (NEMWA);

- National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA);
- National Environmental Management: Air Quality Act (No. 39 of 2004) (NEMAQA);
- National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008) (NEMICMA);
- National Water Act (No. 36 of 1998); and
- National Heritage Resources Act (No. 25 of 1999).

Details of the permitting requirements from these laws are provided in *Table 5.2*.

Table 5.2 Consolidated Permitting Requirements

Law	Requirements	Project Relevance	Competent Authority
National Environmental Management Waste Act (No. 59 of 2008)	Section 19 of NEMWA provides for the listing of waste management activities that have, or are likely to have a detrimental effect on the environment. In accordance with this, GN 921 of 29 November 2013 lists waste management activities for which a waste management licence (WML) is required in terms of Section 20 of the Act. Furthermore, it classifies each of the waste management activities into different categories, with more onerous provisions assigned for activities that are regarding as being more detrimental to the environment. In this regard, 'Category A' activities require a NEMA BAR process to be conducted prior to commencement. 'Category B' activities require a full S&EIR process to be conducted, while 'Category C' activities are wholly exempt from the WML permitting process, as long as they show compliance with a set of prescribed standards.	A Waste Management Licence (WML) is not expected to be applicable for this Project given the small quantities of waste generated, the fact that only temporary storage of general waste and hazardous waste is expected and the fact that no general or hazardous waste is expected to be treated on site.	The Provincial MEC is the competent authority for all applications involving general waste, while the National DEA administers applications involving hazardous waste.
National Environmental Management Biodiversity Act (10 of 2004)	Part 1 of Chapter 4 of NEMBA discusses the protection of threatened or protected ecosystems. In this section, the Minister or the provincial environmental MEC may publish a national or provincial list of ecosystems that are threatened and in need of protection. Subsequently, the Minister can identify by notice in the Gazette, any process or activity in a listed ecosystem as a 'threatening process'. Once so identified, the threatening process is regarded as an activity requiring an EIA to be carried out in terms of section 24(2) (b) of NEMA. Only a draft national list of threatened ecosystems has been published as of yet. As such, these provisions are not yet in effect and will not apply.	The proposed development is not mapped as having any critically endangered or endangered ecosystems listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): National List of Ecosystems that are threatened and in need of protection (Government Gazette No. 34809 of 9 December 2011).	Not applicable.

Law	Requirements	Project Relevance	Competent Authority
National Environmental Management Air Quality Act (No. 39 of 2004)	Chapter 5 of NEMAQA deals with the control and management of emissions relates to the listing of activities that are sources of emissions and the issuing of emission licences in respect of these activities. These activities are listed in terms of GN 893 of 22 November 2013 and are broken up into 10 categories and associated sub-categories, including 'Liquid Fuel Combustion Installations' (Subcategory 1.2), 'Gas Combustion Installations' (Subcategory 1.4), 'Reciprocating Engines' (Subcategory 1.5) as well as the storage and handling of petroleum products (Subcategory 2.4).	An Air Emissions Licence (AEL) is required for the generation of more than 50 MW of power. Application for an AEL can be made during the EIA process and will be granted within 60 days of Environmental Authorisation. Information gathered during the EIA phase will be used in this application process.	The issuing of emission licences for 'power sector' projects is the responsibility of the National DEA.
National Environmental Management Integrated Coastal Management Act (No. 24 of 2008)	Any discharge of land-based effluent to the coastal environment from an activity triggering any of the Listing Notices in the Environmental Authorisation Regulations under the NEMA, is subject to the applicable environmental authorisation issued under the NEMA EA Regulations (2014) administered by the DEA and /or a Coastal Waters Discharge Permit (CWDP) or a General Authorisation (GA) in terms of Section 69 of the ICMA, unless the activity conforms to a standard as prescribed in section 24 of the NEMA and in terms of the ICMA. In addition to this, both the general authorisation and coastal waters discharge permit for the discharge of effluent into estuarine waters require the Minister to consult with, and issue the authorisation or permit in concurrence with the Minister responsible for water affairs [s. 69(2)].	No effluent discharge into the marine environment is planned for this development.	Not applicable

Law	Requirements	Project Relevance	Competent Authority
National Water Act (No. 36 of 1998)	Section 21 of NWA sets out general principles for regulating water use. Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation (refer to 'WULA Listed Activities' in permitting plan). In general a water use must be licensed unless it is listed in schedule I, as an existing lawful use, is permissible under a general authorisation (as listed in GNR 399), or if a responsible authority waives the need for a licence (Section 22).	A Water Use Licence is not anticipated to be required as the proposed Project is not planning to abstract water and will not affect any watercourse, wetland, pan or drainage line.	The Regional Department of Water and Sanitation (DWS) will be the competent authority to engage with on this application.
National Heritage Resources Act (No. 25 of 1999)	Section 38 (1) of the NHRA requires any person who intends to undertake a development which exceeds 5000 m² in extent or 300 m in length to notify the responsible heritage resources authority, viz. the South African Heritage Resources Agency (SAHRA) or the relevant provincial heritage agency. The applicable authority will in turn indicate whether or not a full Heritage Impact Assessment (HIA) would need to be undertaken.	Before undertaking the development the South African Heritage Resources Agency (SAHRA)/Heritage Western Cape (HWC) has to be informed of the planned construction activities (via submission of a Notice of Intent to Develop (NID)), as the development exceeds standard SAHRA thresholds. A NID was submitted to HWC on 25 April 2016 and a response received on 6 May 2016 indicating that a Heritage Impact Assessment (including an assessment of both archaeological and paleontological resources) would be required for the Project. A Heritage Impact Assessment has been undertaken and is attached in *Annex D* of this report. This will be submitted to HWC with the Draft EIA Report.	Heritage Western Cape

5.3 OTHER APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

5.3.1 National Legislation

National legislation relevant for the Project (in addition to those presented in preceding sections) is listed below.

- **Constitution of the Republic of South Africa (108 of 1996)**: South African law, including environmental law, is underpinned by the Constitution (No. 108 of 1996) which promotes specific moral, social and political values. The Constitution is the highest law of the land, and all South African law has to follow in the spirit of the Constitution. The Constitution commits to the establishment of a society based on democratic values, social justice and fundamental human rights through improving the quality of life of all citizens and realising the potential of each person. Sections 7, 8 and 24 of the Bill of Rights give constitutional force to sustainable development and provide that all people in South Africa have the right to a clean and healthy environment. These sections oblige government to pass reasonable legislation to protect the environment, prevent pollution and ecological degradation, and secure sustainable development.

- **National Environmental Management: Protected Areas Act (57 of 2003)**: There are no protected areas directly impacted by the proposed Project.

- **Occupational Health and Safety Act (73 of 1989):** In terms of the Major Hazard Installation (MHI) Regulations (GNR.692 of 30 July 2001), enacted under Section 43 of the Occupational Health and Safety Act (73 of 1989), the proposed pipelines are considered an MHI. In terms of these regulations, the Project will be required to notify the chief inspector, the provincial director and the relevant local government, in writing, prior to erecting, altering or modifying the proposed facility. Following this, a risk assessment will need to be undertaken by a certified entity in order to quantify the risks that the proposed MHI facility poses to employees and the general public. This process will be undertaken outside of the environmental assessment process.

- **Gas Act (48 of 2001):** The Gas Act seeks to promote the efficient, effective, sustainable and orderly development and operation of gas facilities in South Africa. Section 15 of the Act sets out activities that require licencing, issued by the Gas Regulator, prior to commencement. Specific activities that require licencing include the construction and operation of gas transmission, storage, and distribution facilities. The requirements of the Gas Act will be met outside of the environmental assessment process.

- **Noise Control Regulations under the Environmental Conservation Act (73 of 1989):** The control of noise in the Western Cape is legislated in the form of the Noise Control Regulations of the Environment Conservation

Act No. 73 of 1989 applicable to the Province of the Western Cape, Provincial Notice 627 of 20 November 1998.

- **Hazardous Substances Act (56 of 1973):** License required for the use, handling and storage of Group I, II and II Hazardous Substances. The requirements of the Gas Act will be met outside of the environmental assessment process.

- **Explosives Act (15 of 2003):** This would only be applicable to the proposed Project should blasting be required for construction activities. This is not currently anticipated.

- **Conservation of Agricultural Resources Act (43 of 1983):** The Conservation of Agricultural Resources Act, as amended defines different categories of alien plants and those listed under Category 1 are prohibited and must be controlled while those listed under Category 2 must be grown within a demarcated area under permit. This would have relevance if farming activities were to change dramatically due to the proposed Project or if alien species were used for re-vegetation of areas, neither of which is intended for this Project.

- **Electricity Regulation Act (4 of 2006):** The requirements of this Act will be met outside of the environmental assessment process.

- **Subdivision of Agricultural Land Act (70 of 1970):** This Act is applicable to the rezoning application for the land parcel identified for this proposed Project. The requirements of this Act will be met outside of the environmental assessment process.

- **Western Cape Nature and Environmental Conservation Ordinance 19 of 1974 as amended by the Western Cape Nature Conservation Laws Amendment.**

- **National Ports Act (12 of 2005)**: This Act provides for the establishment of the National Ports Authority and the Ports Regulator. In terms of the Act, all ports fall under the jurisdiction of the National Ports Authority, which must own, manage, control and administer ports to ensure their efficient and economic functioning. Part of this control includes the exercise of licensing and controlling functions in respect of port services and port facilities. The proposed site is located within the Saldanha 'back of port' area and as such will need to adhere to the controlling Ports Authority and any orders or notices it may be issued in this respect. The specific Ports Authority requirements will be met outside of the environmental assessment process.

Applicable provisions from these laws and regulations will be and have been incorporated into the design and implementation of the Project.

5.3.2 Guideline Documents

Noise Guidelines

South African national standards (SANS) relevant to noise from mines, industry and roads are:

- SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';
- SANS 10210:2004. 'Calculating and predicting road traffic noise';
- SANS 10328:2008. 'Methods for environmental noise impact assessments'.
- SANS 10357:2004. 'The calculation of sound propagation by the Concave method'.

6 BIOPHYSICAL BASELINE

This Chapter presents the biophysical baseline conditions in the Project's Areas of Influence (AoI) (described in Chapter 3: Project Description). The baseline was determined through review of existing information and observations and interviews conducted during site visits.

The objective of the biophysical baseline is to establish the characteristics of the existing biophysical conditions in the Project's AoI. The baseline serves as the reference point against which changes (impacts) can be predicted and monitored.

6.1 TERRESTRIAL ENVIRONMENT

6.1.1 Climatic Conditions

Saldanha falls within the Mediterranean climate zone which is characterised by warm, dry summers and cold, wet winters. The rainfall in the project area occurs most primarily between the months of April and September, with precipitation intensity highest in the months of June and July. The periods of lowest rainfall occur in the months of January and February, where average monthly precipitation is approximately 3 mm. Mean annual precipitation has been recorded at 320 mm. The maximum and minimum temperatures in Saldanha Bay do not exhibit stark variations due to its proximity to the ocean and the cold Benguela current and the incursion of summer fog which acts to temper summer temperatures. Thus average temperatures over the summer season seldom exceed 25 °C. Winter temperatures seldom drop below 10 °C. *Table 6.1* shows monthly temperatures for towns within the Saldanha Bay Municipality.

Table 6.1 Monthly Temperatures (°C) in the Saldanha Bay Municipality

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cape Columbine	17.2	17.9	17.1	16.1	15.4	14.6	13.9	13.6	14	15.7	16.1	17.2
Geelbek	19.3	19.4	18.1	16.3	14.7	12.8	11.8	12	12.9	15.8	16.7	18.5
Langebaan	21.8	21.9	21	18.0	15.3	13.2	12.3	12.4	13.6	17	18.2	20.4
Vredenburg	18.5	20.4	19.9	17.1	14.8	13.7	14.1	12.9	13.5	15.9	17	18.4

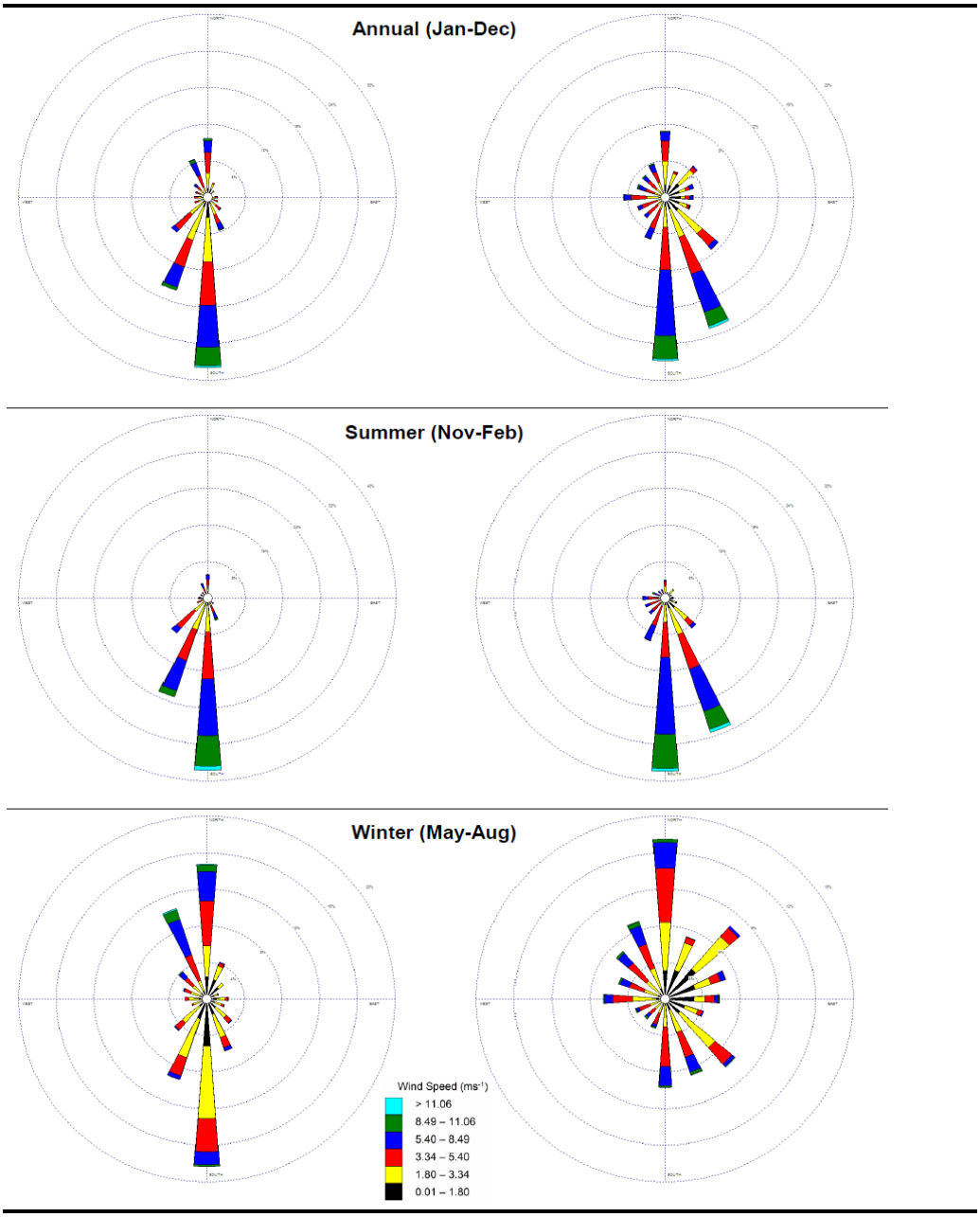
Source: Aurecon (2014)

The release of atmospheric pollutants results in the dilution of pollutants during unstable atmospheric conditions (conditions of free convection and atmospheric mixing). These conditions occur most frequently in summer during the daytime. This dilution effect can however be inhibited under stable atmospheric conditions in the boundary layer where surface pollution is

trapped under a surface inversion (Tyson & Preston-Whyte, 2000). This occurs in Saldanha during the winter months when temperature inversion layers 'trap' air pollution. Under these conditions an inversion can occur when a layer of warm air lies directly above a layer of cool air. This layer prevents a pollutant from mixing. Inversion layers tend to occur in calm and dry conditions during winter.

Winds in the Saldanha Bay area are dominated by the seasonal migration of the South Atlantic Anticyclone (high pressure cell). In the austral summer the high pressure cell moves into its southernmost position and strong southerly and south westerly winds prevail. During the winter months the South Atlantic Anticyclone is situated further north and the Western Cape coastline is exposed to frequent mid latitude cyclones (commonly referred to as cold fronts), which are associated with north and north westerly winds (*Figure 6.1*). The wind roses in *Figure 6.1* below depict the seasonal variances of the measured wind speeds. In the summer months, the wind blows predominantly from the south-west with wind speeds of greater than 5.6 m/s occurring frequently. During the winter months, the percentage of calm periods increase to 11.5 percent and wind blows at low speeds (frequently less than 3.5 m/s) from the south and higher wind speeds from the north and north westerly direction.

Figure 6.1 *Wind roses for Langebaanweg (left panels) and Geelbek (right panels), with annual (top), summer (centre) and winter (bottom)*



Source: SAWS, 2012

6.1.2 *Air Quality*

Particulate emissions within Saldanha Bay arise mostly from industry, although dust emissions from agricultural areas are also high. The main industrial sources of air pollution in Saldanha include (Burger and Krause, 2011):

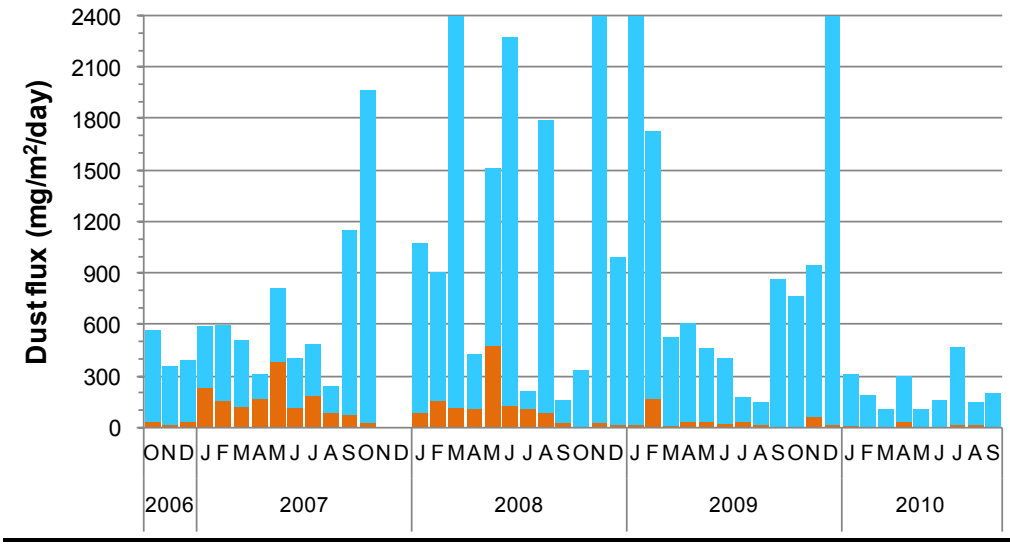
- ArcelorMittal Saldanha Works;
- Tronox (previously Exxaro) Namakwa Sands;
- Duferco Steel Processing;
- Saldanha Iron Ore Terminal;

- SFF Saldanha Bay Oil Storage;
- St Helena Bay Fishmeal Industries (Oceana, Oranjevis, Hannasbaai, West Point); and
- Limestone and Aggregate Quarries.

Emissions originating from these sources may include combustion products, such as SO_2, NOx, CO, Particulate Matter [1](PM_{10} and $PM_{2.5}$, fugitive dust (TSP, PM_{10} and $PM_{2.5}$), trace amounts of organic compounds and heavy metals, and odorous compounds (Burger and Bird, 2014).

Particular hot spots in terms of particulate levels (PM_{10}) are found in the vicinity of the iron ore handling facility (at the Port of Saldanha) and in the vicinity of the large industry complex (mainly comprising ArcelorMittal and Exarro facilities) (EMF, 2015). Iron ore dust levels are also significant (See *Figure 6.2* below for dust levels in Bluewater Saldanha Bay). Other emission source activities at the port include the handling of break bulk cargo and petroleum products, which emit particulates and volatile organic compounds. Emissions from shipping and port side vehicles and equipment are also sources of particulates and volatile organic compounds (VOCs).

Figure 6.2 Dust Monitoring Data in Bluewater Bay (Saldanha Bay)



Source: uMoya-Nilu (2011)

***Blue bars equal other dust and the Orange bars equal Fe oxide*

(1) Particulate matter is the term for solid or liquid particles found in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particles originate from a variety of sources and as a result their chemical and physical compositions vary widely (EPA, 2015). PM10 particles are <10 µm in size and PM2.5 particles are less than <2.5 µm in size.

6.1.3 *Surface and Groundwater*

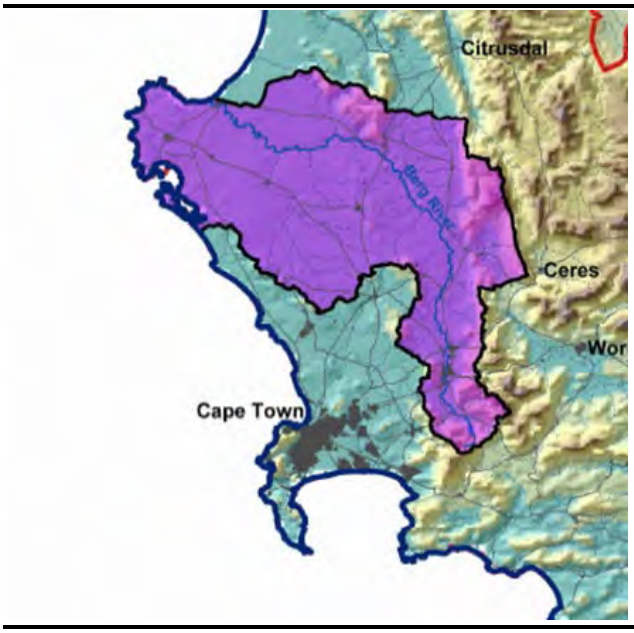
Surface water

The West Coast is a water scarce area with the region receiving on average 300 mm of rain annually (EMF, 2015). The primary water resource is the Berg River; however groundwater still plays a significant role as a water supply source. The area falls within the winter rainfall region of South Africa and therefore receives most of its rainfall April and September. Mean annual evaporation (MAE) is relatively high with a total potential rate of some 1 300 mm (EMF, 2015).

The site is situated within the Berg River catchment area (*Figure 6.3*), which is over 9,000 km^2 in area, and is the most important and largest catchment in the Western Cape Province. The catchment area is divided into 12 zones. The proposed site is located in quaternary catchment G10M (1), within the Berg Water Management Area (WMA). G10M is the catchment area's biggest zone, covering an area of 1,999 km^2.

There are no surface water resources (including rivers, dams or wetlands) located at the proposed site or along the pipeline route.

Figure 6.3 Berg River Catchment



Groundwater

<u>Geology and aquifers and recharge</u>

(1) Department of Water Affairs water management area boundary description number

According to the available published geological information, the proposed site is underlain by limestone and calcrete of the Langebaan Formation (GMS, 1973). The formation is of Quaternary age and the thickness ranges from 30m to 80m. The older limestone dunes of the formation in the area are heavily calcretised and are capped by a 1-2m thick layer of cohesionless, quartzitic sand overlying hardpan calcrete. The younger limestone dunes occur on the western shore of the Langebaan Lagoon are exposed as a calcrete-capped, consolidated barrier dune (Theron *et al*. 1992).

The proposed site is located on the Langebaan Road Aquifer System (LRAS) which extend towards Vredenburg in the North-west, Velddrif in the north and Hopefield in the east. The aquifer is an intergranular type aquifer with typical borehole yields between 0.1 and 0.5 litres/second. Using the Aquifer Classification according to the Aquifer Classification Map of South Africa (DWAF, 1999) the aquifer at the site is classified as a poor aquifer system with low vulnerability ( ) and low susceptibility ( ) to contamination.

The mean annual precipitation for the area ranges from 300 to 400mm and groundwater recharge is 10 to 15mm per annum (DWAF, 1995).

Groundwater levels and flow direction

The depth to groundwater is important primarily because it determines the depth of material through which any contaminants from surface must migrate before reaching an aquifer. There is a greater chance for attenuation of contaminants to occur as the depth to groundwater increases. The groundwater levels in the area are typically 10 to 20 meters below ground level (DWAF, 1995) and groundwater level data obtained from NGA boreholes suggest groundwater ranges between 2 and 7 meters below ground level. The difference in depth to groundwater levels suggest that the boreholes are accessing a perched water aquifer, perhaps above the calcrete geology typically found in the area.

Groundwater flows in a south-westerly direction across the site towards the coast and Saldanha Bay.

Quality and groundwater users

The electrical conductivity (EC) of water is a physical property which is widely used as an alternative to the chemical measuring of total dissolved solids (TDS), to determine water quality. Pure water has a low conductivity and an increase in conductivity generally reflects a decrease in water quality. The EC of groundwater in area of Sites A and B is generally between 150 and 300 mS/cm (DWAF, 2002). According to DWAF (1998) this represents saline conditions and is unacceptable for long-term drinking purposes.

According to the National Groundwater Archive (NGA) there are a number of registered boreholes within 1 km of Site A and Site B. The location, usage and owner of the boreholes are detailed in *Table 6.2.*

Table 6.2 Identified NGA boreholes

Approx. distance and direction	Land owner / operator	Usage	Other information
3.0km, west	Arcelor Mittal	Unknown	None
4.0km, south west	Arcelor Mittal	Groundwater monitoring	Depth to groundwater is 4-7mbgl (Aurecon, 2013)
7.5km, west	Water works plant	Unknown	Depth of groundwater is 2-3mbgl (NGA, 2015)

The closest municipal abstraction of groundwater occurs approximately 20 kilometres to the north east of the sites close to Langebaanweg where the range of extraction is between 1 and 2 million cubic metres per annum.

6.1.4 Geology, Soils and Fossils

The geology of the region and its paleontological history are closely linked as fossil types, their abundance, and mode of occurrence is directly related to the nature of the sediments in which they occur (EMF, 2015). Thus a description of the fossil potential or sensitivity is closely related to the geology of the area. The Saldanha Bay area has the following key formations:

- The *Varswater* Formation: This consists of two key sub members. The Langeberg Quartz Sand Member (LQSM) is richly fossiliferous, with a diversity of bones, shells and microfossils reflecting river floodplain, salt marsh and tidal-flat environments; and the Muishond Fontein Pelletal Phosphorite Member (MPPM) reflects further deepening, with deposition in an expanded estuarine system.

- The *Uyekraal* Formation: Shelly Sands were deposited on the shoreline to form the lower, outer part of the coastal plain after a seal level lowering occurring in the middle of the Pliocene period.

- The *Velddrif* Formation: includes all Quaternary marine deposits below about 15 meters above sea level (masl) that fringe the coast.

- The *Prospect Hill* Formation; consists of the inner aeolianite ridge between Saldanha Bay and Paternoster, includes fossil eggshell of the extinct ostrich *Diamantornis wardi.*

- The *Langebaan* Formation: These calcareous aeolianites are evident in the coastal landscape as the ridges, low hills and mounds beneath a capping calcrete crust, or surface limestone.

- The *Springfontyn Formation*: This formation comprises the mainly non-calcareous, windblown sand sheets and dunes that have covered parts of the landscape during the Quaternary.

There have been numerous fossil discoveries in the area many of which are now preserved in the West Coast Fossil Park, near Langebaan. Stone Age artifacts and remains of the indigenous Khoikoi are also widespread.

The soils in the area range from calcareous sands at the coast to acidic sands further inland. Shale and granite soils are relatively fertile and form the backbone of agriculture in the region (CWCBR, 2010). The area is primarily underlain by the *Langebaan Formation*, characterised by old calcareous aeolianites (dune sandstones), beneath a capping calcrete crust. The old dune accumulation dominates the local topography, forming the low mounded hills that are evident in the coastal landscape and are covered with vegetation of darker-green hue. The old dunes were formed during a lower sea level, when Saldanha Bay was exposed. At the coast these old dunes are now erosionally truncated by previous high shorelines and the present shoreline, forming a cliff that is partly covered by more recent sands.

Between the low hills of outcropping "Langebaan Limestones" is a cover of pale sands with less dense vegetation. Due to the erosional truncation of the Langebaan Formation at the present coast, it is exposed in the intertidal zone of the beach fringing the farm Spreeuwal. These beds are fossiliferous, with large mammal bones and some MSA artefacts (Avery & Klein, 2009). These "Spreeuwal Beds" illustrate the palaeo-environments that are a typically interbedded in the lower parts of the Langebaan Formation.

6.1.5 Flora and Fauna

Flora

Saldanha Bay falls within the Fynbos Biome and the Cape Floristic Region (CFR). The CFR is one of only six floristic regions in the world, is the richest temperate flora in the world, and is the only one confined to a single country. It is also the smallest floristic region and supports about 9000 plant species - almost half of all the plant species in South Africa. At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics, and may be confined to a single farm).

Many of the vegetation types that are present in the Saldanha Bay area occur only along the West Coast and are thus endemic to this area. The area is characterised by lowland habitats which are under pressure from agriculture, urbanisation, and alien plants, and thus many of the range restricted species

are also under threat of extinction, as habitat is reduced to extremely small fragments. Data from the Red Data Book listing process recently undertaken for South Africa is that 67% of the threatened plant species in the country occur only in the Fynbos biome, and these total over 1800 species (Raimondo *et al* 2009). The south-western Cape is a national and global conservation priority (Helme, 2015). In addition, there are Critical Biodiversity Areas (CBA's) across Saldanha Bay and the West Coast. CBAs are regarded as essential areas for the achievement of regional conservation targets, and are designed to ensure minimum land take for maximum result (Maree and Vromans 2010). These areas are categorised across the country.

Power Plant Site

A survey of the proposed site (1) was undertaken by Nick Helme during August 2015 (flowering season). The site is largely disturbed (likely by ripping) and has been heavily grazed and trampled which has reduced the rehabilitation success. The heavy grazing has meant that there were virtually no flowering annuals on the site at the time of the survey. Prior to disturbance the site would have supported Saldanha Flats Strandveld. The site is largely flat, but with deep neutral sands overlying calcrete, which are seldom exposed at the surface. There are no wetlands.

Figure 6.4 View of the proposed site looking northeast looking toward Blouwater substation

Source: Nick Helme, 2015
* Note the relative lack of flowering spring annuals, due to heavy grazing by livestock.

The northern 5-10% of the study area (adjacent to the road to Blouwaterbaai substation) supports intact Saldanha Limestone Strandveld, which has not

(1) Note that at the time of survey the site area had not been refined and was larger than the site area now indicated. The area of high conservation concern has been removed from the proposed site.

been ripped or heavily disturbed, and is thus more structurally diverse and of higher conservation value than the rest of the site.

Saldanha Limestone Strandveld was previously listed as an Endangered vegetation type (Rouget *et al* 2004), and then was unfortunately downgraded to Least Threatened (DEA 2011), due to an oversight by SANBI, and this error will apparently only be remedied only in about 2016. The unit has the highest number of threatened and localised plant species of all vegetation types in the Saldanha region (Helme & Koopman 2007). The unit is also poorly conserved (represented) in the West Coast National Park.

Typical species in this intact limestone area include *Thamnochortus spicigerus*, *Zygophyllum morgsana*, *Limonium capense*, *Senecio alooides*, *Pteronia divaricata*, *Euphorbia burmanii*, *Othonna cylindrica* and *Searsia glauca*.

Two plant Species of Conservation Concern (SCC) were recorded in this limestone area, and the likelihood that any others occur here in viable numbers is low. The recorded SSC include *Limonium capense* (Near Threatened), *Aloe distans* (a large population of this regional endemic, but now regarded as a subspecies of *A. perfoliata*), and *Nenax hirta ssp calciphila* (Near Threatened).

Indigenous plant species diversity includes *Galenia fruticosa*, *Exomis microphylla* (brakbos), *Oncosiphon suffruticosum* (stinkkruid), *Arctotheca calendula* (Cape weed), *Osteospermum incanum* (dune bietou), *O. chrysanthemoides* (bietou), *Muraltia spinosa* (tortoise berry), *Helichrysum niveum*, *Phyllobolus canaliculatus*, *Tetragonia fruticosa* (kinkelbos), *Stachys ballota*, *Mesembryanthemum crystallinum* (slaai), *Lycium ferocissimum*, *Oxalis pes-caprae* (geel suuring), *O. obtusa*, *Limeum aethiopicum* (koggelmandervoet), *Trachyandra divaricata* (duinekool), *Carpobrotus edulis* (suurvy), *Torilis arvensis*, *Senecio burchellii* (hongerblom), *Gladiolus cunonius*, *Calobota sericea* (fluitjiesbos), *Felicia hyssopifolia*, *Ehrharta calycina* (polgras), *Cynodon dactylon* (fynkweek), *Conicosia pugioniformis*, *Hermannia prismatocarpa*, *Ehrharta villosa* (pypgras), *Pelargonium myrrhifolium*, *Thamnochortus spicigerus* (duinriet), *Aspalathus acuminata*, *Searsia glauca* (kunibush), *Searsia laevigata* (dune taaibos), *Melolobium adenodes*, *Cissampelos capensis*, *Asparagus africanus*, *A. capensis*, *Amellus sp*., Gymnosporia buxifolia (pendoring), *Oxalis luteola*, *Crassula expansa*, *C. vaillantii*, *Ornithogalum sp*., *Zygophyllum morgsana*, *Viscum capense* (voelent), *Haemanthus pubescens* (poierkwas), *Trachyandra falcata* (veldkool) and *T. ciliata*.

Various annual alien grasses are also present, including *Bromus pectinatus*, *Bromus diandrus* (ripgut brome), *Lolium sp.* (ryegrass), *Avena sp*. (wild oats) and *Vulpia myuros* (ratstail fescue), plus the alien herbs *Erodium moschatum* (cranesbill), *Echium plantagineum* (Pattersons's curse), *Raphanus rapistrum* (wildemostert) and *Brassica tournefortii*. No woody alien species are present, and none of the alien herbs or grasses is dominant.

No plant Species of Conservation Concern were recorded in the disturbed part of the study area, and the likelihood that any occur here in viable numbers is low.

Importantly it should be noted that the small northern portion of the study area with high conservation concern has been removed from the proposed site subsequent to the survey.

Botanical Conservation Value

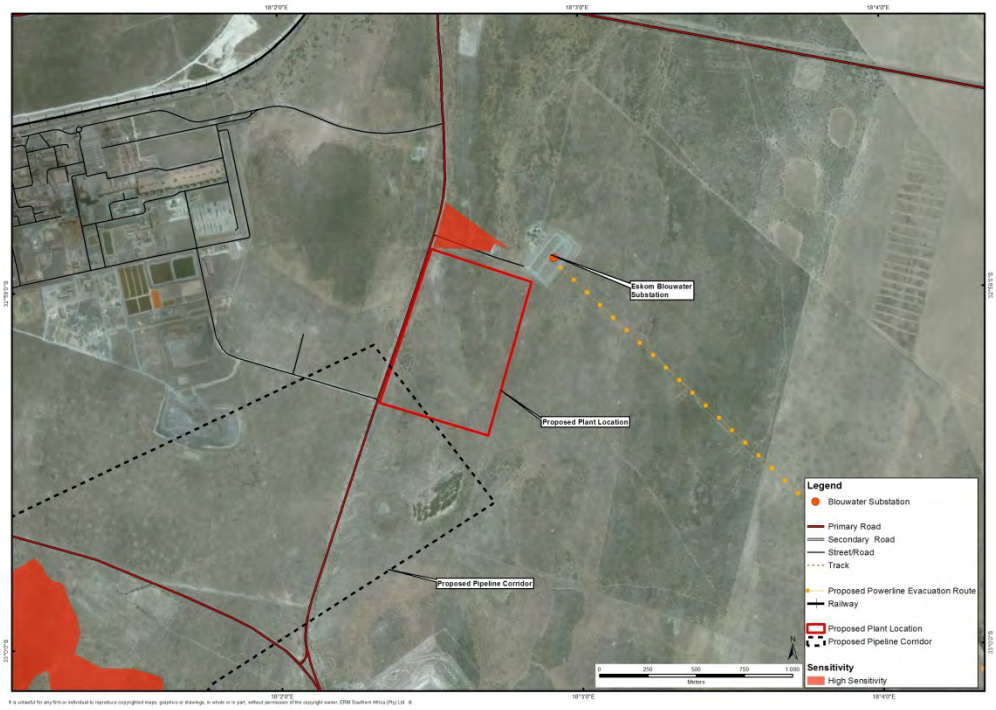
The terms conservation value and sensitivity are often used interchangeably, but this is not strictly correct. The term "conservation value" refers to the value of the habitat in local and regional conservation terms (*i.e.* answering the question how important is it?), whilst "sensitivity" strictly means how resilient is the habitat to disturbance. In the case of urban or industrial development any natural or partly natural habitat would effectively be permanently lost in the development footprint, and thus technically sensitivity would be high, irrespective of the conservation value of the underlying habitat.

The conservation value of a habitat is a product of species diversity, rarity of habitat, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats (ease of rehabilitation).

Areas that have been cultivated or ripped and have relatively low botanical diversity and no significant populations of plant Species of Conservation Concern (SCC) are considered to be of Low botanical conservation value at a regional scale.

High conservation value areas support relatively intact examples of the locally restricted vegetation type Saldanha Limestone Strandveld, with regionally significant populations of various plant Species of Conservation Concern. These areas may or may not be designated CBAs. These areas are considered ecologically irreplaceable, on account of the presence of relatively intact examples (with both high species diversity and high structural heterogeneity) of a regionally restricted vegetation type (in this case Saldanha Limestone Strandveld), and due to the presence of regionally endemic plant Species of Conservation Concern. Conservation of such areas would contribute significantly to species and/or ecological process targets for the region, and should be considered No Go areas for development.

Figure 6.5 ***Orthophoto showing the proposed site and the area of high conservation concern to the north***



Source: ERM, 2016

Fauna

In general, fynbos vegetation cannot support high numbers animals due to the poor nutrients in the soils. However, there is a range of faunal life within the Saldanha Bay area (EMF, 2015).

- *Mammals*. A number of mammal species are threatened, endemic or near endemic to the area. Key species include: The Van Zyl's Golden Mole (*Cryptochloris zyli)*, Cape Dune Molerat (*Batyergus suillus)*, Cape Gerbil *Tatera afra* and Grant's Golden Mole (*Eremitalpa granti)* (Vulnerable) are endemic or near endemic. The Honey Badger (*Mellivora capensis)* is listed as Near Threatened, as is the Cape Horseshoe Bat (*Rhinolophus capensis)*, and the White-tailed Mouse (*Mystromys albicaudatus)* is endangered.

- *Reptiles*. The diversity of reptile species is relatively high in the drier areas along the West Coast including snakes, lizards and tortoises. For example. Seven species of girdled lizards of the genus Cordylus, including the armadillo girdled lizard (*Cordylus cataphractus*, Vulnerable) and the Cape Girdled Lizard *(Cordylus niger)* (endemic to Cape Peninsula and Saldanha Peninsula) are endemic to the area. The Geometric Tortoise (*Psammobatus geometricus)* is Critically Endangered and has lost more than 90% of its habitat.

Avifauna

Up to 267 bird species have been recorded within the relevant and respective South African Bird Atlas Project (SABAP 1) and within the study area as well as the broader impact zone of the development, including 26 red-listed or threatened species, 40 endemic species and 26 near – endemic species. A large portion of these species were however not considered relevant for this study due to the fact that the grid size used for the SABAP 1 data collection was 27 km X 27 km, extending out to sea.

The birds of greatest potential relevance and importance in terms of the possible impacts of the proposed CCGT power plant are likely to be local populations of endemic passerines (Cape Long-billed Lark Certhilauda curvirostris and Cape Clapper Lark Mirafra apiata), resident or visiting large terrestrial birds (Blue Crane, Southern Black Korhaan and Secretarybird Sagittarius serpentarius), resident or passing raptors (Martial Eagle, Lanner Falcon, Black Harrier) and transient waterbirds (Greater Flamingo, Lesser Flamingo, Great White Pelican and Maccoa Duck).

Table 6.3 includes a list of priority species list considered central to the avifaunal impact study for the proposed Project, selected on the basis of conservation status (Taylor *et al.*, 2015).

Critical Biodiversity Areas (CBA)

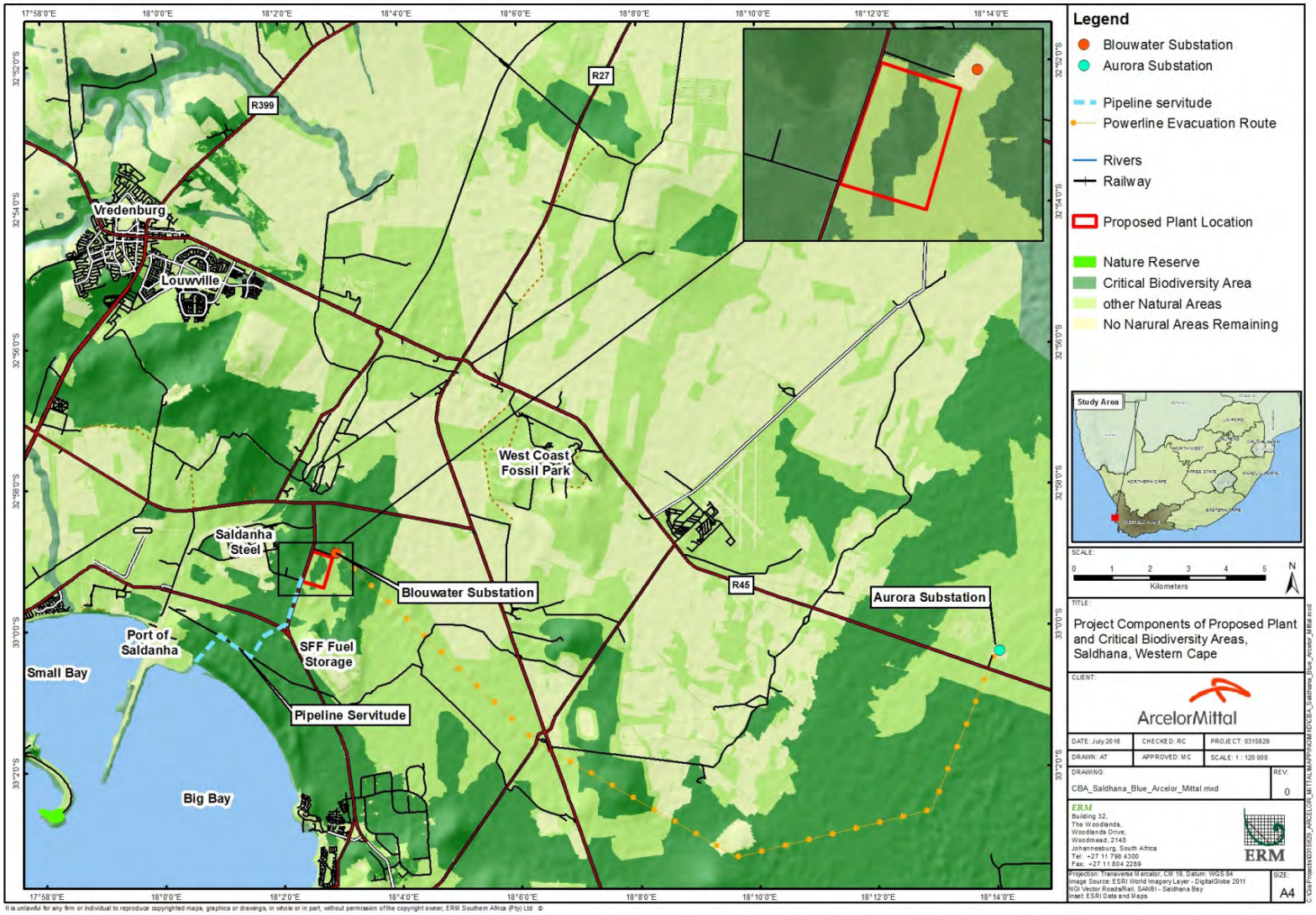
CBA information has been drawn from the Biodiversity Sector Plan that has been prepared for the Saldanha Bay, Berg River, Cederberg and Matzikama municipalities. The sector plan is based on the work conducted under the auspices of Cape Nature's Fine-Scale Biodiversity Planning project. The study area is within the planning domain of the Saldanha Fine Scale Conservation Plan (Pence, 2008). The maps have been produced to satisfy legislation in Chapter 3 of NEMBA. CBA's defined as biodiversity areas that are of high priority and that is required to maintain biodiversity pattern and process (i.e. functioning ecosystems) and to meet conservation targets (EMF, 2015). *Figure 6.6* illustrates the CBA and potential Project component, showing that potentially up to 43percent of the land within the ArcelorMittal project site is within a declared CBA.

Table 6.3 Important avifauna species found within study area

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in the study area
Bustard, Ludwig's	*Neotis ludwigii*	Endangered	Endemic	Moderate	Semi-arid dwarf shrubland, also in arid savanna and fynbos	Low
Crane, Blue	*Anthropoides paradieus*	Near-threatened	Endemic	High	Grasslands, but also in wetlands, cultivated pastures and croplands	High
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Near-endemic	Low	Sparsely vegetated arid regions	Low
Duck, Maccoa	*Oxyura maccoa*	Near-threatened	-	Moderate	Inland water bodies with emergent vegetation; flyover	Moderate
Eagle, Martial	*Polemaetus bellicosus*	Endangered	-	Low	Open savanna and woodland on plains, also semi-arid shrublands	Recorded in the study area
Eagle, Verreaux's	*Aquila verreauxii*	Vulnerable	-	Moderate	Mountainous regions and rocky areas with cliffs	High
Falcon, Lanner	*Falco biarmicus*	Vulnerable	-	High	Open grassland or woodland near cliff or electircity pylons	Recorded in the study area
Flamingo, Greater	*Phoenicopterus ruber*	Near-threatened	-	High	Saline or brackish water bodies; flyover	High
Flamingo, Lesser	*Phoenicopterus minor*	Near-threatened	-	High	Eutrophic shallow wetlands, saltpans; flyover	High
Harrier, African Marsh	*Circus ranivorus*	Endangered	-	High	Inland and coastal wetlands, and ajacent moist grasslands	High
Harrier, Black	*Circus maurus*	Endangered	Near-endemic	High	Fynbos, shrubland, dry grassland and croplands	Recorded in the study area
Korhaan, Southern Black	*Afrotis afra*	Vulnerable	Endemic	High	Renosterveld, fynbos and succulent Karoo	Recorded in the study area
Pelican, Great White	*Pelecanus onocrotalus*	Vulnerable	-	High	Shallow lakes, estuaries, large pans and dams	High
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	Moderate	Open grassland with scattered trees and shrubs	Moderate

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in the study area
Stork, Black	*Ciconia nigra*	Vulnerable	-	Moderate	Mountainous regions	High
Vulture, Cape	*Gyps coprotheres*	Endangered	Near-endemic	Low	Mountainous regions, but range widely in surrounding areas	Low

Figure 6.6 *Critical Biodiversity Areas close to the Project*



6.1.6 Noise

The area is sparsely populated in the vicinity of the industrial zone. The closest noise-sensitive receptors are further than 2000 m from the proposed Project. An assessment of the area was done using available topographical maps to identify potential Noise Sensitive Developments (NSD) in the area. Noise-sensitive developments and other potential Interested and Affected Parties identified are highlighted in *Figure 6.7*.

Ambient sound levels were measured at one location for a two night-time period during May 2016 using a class-1 Sound Level Meter. The sound level meters would measure "average" sound levels over a 10 minutes period, save the data and start with a new 10 minute measurement till the instrument was stopped. This data was also augmented with additional measurements at three locations during the day and night.

The data collected and information about the measurement locations are presented in *Table 6.4*.

Short term measurements indicated ambient sound levels typical of an urban noise district (with main roads, business and workshops) closer to the project site. Daytime ambient sound levels are higher, mainly due to road traffic, although wind-induced noises also contributed to the ambient sound levels. Short term measurements away from roads, business and residential dwellings indicate an area with the potential to be very quiet.

Figure 6.7 *Aerial image indicating potential noise sensitive receptors in the vicinity of the proposed development*

Table 6.4 Summary of singular noise measurements

Measurement location	$L_{Aeq,i}$ level (dBA)	$L_{Aeq,f}$ level (dBA)	L_{A90} Level (dBA90)
AMSGSTASL01 Daytime	76	73	52
	76	73	50
AMSGSTASL01 Night-time	51	47	45
	52	48	45
AMSGSTASL02 Daytime	75	72	51
	75	72	51
AMSGSTASL02 Night-time	49	46	45
	51	47	46
AMSGSTASL03 Daytime	49	47	39
	47	45	37
AMSGSTASL03 Night-time	37	29	24
	32	24	20

Legend:
$L_{Aeq,i}$ - Equivalent (average) A-weighted impulse-time-weighted noise level
$L_{Aeq,f}$ - Equivalent (average) A-weighted fast-time-weighted noise level
L_{A90} - Noise level that is exceeded 90% or more of the time, A-weighted fast-time-weighted noise level

Figure 6.8 Day and night spectral frequencies recorded at AMSGSTASL01

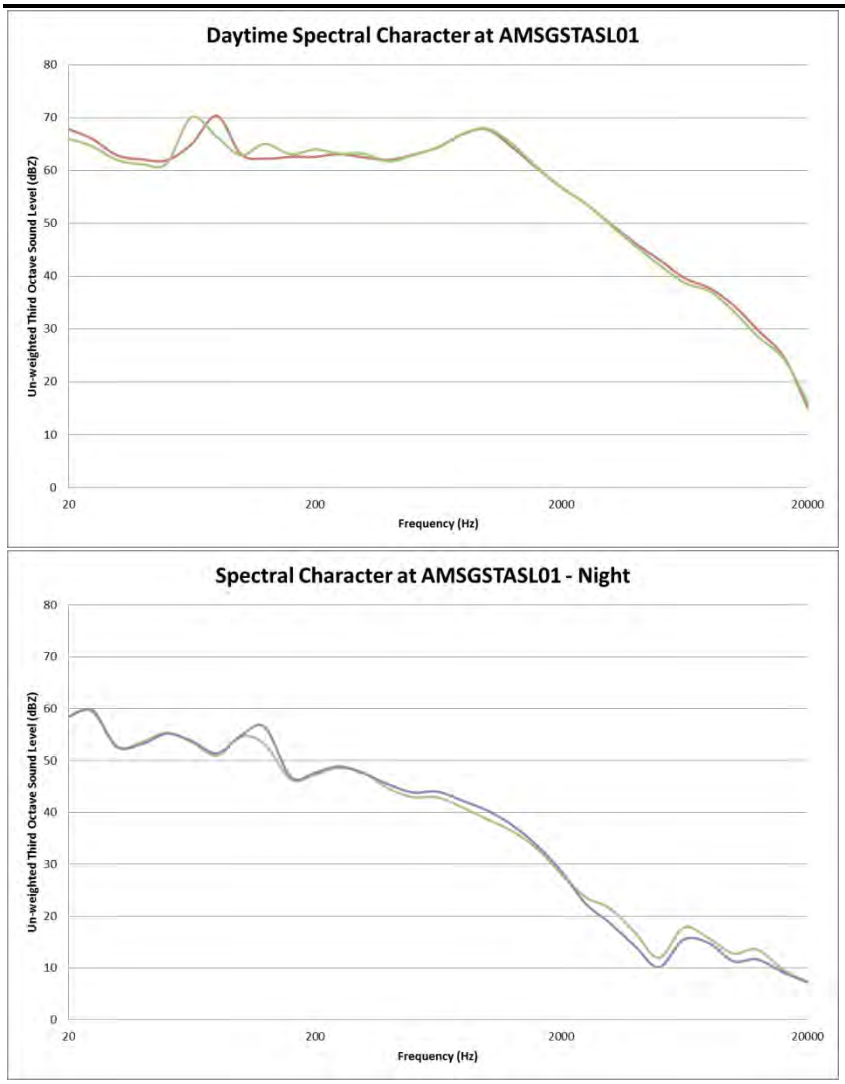


Figure 6.9 Day and night spectral frequencies recorded at AMSGSTASL02

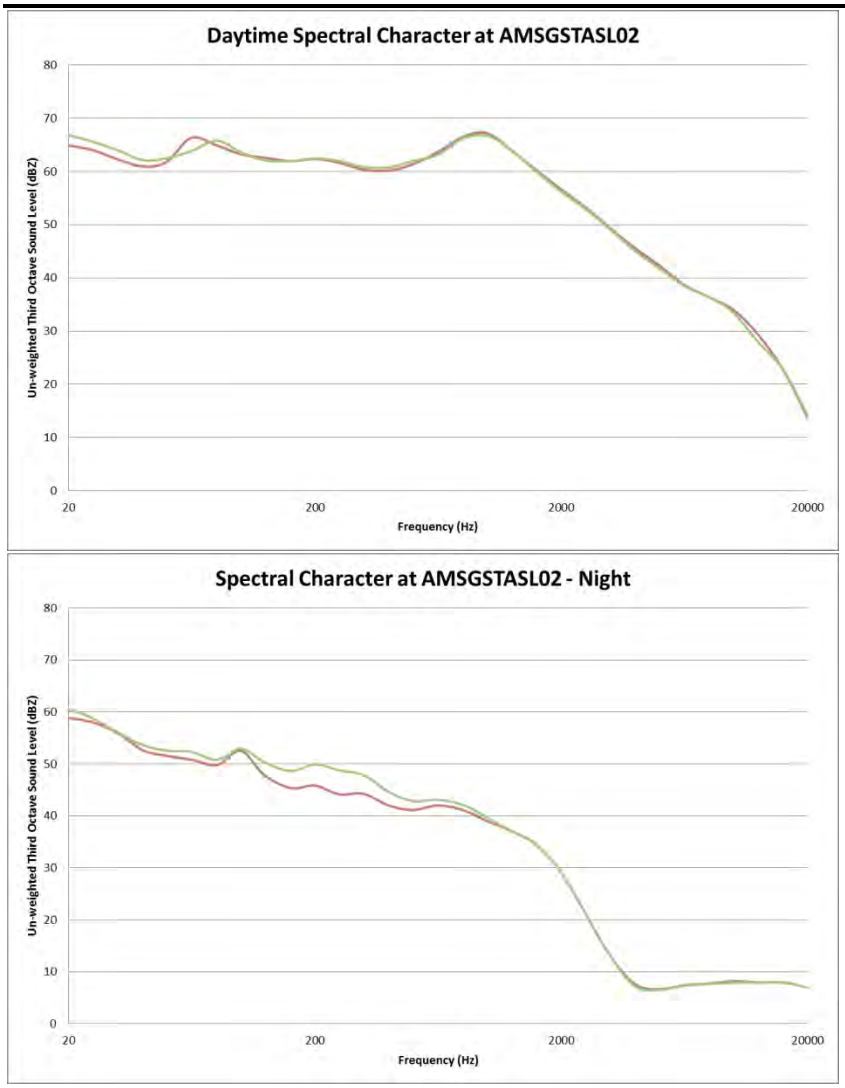
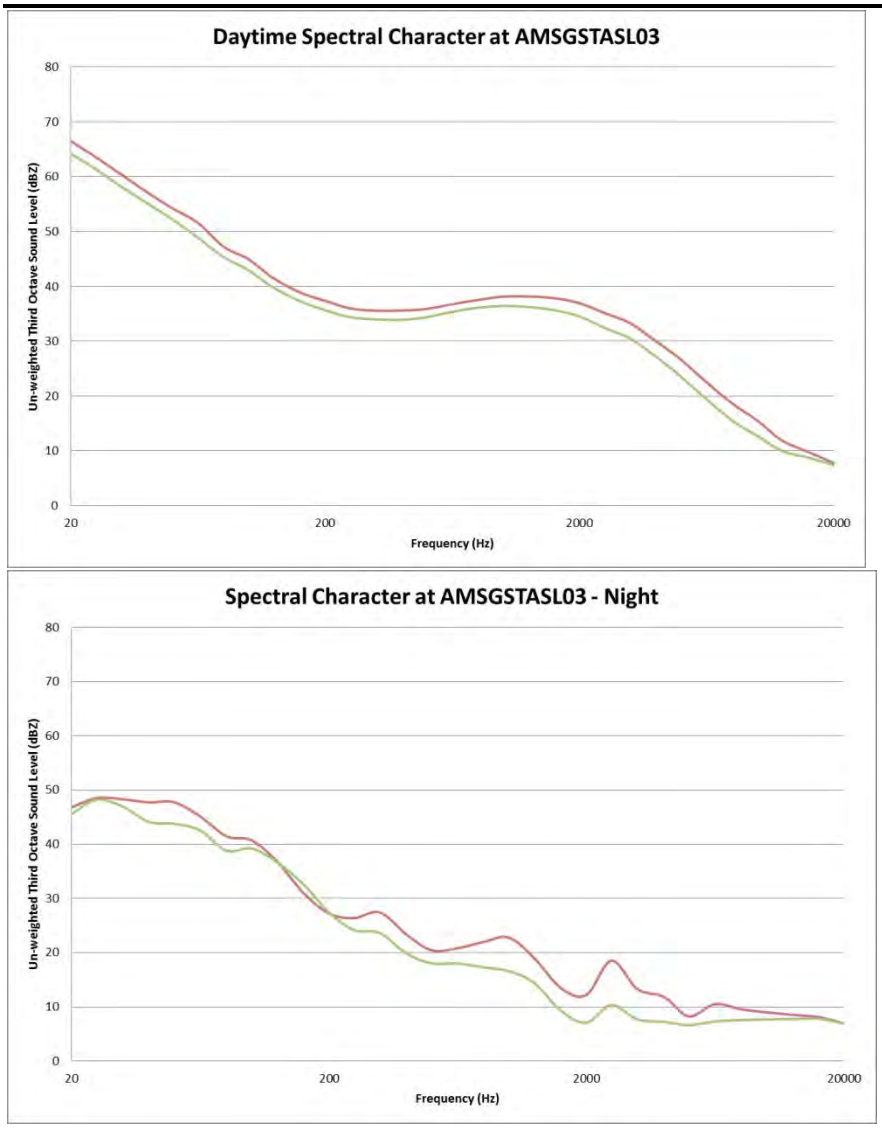


Figure 6.10 Day and night spectral frequencies recorded at AMSGSTASL03



7 SOCIO-ECONOMIC BASELINE

This Section describes the socio-economic environment in which the Project is situated. The description provided in this section is based on publicly available and secondary information, as well as primary data collected for the Project.

7.1 AREA OF INFLUENCE (AOI)

The socio-economic baseline description is focused on local level, i.e. within the Saldanha Bay Local Municipality, situated in the West Coast District Municipality. This is because it is expected that although the proposed Project will result in macro-economic benefits at a national level, the primary socio-economic impacts of the Project will be experienced at a district and local level.

The socio-economic area of influence has been divided into the Direct Area of Influence and the Indirect Area of Influence, these are described below.

7.1.1 *Area of Direct Influence*

The Area of Direct Influence, ADI, includes the Project footprint and related facilities as well as the associated effects of the Project on the receiving environment. This encompasses:

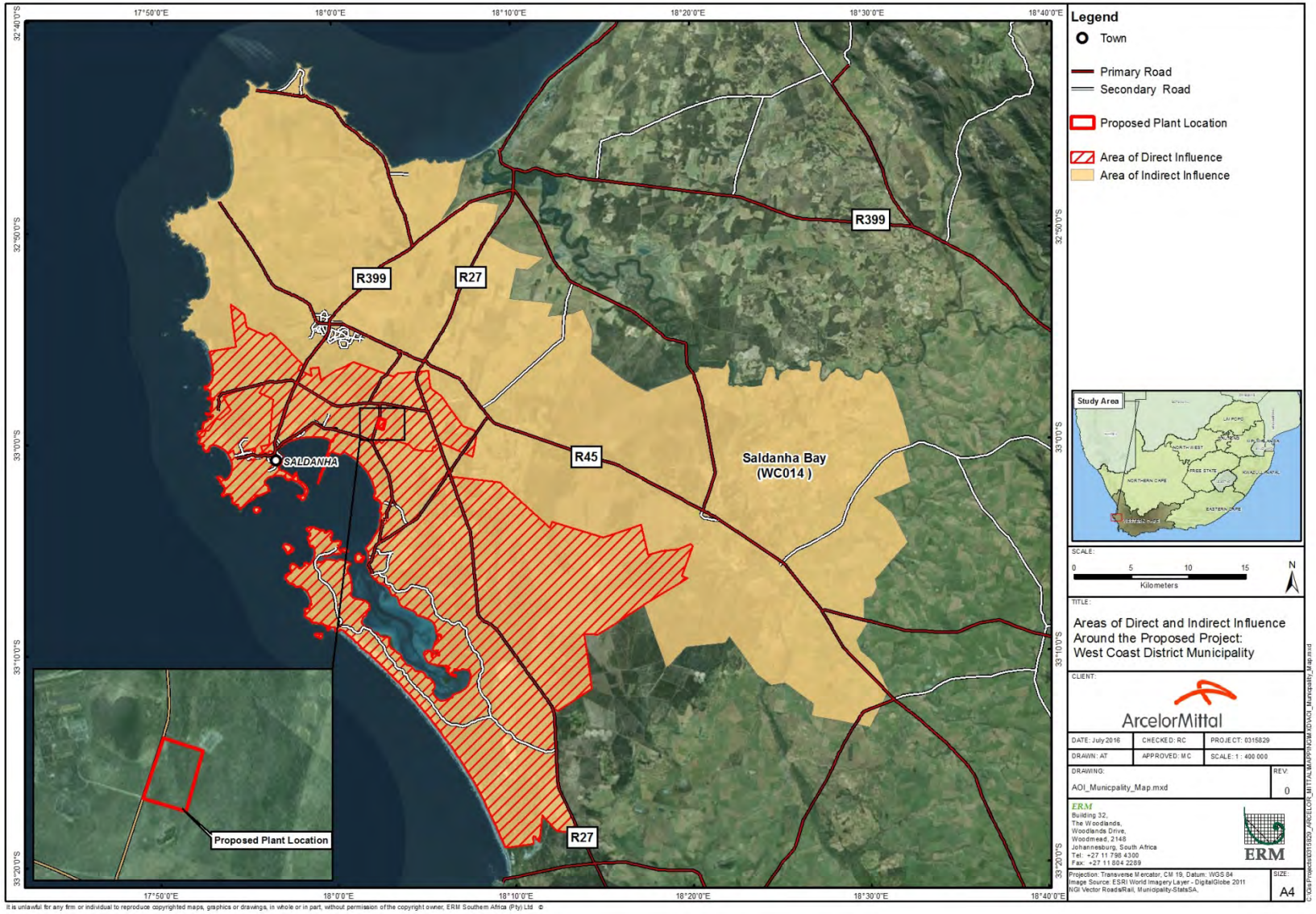
- The 45 ha CCGT Power Plant site;
- the 5 km pipeline route;
- the transmission line to Saldanha Steel.

In the context of this study, the ADI further includes areas around the site likely to be affected by the Project activities during the pre-construction, construction and operation phases. The effects can be positive or negative, short or long term or permanent, as well as direct and in-direct. These areas include the settlements located within close proximity to the Project site, namely, the greater Saldanha Bay area, in particular Ward 1, Ward 3, Ward 4, Ward 5 and Ward 6 (refer to *Figure 7.1*).

7.1.2 *Indirect Area of Influence*

The Area of Indirect Influence, AII, includes areas within a wider radius of the Project Site, which may be affected by the Project, this includes, although to a lesser extent, the remainder of the Saldanha Bay Local Municipality, particularly the town of Vredenburg, Ward 2, Ward 9, Ward 10 and Ward 13 (refer to *Figure 7.1*).

Figure 7.1 Project Area of Influence



7.2 *ADMINISTRATIVE STRUCTURE*

The Project is in the Western Cape Province and the West Coast District Municipality (WCDM). The WCDM borders the Northern Cape District Municipality (NCDM) in the north and the Cape Metro District Municipality (CMDM) and Cape Winelands District Municipality (CWDM) in the south and south-east, respectively. The District Municipality has five local municipalities; namely Swartland, Bergrivier, Matzikama, Cederberg, and Saldanha Bay, and the Project site is located in the Saldanha Bay Local Municipality (SBLM) (see *Figure 7.2).* There are 13 Wards within the SBLM and the Project footprint falls within Ward 5.

The Provincial government is responsible for providing the strategic vision and framework for the Province. They are responsible for ensuring cooperation and collaboration between municipalities and that each municipality performs their respective functions. In turn, each of the District Municipalities is responsible for the preparation of Integrated Development Plans and for the overall provision of services and infrastructure within their District. *Figure 7.3* shows the administrative structure of the respective levels of government.

Figure 7.2 West Coast District Municipality Boundaries

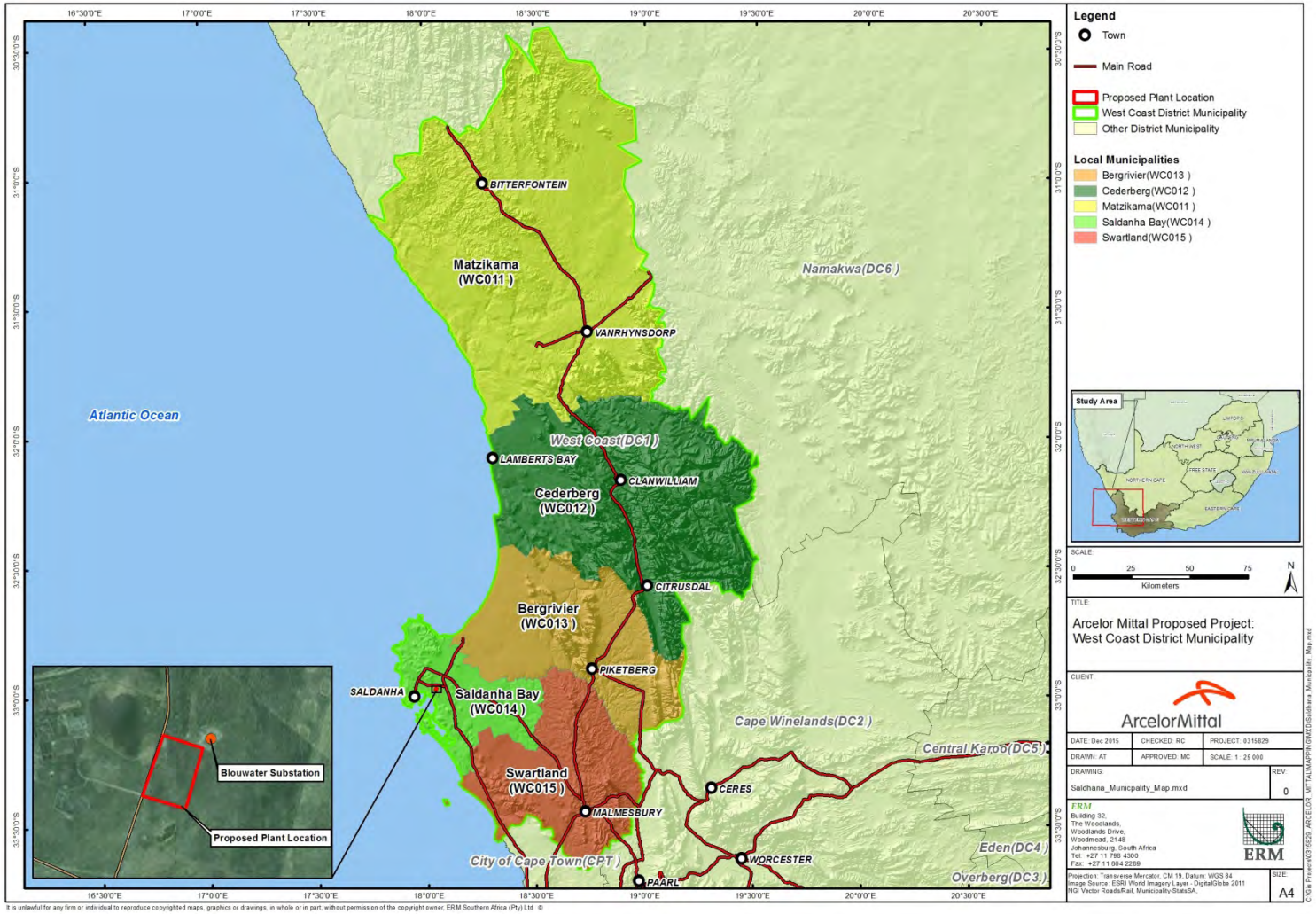
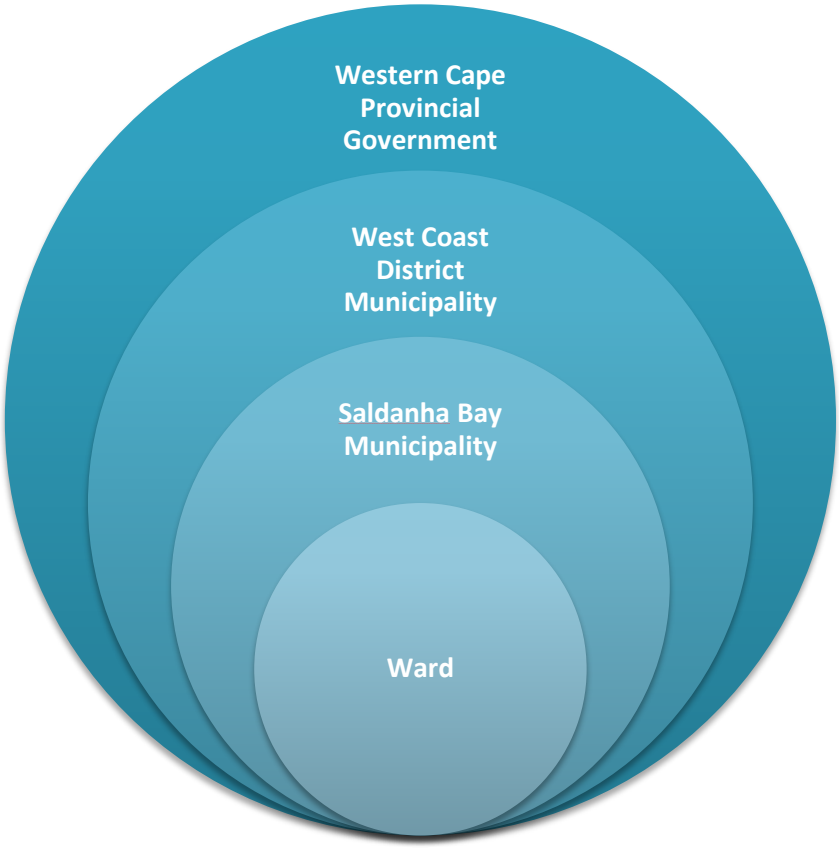


Figure 7.3 Administrative Structure



7.3 SITE SETTING AND LANDUSE

7.3.1 *Land-use of the Project Site*

The Project site is located on land currently owned by ArcelorMittal, less than 1 km to the east of the existing Saldanha Steelworks, immediately adjacent to the Blouwater substation. The site is vacant and is currently managed by Saldanha Steel for grazing. The site is not leased out to other farmers. The site is located within an area identified for industrial development according the Saldanha Bay Municipal Spatial Development Framework (2011).

The pipeline will traverse across land owned by ArcelorMittal until the Port boundary (where the Scope of this EIA ends).

The site is served by the existing road infrastructure. The access to the development is via TR 85/1 coming from the east off the R27 (TR 77/1). Provincial Road OP7644 abuts the site to the west and links TR85/1 to MR559. OP7644 is a two lane undivided rural roadway from which access to the site is provided opposite the Saldanha Steel entrance.

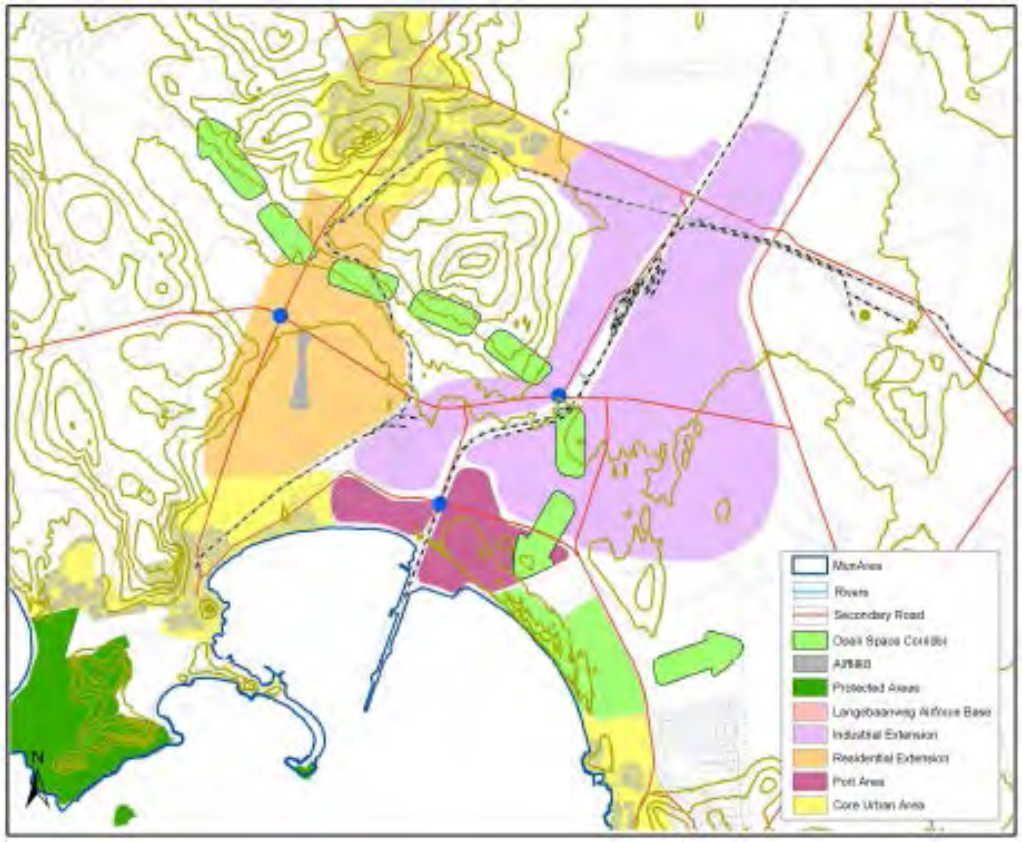
Figure 7.4 View of the Site

7.3.2 Surrounding Land-use

The Project site is located in an industrial area within Saldanha Bay. The land immediately surrounding the site it utilised for industrial purposes, grazing or is vacant land. Within the broader area, much of the surrounding land to the north and east is utilised for agriculture. The residential areas of Langebaan and Saldanha Bay are located approximately 7 km south and west of the site respectively, while Vredenburg is located approximately 8 km north-west of the site.

Surrounding industries include Saldanha Steel, a number of engineering companies with an oil and gas focus located in the IDZ, and the Port of Saldanha with associated infrastructure and terminals. The West Coast National Park is located approximately 15 km south of the site, and the SAS Saldanha Contractual Nature Reserve is located 12 km south west of the site. *Figure 7.5* shows the planned land-use zoning within Saldanha Bay.

Figure 7.5 Planned Land Use within Saldanha Bay Area



Source: Saldanha Bay Municipal Spatial Development Framework, 2011

The Saldanha Bay residential area is divided in to a number of sub-places, namely, Saldanha, Diazville (including Middlepos), White City and the Military Area. Diazville and White City are densely populated areas, with low cost, single unit dwellings on small stands. The population in these areas are predominantly lower income families. The population of Saldanha are predominately of middle to high income. The residential area of Langebaan and the surrounding sub-places consist largely of single unit residential homes and housing estates, many of which are second homes or rented out to accommodate tourists.

This pattern is replicated in Vredenburg, which is divided into Vredenburg, Louwville, Witteklip and Ongegund. Louwville, Witteklip and Ongegund are densely populated, with a population of a lower income bracket, while Vredenburg is comprised of middle to high income families.

7.3.3 The Port of Saldanha

The Port of Saldanha Bay is South Africa's largest natural anchorage. The Port developed into a modern harbour when it became necessary to facilitate the export of iron ore from the Northern Cape via an 800 km railway line from the mines at Sishen in the Northern Cape. The Port accepts vessels of up to 20.5 m

draught. The Port entrance channel is dredged to a depth of -23 m Chart Depth and a width of 400 m.

The total area occupied by the Port (land and water areas) is 18,300 ha and it has a 990 m long jetty containing two iron ore berths linked to the shore along a 3.1 km long breakwater. There is also an 874 m long multipurpose quay for the handling of breakbulk cargo. Between 2011 and 2012 the Port of Saldanha Bay handled a total of 528 ships with a total gross tonnage of 34,503,749-gt. In 2011/12 cargo handled by the port totalled 58,263,030 tonnes, of primarily iron ore but also oil.

Figure 7.6 ***Ariel View of the Port of Saldanha***

7.4 *DEMOGRAPHIC PROFILE*

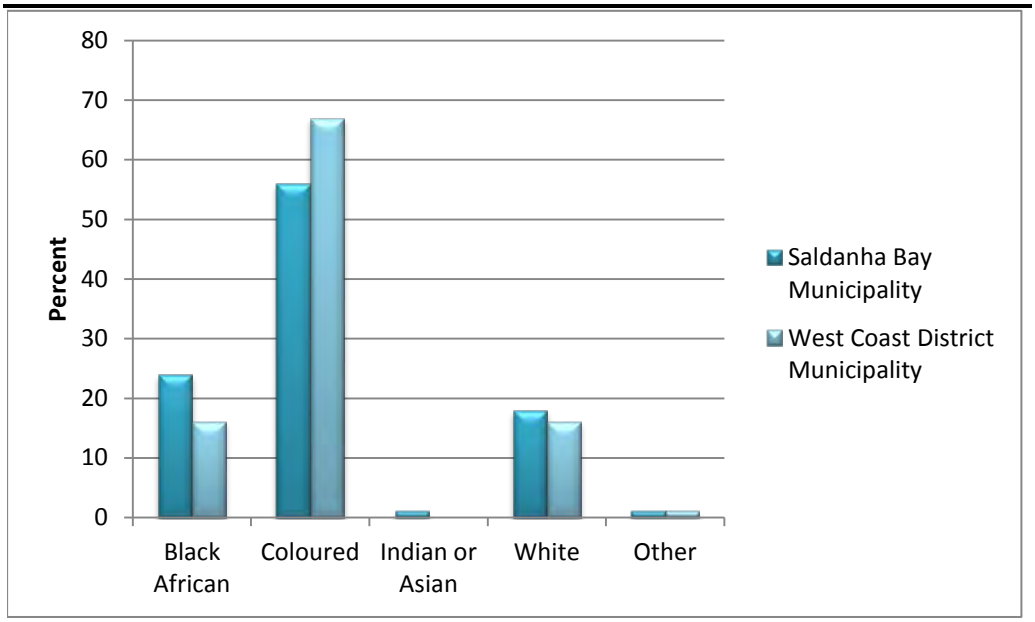
The 2011 Community Survey notes that the population of the WCDM is estimated to be 391 758. The District occupies 19 percent of the total land area of the Western Cape Province and is sparsely populated with a population density of 13 people per square kilometre. Approximately 72 percent of the population lives in urban areas with the remaining 28 percent living in rural areas. The District is relatively urbanised and the rural areas are sparsely populated.

The SBLM has the second largest population (99,193 people) in the District area with the Swartland Municipality having the highest population (113 763). The population of the SBLM increased by 3.4 percent between 2001 and 2011 (StatsSA, 2011), greater than the predicted 2.2 percent growth expected in the Saldanha Bay Local Municipality, IDP, 2007/2008. Some 95 percent of SBLM

households are concentrated in urban areas with the remaining 5 percent living in rural areas (DEA&DP, 2012). This is the highest proportion of people living in urban areas as compared to the other Local Municipalities in the WCDM and well above the District average of 72 percent (StatsSA, 2011). The population density in SBLM is 49 persons per square kilometer which is significantly higher than that of the District Municipality (13 people per square kilometer).

The WCDM's population is composed of three ethnic groups, namely; Coloured, Black Africans and White Communities. The most dominant of these is the Coloured community (67 percent) while both White and Black African groups account from 16 percent of the population, as shown in *Figure* 7.7. Within the SBLM, the Coloured community account for 56 percent of the population, while Black Africans account for 24 percent and White people account of 18 percent of the population (StatsSA, 2011).

Figure 7.7 Ethnic Composition in the WCDM and the SBDM



Source: StatsSA (2011)

The total population within the ADI is 37,866, and a breakdown thereof is provided in *Table 7.1* below. *W*hile the population is fairly evenly spread between the five wards, Ward 3 and 4 are significantly smaller than the other wards, indicating that the population density is highest within these two wards.

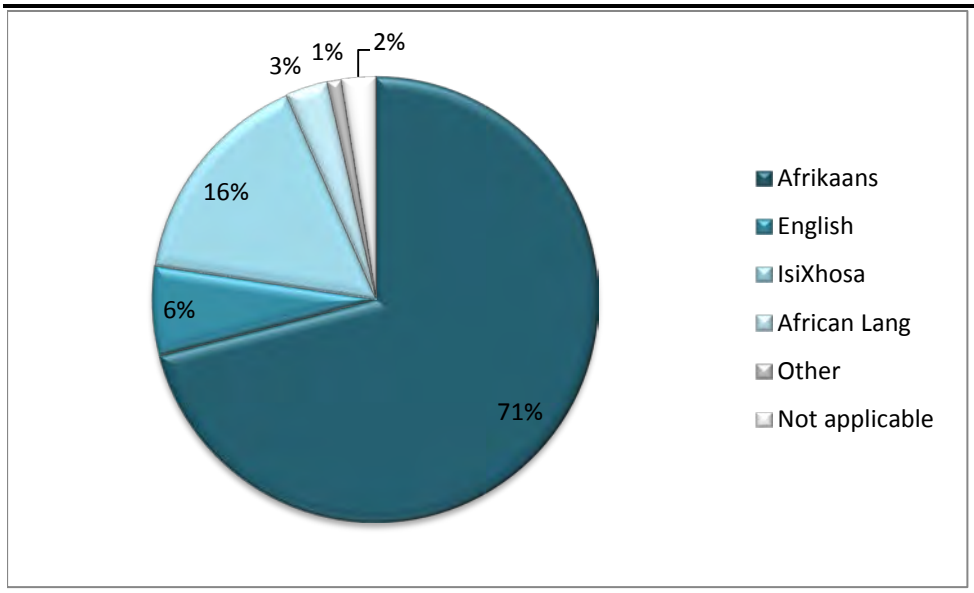
Table 7.1 Population with the ADI

Ward	Black African	Coloured	Indian or Asian	White	Other	Total Population
1	4 647	3 519	120	9	105	8 400
3	2 115	3 237	96	717	42	6 207
4	1 191	7 254	84	6	57	8 592

Ward	Black African	Coloured	Indian or Asian	White	Other	Total Population
5	492	1 818	96	3 744	51	6 201
6	630	2 931	39	4 749	117	8 466
Total Population						37 866

Afrikaans is the dominant language spoken in the SBLM, with an estimated 71 percent of the population being native speakers, isiXhosa is the second most commonly spoken language at 16 percent and English at 6 percent this is illustrated in *Figure 7.8.*

Figure 7.8 Language Spoken in the SBLM



Source: StatsSA (2011)

7.5 MIGRATION

The primary driver of migration is the search for employment and income, and the urban centres of the Western Cape attract many migrants as they provide a hub of economic activity. The agriculture sector dominates much of the WCDM, with populations highly dependent on agriculture for employment. The contraction of the agriculture sector in the WCDM resulted in notable job losses and although the agricultural sector remains a large employer (25 492 workers), the sector shed 19 786 between 2000 and 2013 (Western Cape Government, 2013). As a result, many people seeking alternative employment will gravitate towards larger urban centres, where there is perceived to be a greater prospect of employment opportunities.

The population of the SBLM increased by 3.4 percent between 2001 and 2011 (StatsSA, 2011), greater than the predicted 2.2 percent growth expected in the Saldanha Bay Local Municipality, IDP, 2007/2008, and this is likely due to an in-migration of job seekers. Saldanha Bay and Vredenburg, the major urban centres in the SBLM, will attract many of the migrants entering the SBLM as

they seek access to employment opportunities as well as social infrastructure and services.

7.6 LIVELIHOODS AND ECONOMY

The WCDM contributed about 4.3 percent to the Western Cape's total GDPR (Regional Gross Domestic Product) in 2011 (Western Cape Government, 2013). The WCDM has experienced slow economic growth in the past five years. This can be attributed to the contraction in agriculture in some of the municipal areas, namely Bergrivier LM, Matzikama LM and Cederberg LM, as well as a struggling manufacturing sector, particularly in the SBLM, which was affected by the economic downturn. While jobs have been lost in the agricultural and manufacturing sectors, positive net employment was recorded in the services sector, with SBLM recording the highest number of new jobs in the service sector (Western Cape Government, 2013).

The agricultural, forestry and fishing sectors were the sectors that performed the best; contributing 16.8 percent to the GDPR of the WCDM. Sectors such as wholesale, retail trade catering and accommodation, and finance, insurance, real estate and business services had the lowest contribution to the GDPR of the West Coast Region at 3.7 percent and 3.4 percent respectively (Western Cape Government, 2013).

It is important to note that the SBLM differs significantly from the WCDM in terms of economic activity. The SBLM, being host to a large port, supports a more lively manufacturing and processing sector, and has developed the economic hub of the WCDM, supporting more business and commerce than the surround rural municipalities.

The SBLM contributed 33.9 percent towards the GDP of the WCDM. The key economic sectors for the SBLM are shown in *Table 7.2*. Collectively, these sectors contributed towards approximately 90 percent to the Local Municipality's economic output in 2011 (Western Cape Government, 2014).

These sectors are discussed further below.

Table 7.2 Contribution to the SBLM Economic Output 2014

Economic Sector	Percent Contribution to Economic Output
Finance, insurance, real estate and business services	32
General government	18
Manufacturing	13
Wholesale and retail, trade, catering and accommodation	10
Transport, storage and communication	9
Agriculture, forestry and fishing	8

Source: Western Cape Government (2014)

7.6.1 *Manufacturing and Processing*

The main contributors to the SBLM manufacturing sector are metal processing and food processing. The two sectors contributed 54.2 percent and 37.1 percent, respectively in 2009 (Demacon, 2009), and account for over 80 percent of the SBLM manufacturing sector. The high metals contribution is due to the exporting of metals from the Northern Cape mines for steel-manufacturing plants near the port of Saldanha. The contribution of the food processing is largely driven by the processing of products from the fishing industry. While the manufacturing sector enjoyed steady growth in the past (2,6 and 3,9 percent from 1995 to 2004), the sector has shown slow and negative growth since 2009, largely linked to the slump in the metals industry (Western Cape Government, 2014).

7.6.2 *Wholesale and Retail Trade, Catering and Accommodation*

This sector contributed 10 percent towards the SBLM's total GDPR, largely driven by the wholesale and retail trade sector. This sector has also been bolstered by positive growth in the tourism industry which is discussed in more detail below.

Tourism

Tourism is one of the fastest growing sectors of South Africa's economy with its contribution to the country's gross domestic product (GDP) reaching almost 12 percent in 2010. The tourism industry in the Western Cape contributes 14 percent to the total (GDP) of the Province and makes a significant contribution to economic development and jobs, thus being the most important growth sector in the Province.

The contribution made by tourism to the economy of the SBLM is included in the Wholesale and Retail Trade, Catering and Accommodation sector, which contributed 10 percent towards the SBLM's total GDPR. Tourism is recognized as sector of economic growth by the SBLM, and is seen to offer economic development potential to a large part of the local community, with the potential of a year round flow of tourists, and consequently, economic activity. Further, eco-tourism and agri-tourism are recognized as ways of supplementing the income of farmers.

The natural environmental is the primary attraction for tourists visiting the SBLM. There are numerous protected areas such as the SAS Saldanha Nature Reserve, West Coast National Park, and the West Coast National Fossil Park located in the SBLM (http://capewestcoastpeninsula.co.za, accessed November 2015). Within these protected areas people can take part in activities such as gaming, whale and bird watching, and seeing wild flowers blooming in the winter and spring.

WCDM IDP cites a lack of funding as a major challenge for the development and marketing of the tourism sector in the District.

7.6.3 Transport and Communication

Transport and communication was the second-largest sector in the Saldanha Bay Municipality, contributing 9 percent to the total GDPR in 2011. The industry showed growth between 1996 and 2001, but has subsequently started to slow, if not retract (Demacon, 2009). This could be linked to the general slow-down in economic growth experienced by the SBLM since 2009. Transport activities included bus and tour-bus services, taxis, school buses, travel agents, the hiring of transport equipment and telephone and radio-communication services.

7.6.4 Agriculture, Forestry and Fishing

Between 1994 and 2004 the agriculture, forestry and fishing sectors combined contribution to GDPR increased from 10 percent to 11.9 percent, (Western Cape Government, 2006). However, this combined contribution decreased to 8 percent in 2011, supporting the notion that there has been a general retraction in the agricultural sector within the WCDM (Western Cape Government, 2014). Agriculture is the primary economic contributor in the rural municipalities of the WCDM, such as Bergrivier, Matzikama and Cederberg. The rural areas of the SBLM, north Vredenburg, rely on agriculture, whereas agriculture is not a key economic activity with the ADI.

The SBLM IDP recognizes that the agricultural sector faces challenges, and noted that to improve economic viability and sustainability of agriculture within the municipal area, it is important that the development and implementation of integrated approaches to natural resource management are adopted, and that farmers should consider alternative income generating activities, such as agro-tourism, conservancies and value add services.

In SBLM, mariculture industry and the fishing industry are important activities and are therefore, discussed further below.

Aquaculture

The aquiculture industry in Saldanha Bay consists of mussel and oyster (bivalve) growers, located predominantly in Small Bay with just one operator with an allocation in Big Bay. Farmers lease space from the Transnet Ports Authority and must obtain a permit to operate from the Department of Agriculture, Forestry and Fisheries (DAFF).

The bivalve industry currently employs approximately 130 people, of which 85 to 90 percent are factory workers or boat crew. Lack of a formal education is not a barrier to entry within the aquaculture sector, and according Olivier et al (2013), 75 percent of the workforce employed by the bivalve sector in Saldanha is educated to Grade 9 level or less, and a further 21 percent of

factory employees had passed matric (Grade12), (Olivier et al, 2013). The bivalve industry has provided employment for many people that have lost their jobs due to the decline in the fishing industry in Saldanha.

There are a number of emerging farmers operating in Small Bay who have branched off from the bigger operators. They have received support from bigger companies such as start-up capital. The emerging farmers are typically limited to Small Bay as they do not have the boats and skills to operate in the rougher sea of Big Bay.

Figure 7.9 Mussels seed themselves onto ropes suspended beneath rafts

Mussel Rafts | Cane hoisting a rope with mussels attached

Source: Dr Sue Jackson

Fishing

There are well known national fishing companies that operate from Saldanha Bay, such as Sea Harvest and Southern Seas Fishing. While the fishing industry is well established in Saldanha, it showed slow growth between 2001 and 2009, (only 2.2 percent) (SBLM IDP) and continues to contract.

Figure 7.10 Fishing Boats Docked in the Port of Saldanha

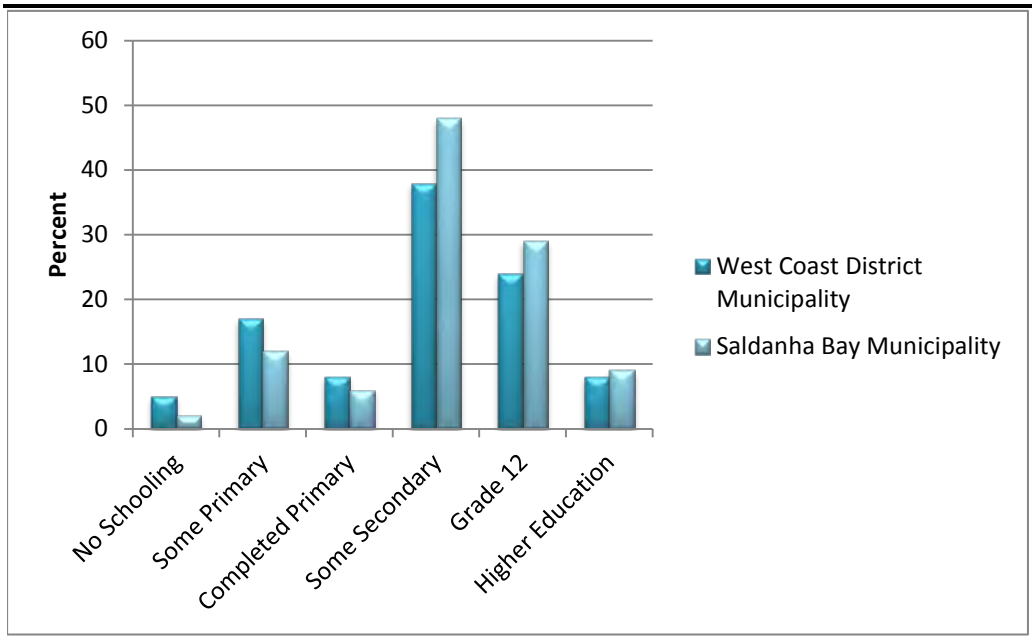
7.7 EDUCATION

The WCDM has a total of 130 schools (primary and secondary schools). The literacy rate (1) in the WCDM is 79.1 percent (Western Cape Government, 2014), which falls short of the Provincial literacy rate of 87.2 percent. The teacher student ratio is 28 students per teacher.

SBLM has a total of 19 schools and the literacy rate is 86.7 percent. Similar to the WCDM, the levels of illiteracy are highest amongst those above the age of 14 years. The learner-educator ratio is 1:28.5, in line with that of the WCDM, (Western Cape Government, 2014). *Figure 7.11* below shows that overall the level of education is slightly higher in the SBLM than in the WCDM, with a slightly higher percent of people having obtained a Grade 12 or some level of higher education in the SBLM. The figure also shows that in both Municipalities a greater proportion of learners have completed some secondary schooling, while fewer that have completed Grade 12. Overall, the population within both municipalities is poorly educated, with just a small portion of the population having received higher education.

(1) The Department of Social Development defines people aged 14 years and older as literate if they have successfully completed 7 years formal education (passed Grade 7/Standard 5).

Figure 7.11 Levels of Education in the Local Municipality

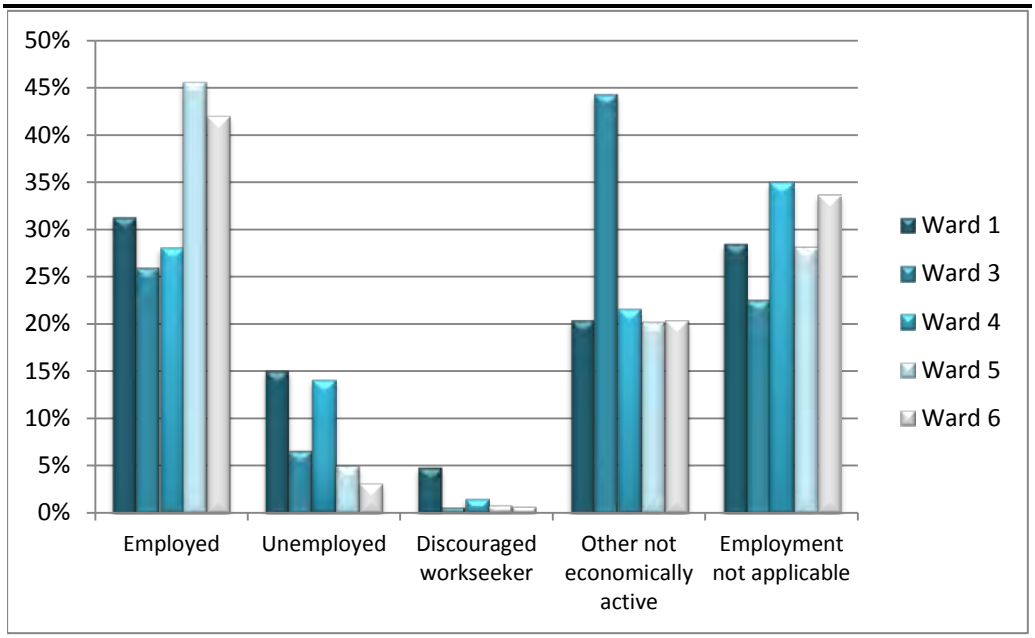


Source: Statssa, Census 2011

7.8 EMPLOYMENT AND SKILLS

The unemployment rate in the WCDM was 14.6 percent in 2011. This is comprised of people who are unemployed but seeking employment, as well as those who are not seeking employment. The unemployment rate in the SBLM was higher than that of the District at 23.4 percent (Western Cape Government, 2014). *Figure 7.12* shows a breakdown of the employment status within the ADI. Wards 5 and 6 have the highest employment rates, while Wards 1 and 4 have the highest unemployment rates. Across all wards, the percentage of people who have stated either that they are not economically active or "that employment does not apply", is high. This indicates that a large portion of the population are not economically active and are either dependent on social grants, or others people for an income (such as students or the elderly).

Figure 7.12 Employment Status within the ADI



Source: StatsSA (2011)

Sectoral–employment data (2011) showed the following sectors as being the biggest employers in Saldanha Bay Local *Table 7.3.* Manufacturing is key employer in the SBLM, which is in contrast to the WCDM where agriculture, forestry and fishing are the major employment sector.

Table 7.3 Formal Employment by Sector in the SBLM 2014

Sector	Percent Employed
Manufacturing	24.2
Community, personal, and social services	20.4
Wholesale and retail trade; and catering and accommodation	15.1
Agriculture, forestry and fishing	14.2
Finance and business services	11.4

Source: CCA (2014)

The major employers in the fishing industry include companies such as Sea Harvest, Oceana, Southern Seas and West Point Processors. Within the Steel and mineral-processing companies (Manufacturing sector), the Saldanha Steel Project (ArcelorMittal SA), Namakwa Sands is the major employer.

7.8.1 Skills Levels

The population of SBLM is typically engaged in occupations requiring a higher level of skills than that of the WCDM (West Coast District Municipality IDP, 2012 – 2016). According to the IDP, almost half the population of the SBLM has some skills, which implies that they have received some training in

the past. *Table 7.4* provides a comparison of the skills levels within the two populations.

Table 7.4 ***Comparison of Skills Levels between District and Local Municipality in 2012***

Area	Highly Skilled %	Skilled%	Low Skilled%	Not Specified%
West Coast District Municipality	21.3	41.9	27.9	8.9
Saldanha Bay Local Municipality	28.5	49.3	12.1	10

Source: West Coast District Municipality (2012)

7.8.2 Income Levels and Poverty

Within both the WCDM and the SBLM, household income falls predominantly into the middle to low income categories. However, the SBLM does have a larger number of households in the higher income brackets which is likely linked to employment opportunities in skilled positions, as shown in *Table 7.5.*

Within the ADI, Ward 1 and 4 have a larger number of households in the lower income brackets, while Wards 5 and 6 have a larger number of households in the higher income brackets.

Table 7.5 ***Percentage of population per Average Household Income Bracket in 2011***

	No income	R 1 - R 4800	R 4801 - R 9600	R 9601 - R 19 600	R 19 601 - R 38 200	R 38 201 - R 76 400	R 76 401 - R 153 800	R 153 801 - R 307 600	R 307 601 - R 614 400	R 614 001 - R 1 228 800	R 1 228 801 - R 2 457 600	R 2 457 601 or more
WCDM	11%	2%	3%	14%	22%	19%	13%	9%	5%	1%	0%	0%
SBLM	14%	2%	4%	11%	17%	17%	15%	11%	6%	2%	0%	0%
Ward 1	22%	4%	6%	15%	22%	14%	10%	5%	2%	0%	0%	0%
Ward 3	7%	1%	3%	9%	16%	19%	20%	17%	6%	1%	0%	0%
Ward 4	8%	2%	5%	14%	24%	25%	17%	4%	1%	0%	0%	0%
Ward 5	8%	1%	1%	4%	7%	11%	18%	25%	17%	5%	1%	1%
Ward 6	18%	1%	1%	4%	8%	13%	18%	17%	14%	5%	1%	0%

Source: StatsSA (2011)

The SBLM has an estimated poverty rate of 23.9 percent. This is lower than the surrounding municipalities and that of the WCDM, which has a poverty rate of 30.4 percent.

7.9 *HEALTH*

The WCDM has 76 medical facilities (26 clinics, 24 satellite clinics, 19 mobile clinics and seven district hospitals) (Western Cape Government, 2014). Some of the challenges encountered by the Health Department in the WCDM are the poor/insufficient physical infrastructure, overcrowded primary healthcare facilities and insufficient numbers of skilled health workers in the region.

The most common illnesses affecting communities are infectious diseases such as HIV/Aids and TB, as well as chickenpox and measles amongst children. The SBLM has the lowest number of antiretroviral treatment (ART) clinics/treatment sites in the WCDM, which is of concern considering it has the heaviest ART patient load in the WCDM (1,779 patients in March 2014, up from 1,435 patients in 2013) (Western Cape Government, 2014).

There has been a general increase in the numbers of teenage pregnancies recorded in the region; the increase in teenage pregnancies is potentially linked to poverty in the area. Violence and substance abuse are also common in the District leading to increased pressure on the local health services (West Coast District Municipality, 2009).

SBLM has 14 medical facilities (8 clinics, 3 satellite clinics, 2 mobile clinics and 1 district hospital) (Saldanha Bay Municipality, 2012). According to the IDP, nine doctors and 59 professional nurses have been employed by the Department of Health to render health services to patients attending the health facilities in Saldanha Bay (1).This indicates that there is high number of patients compared to the nursing staff available to service the patients' medical needs.

The most common illnesses are HIV/Aids and TB; this is similar to the District level. The HIV/Aids prevalence in the District was 4.3 percent in 2005 and it was expected to increase to 5.5 percent by 2010 (West Coast District Municipality, 2006). There is a relationship between the high prevalence of TB and HIV/Aids.

(1) Note that these totals exclude health professionals employed within the private sector.

Figure 7.13 Saldanha Health Clinic

7.10 SOCIAL INFRASTRUCTURE AND SERVICES

7.10.1 Water

In the SBLM, 99.2 percent of the population has access to piped water; households that have access to water inside their homes, from outside taps on their properties and from communal taps (Western Cape Government, Socio-economic Profile Saldanha Bay Municipality, 2014).

The WCDM provides bulk potable water to the Saldanha Bay Municipality through the Misverstand Scheme which is part of the Berg River – Saldanha supply system (EMF, 2015). Water is obtained from both surface water (Berg River) and groundwater (Langebaan Road Aquifer) for the Misverstand Scheme. This scheme supplies the Saldanha Bay municipality and some of the towns in the Berg River municipality (EMF, 2015).

Water demand in the SBLM increased significantly with the establishment of a number of industries over the past 30 years (EMF, 2015). This is attributed to the development of the Port and associated infrastructure. According to the IDP Review, industrial water users account for approximately 50 percent of potable water use within the Saldanha Bay municipal area (EMF, 2015).

There are plans to construct a desalination plant in Saldanha Bay to supply additional water to the local area (WCDM IDP, 2012).

7.10.2 *Sanitation*

The WCDM has provided 92 percent of households with adequate sanitation. Compared with the District Municipality, the SBLM has provided 96.2 percent of its households with adequate sanitation facilities (Western Cape Government, 2014).

Table 7.6 below illustrates the existing wastewater treatment plants operated by the Saldanha Bay Local Municipality. In addition, it is important to note that a regional Waste Water Treatment Works (WWTW) is proposed for the SBLM, which will service the proposed industrial areas within Saldanha.

Table 7.6 Wastewater Treatment Plants in the Saldanha Bay Municipality

Responsible Municipality/ Organization	Name Of WWTW	Water Disposal Method	Technology Being Used
Saldanha Bay LM	Sandy Point (Shelly Point	Irrigation, 100 % Re-use	Package plant, Activated sludge
Saldanha Bay LM	Paternoster	Irrigation	Oxidation pond (lined)
Saldanha Bay LM	Laingville (St Helena Bay)	Irrigation, 30 % Re-use	Activated sludge, Maturation ponds, Disinfection
Saldanha Bay LM	Hopefield	Irrigation, 100 % Re-use	Activated sludge, Maturation ponds
Saldanha Bay LM	Langebaan	Irrigation, 100 % Re-use	Oxidation pond (lined), Activated sludge, Maturation ponds, Disinfection
Saldanha Bay LM	Saldanha	Irrigation, 100 % Re-use	Oxidation pond (unlined), Activated sludge, Maturation ponds, Disinfection
Saldanha Bay LM	Vredenburg	Watercourse, 50 % Re-use	Oxidation pond (lined), Activated sludge, Maturation ponds, Disinfection

Source: DWA (2009)

7.10.3 *Waste*

SBLM dispose of all waste at the licensed Vredenburg landfill and a number of drop-off facilities are provided at various communities (WCDM, 2014). There is also a Materials Recovery Facility at the Vredenburg landfill. In addition, any hazardous material can be discarded at the Visserhoek Disposal facility. Finally, it is important to note that a regional waste disposal facility has been planned to be constructed in Vredendal (WCDM, 2012).

7.10.4 Housing

There is a wide variety of housing in the SBLM, from low cost housing to luxurious holiday homes. Wards 5 and 6 typical have larger houses, while Wards 3 and 4 consist of low cost housing.

There has been a slow delivery of housing in the WCDM and SBLM. Although 2,535 households gained access to housing for the first time since 2007, the number of households on the waiting list for housing is currently estimated at 8,179 and the number of households affected by the housing backlog is 6,730 (Saldanha Bay Local Municipality IDP, 2012). The housing backlog has been increasing steadily since 2001, when it was 2,836.

According to the 2006 West Coast Socio-Economic Profile, the slow pace of housing delivery was attributed to the constantly changing settlement patterns resulting from in-migration.

7.10.5 Energy

Within the SBLM the proportion of households using electricity for lighting has increased in the Municipality from 91.6 percent during the 2001 Census to 97 percent in 2011 (StatsSA, 2011). Even though an increase was seen in the number of households having access to electricity, 92 percent of households use electricity for cooking purposes, and the other 8 percent use gas or paraffin (StatsSA, 2011).

7.10.6 Roads

The WCDM has approximately 10 097 km of road, (West Coast District Municipality, 2012). The roads are maintained by the WCDM on behalf of the Western Cape Provincial Department Transport and Public Works.

The SBLM has 410 km of tarred Municipal roads and 48, 24 km of gravel roads (excluding private farm roads), and the roads are generally of poor quality. There is a backlog in the SBLM relating to road maintenance, and it is noted in the IDP that 548 households did not have access to a road from their dwelling (Saldanha Bay Local Municipality, 2012)

7.10.7 Policing and Crime

There are 26 police stations in the WCDM. These are evenly distributed across the local municipalities, with five in each local municipality. This distribution does not account for the geographic extent or the population size of each local municipality. There are police stations in all the major towns within the SBLM which service the town and the rural surroundings (Saldanha Bay Local Municipality, 2012). The most prolific crimes committed in the SBLM are "burglaries at residential premises" and 'drug-related crimes" with 995 and 828 incidents being reported in 2013/14 respectively. Crime statistics across all

categories increased from 2010 to 2013, but have subsequently started to decrease again (refer to *Table 7.7*). At this stage the reason for this is unclear.

Table 7.7 Crime in the SBLM between 2009 and 2014

Type of Crime	2009/10	2010/11	2011/12	2012/13	2013/14
Burglary at residential premises	792	787	1 018	1 225	955
Driving under the influence of alcohol or drugs	262	194	161	148	137
Drug-related crime	1 138	1 071	1 006	1 013	828
Murder	35	33	21	29	25
Total Sexual Crimes	154	132	134	147	123

Source: Western Cape Government (2014)

7.11 CULTURAL HERITAGE

The West Coast gained prominence, from quiet coastal village better known for its fishing villages and grain-producing farms, to world heritage locality of international repute, with the discovery of one of the richest deposits of fossils in the world. The bones of over two hundred different kinds of animals have been recovered in the area (Potgieter, 1972). These fossils are now preserved in the West Coast Fossil Park, near Langebaan. The 14 ha Park lies on the R45 close to the Langebaanweg Air Force Base, roughly 14 kilometres ENE of the site under review. Stone Age artefacts and remains of the indigenous Khoikoi are also widespread, which makes it imperative that palaeontological, geological and cultural heritage surveys be undertaken to record and preserve the rich heritage of the region.

7.11.1 Archaeological Background

There have been numerous field assessments of the Saldanha Bay area during the course of the last 20 years. Kaplan (1996) recorded a scatter of MSA and LSA stone artefacts during his survey for the proposed Saldanha Steel facility. Orton (2011) noted, during his survey for the Isivunguvungu Wind Farm to the south of the ArcelorMittal site, that no significant archaeological remains were recovered. Orton (2011) undertook a survey for a possible pipe line for the Mass Oil and Gas Services (MOGS) and reported finding a single calcrete flake of unknown origin and has thus considered the archaeological significance of the area to be very low.

Saldanha Bay, which was named by the Dutch after Antonio de Saldanha who visited the Cape in the early 1500's, has since its discovery been used as a safe anchorage by virtually every sea going nation who had trading interests in the east. The bay shores were never permanently settled in any meaningful way until quite late in the history of the Cape.

7.11.2 Cemeteries and Graves

Burials in the later Stone Age occurred anywhere and typically in the sandy substrate. This is due to people being buried very close to where they died and this has thus led to many burials being reported from the Saldanha coast and in the adjacent hinterland (Morris 1992).

7.11.3 Palaeontological Background

In recent years the area has become famous for its fossil wealth – just inland of Langebaan is the largest Pliocene-Miocene (5-6 million years old) fossil deposit in the world, parts of which are on display at Langebaanweg Fossil Park. This material was deposited in sandbar sediments at the mouth of the proto-Berg River (an ancient river and estuary that was the precursor to the Berg River), the course of which changed over the millennia in response sea level changes. On the edges of the lagoon Dr Dave Roberts and Dr Lee Berger discovered the 200 000 year old footprints of an early modern human fossilized in calcrete sediments. At Hoedjiespunt Prof. John Parkington has excavated on the site of an ancient hyena lair where skull fragments and teeth of an early human were found. Nearby, fossilized within the calcretes and aeolianites are shell fish, animal bone, ashy hearths of people who lived in the area more than 100 000 years ago. A further find at Spreeuwalle between Paradise Beach and the ore terminal has been investigated by Dr G Avery and Mr D Halkett, but unfortunately most of the material lies below sea level as the site dates to a time when sea levels were lower than that of today.

7.11.4 Findings

The area surveyed is observed to have been extensively disturbed by agricultural practices, which have left large heaps of calcrete blocks deposited on the edges of the old fields. No palaeontological or Pleistocene archaeological remains were observed on the surface whilst there were also no pre-colonial archaeological sites found. There are also no structures of significance within the study area with the exception of a recently modified building located outside of the proposed activity.

No graves or stone cairns were found during the survey. The location of the power plant is an industrial landscape, adjoining the steel works site and ideally suited to the proposed development.

8 PUBLIC PARTICIPATION

8.1 PUBLIC PARTICIPATION OBJECTIVES

Public consultation is an inclusive and culturally appropriate process which involves sharing information and knowledge, seeking to understand the concerns of others and building relationships based on collaboration. It allows stakeholders to understand the risks, impacts and opportunities of the Project in order to achieve positive outcomes.

The public participation process is designed to provide information to and receive feedback from interested and affected parties (I&AP) for use throughout the EIA process, thus providing organisations and individuals with an opportunity to raise concerns and make comments and suggestions regarding the proposed project. By being part of the assessment process, stakeholders have the opportunity to influence the Project layout and design, and provide input into mitigation measures, technical solutions, and the Plan of Study for the EIA.

The main objectives of public participation are:

i. to ensure that adequate, accessible and timely information is provided to those potentially affected by the Project;

ii. to provide these groups with sufficient opportunity to voice their opinions and concerns;

iii. to ensure that comments are received in a timely manner; and

iv. to demonstrate that comments received are responded to and taken into account in Project decisions.

8.2 LEGISLATIVE CONTEXT

Public participation with regards to EIAs in South Africa is determined by the principles of the National Environmental Management Act (NEMA) (Act 107 of 1998, as amended) and elaborated upon in 'GN 657: Guideline 4: Public Participation' (Department of Environmental Affairs and Tourism, 19 May 2006), which states that: "*Public participation process means a process in which potential interested and affected parties (I&APs) are given an opportunity to comment on, or raise issues relevant to, specific matters.*"

Public participation is required for an environmental authorisation process in terms of the EIA Regulations GN R.982 (December 2014).

8.3 PUBLIC PARTICIPATION ACTIVITIES UNDERTAKEN

Table 8.1 details the public participation tasks that have been undertaken to date.

Table 8.1 Public Participation Tasks

Activity	Description and Purpose
Pre-Application	
Preparation of a preliminary stakeholder database	A preliminary database has been compiled of authorities (local and provincial), Non-Governmental Organisations, neighbouring landowners and other key stakeholders (refer to *Annex B*). This database of registered I&APs will be maintained and updated during the ongoing EIA process.
Preparation and Distribution of a Background Information Document (BID)	BIDs were distributed via email and post to all I&APs on the stakeholder database. See *Annex B*. The BID provides an introduction to the Project and the EIA process.
Advertisement of the Project and Open House Meeting	The Project was advertised on 21 January 2016 in the local newspaper the Weslander (English) and regional newspaper Die Burger (Afrikaans). See proof of Advertisement in *Annex B*.
Open House Meeting	An open house meeting was held at Hoedjiesbaai Hotel, Saldanha Bay on 16 February 2016 to present the proposed Project and solicit input from stakeholders into the scoping process. Presentation, attendance registers and meeting notes are included in *Annex B*.
Development of an Initial Comments and Response Report	All comments received during the initial consultation period and at the open house meeting were recorded in a Comments and Response Report. See included in *Annex B*.
Post-Application	
Erection of Site Notices	Site notices have been placed at the following locations: • The Saldanha Bay Public Library; • The Saldanha Bay Municipality Office notice board; • At the entrance to the project site.
Release of draft Scoping Report for Public Comment	The draft Scoping Report was released for a 30 day public comment period: 4 March 2016 – 6 April 2016 (including three public holidays). Notifications were sent to all stakeholders on the database and the report was made available online (www.erm.com/saldanhasteel) and in the Saldanha Bay Public Library.
Development of a Comments and Response Report	All comments received during the Scoping consultation period were recorded into a Comment and Response Report. See included in *Annex B*.
EIA Phase	
Release of draft EIR and EMP for Public Comment	The draft EIR and EMP document was made available to stakeholders and the relevant authorities for a 30-day comment period (22 July – 25 August 2016). A notification letter was sent to all registered I&APs on the project database. The letter invited I&APs to comment on the draft EIR, and included details of the public meeting (see below). All comments received, along with responses, have been included in the final EIR in *Annex B*.

Activity	Description and Purpose
Public Meeting	A public meeting was held at the Hoedjiesbaai Hotel, Saldanha Bay on 11 August 2016 in order to present the EIA findings to stakeholders. A copy of the presentation, attendance register and meeting notes are included in *Annex B*.
Reminder Notification	A notification to inform stakeholders that the presentation from the public meeting was available on the Project website, and to remind stakeholders when the comment period closed was distributed to I&APs on the Stakeholder Database. *See proof of distribution in Annex B*.
Re-release of draft EIR and EMP for Public Comment	Based on comments received on the Draft EIA Report, the report was revised and made available for comment for a further 30 days, from 16 September to 18 October. A notification letter was sent to all registered I&APs on the project database and the report was available online on the Project webpage (www.erm.com/saldanhasteel) and in the Saldanha Bay Library. All comments received, along with responses, have been included in the final EIR in *Annex B*.
Notification of Environmental Authorisation	I&APs will be notified of the Environmental Authorisation and the statutory appeal period. An advertisement will be placed to advertise the Environmental Authorisation.

A summary of the main concerns raised through the public participation process to date is provided in *Table 8.2*. Detailed comments and responses are included in the Comments and Response Report in *Annex B*.

Table 8.2 Summary of Key Comments raised during the EIA

Topic	Issue
Air Emissions	Stakeholders noted that the Project will generate dust and exhaust emissions which could be of concern from health and nuisance perspective. It was noted that the Project must comply with the National Dust Control Regulations of 1 November 2013 (GNR No. 827) in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA). It was further noted that the air quality study must identify appropriate management and mitigation measures to address the emission sources from the proposed CCGT plant and traffic.
Noise Emissions	There is a concern that Project will generate noise which may affect surrounding land users. It was noted that noise generated during the construction and operational phases of the development must comply with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013.
Impact on Avifauna	There is concern that the Project site lies across one of the main flyways for water birds and migrant waders, travelling between St. Helena Bay/Lower Berg River and Langebaan Lagoon.

Topic	Issue
Impact on Flora and Flora	Stakeholders raised concerns regarding the potential impact on flora and fauna as some of the site falls within a CBA. It was noted that poor vegetation management and development in the area has put pressure on natural vegetation. Stakeholders requested that this issue be investigated in the botanical study.
Impacts on the Marine Environment	There is a concern that the marine environment is excluded from the scoping report, noting that the Project will increase shipping traffic in the Saldanha Bay marine environment and may impact on marine fauna and flora.
Socio-economic Impacts	Stakeholders wanted to know what kind of employment opportunities would be available to locals, and how many employment positions would be available. It was further noted that local employment should be prioritised. It was suggested that a partnership with the municipality should be developed to address possible pressure on the municipal infrastructure, especially basic services.
Water	There is a concern that the Project will increase pressure on stressed water resources within the area. Stakeholders noted that alternative sources of water must be considered.
Cumulative Impacts	Stakeholders pointed out that there are at least two other EIA processes being undertaken for gas turbine power plants within close proximity to the proposed site and that the potential cumulative impacts of the proposed must be assessed.
Traffic	Stakeholders noted that the Project will increase traffic volumes in the area and that a Traffic Study must be included as part of the EIA.

9 EIA METHODOLOGY

9.1 IMPACT ASSESSMENT METHODOLOGY

An EIA methodology should minimise subjectivity as far as possible and accurately assess the Project impacts. In order to achieve this ERM has followed the methodology defined below.

9.1.1 Impact Identification and Characterisation

An 'impact' is any change to a resource or receptor caused by the presence of a project component or by a project-related activity. Impacts can be negative or positive. Impacts are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). Terms used in this EIA are described in *Table 9.1.*

Table 9.1 Impact Characteristics

Characteristic	Definition	Terms
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	**Direct** - Impacts that result from a direct interaction between the Project and a resource/receptor (eg, between occupation of a plot of land and the habitats which are affected). **Indirect** - Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (eg, viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land). **Induced** - Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project. Cumulative - Impacts that arise as a result of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect.
Duration	The time period over which a resource / receptor is affected.	**Temporary** - (period of less than 3 years -negligible/ pre-construction/ other). **Short term** - (period of less than 5 years i.e. production ramp up period). **Long term** - (period of more than 5 years and less than 19 years i.e. life of plant). **Permanent** - (a period that exceeds the life of plant – i.e. irreversible.).
Extent	The reach of the impact (i.e. physical distance an	**On-site** - impacts that are limited to the Project site.

	impact will extend to)	**Local** - impacts that are limited to the Project site and adjacent properties. **Regional** - impacts that are experienced at a regional scale. **National** - impacts that are experienced at a national scale. **Trans-boundary/International** - impacts that are experienced outside of South Africa.
Scale	Quantitative measure of the impact (e.g. the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.).	Quantitative measures as applicable for the feature or resources affects. No fixed designations as it is intended to be a numerical value.
Frequency	Measure of the constancy or periodicity of the impact.	No fixed designations; intended to be a numerical value or a qualitative description.

Unplanned events (e.g. incidents, spills) are considered in terms of likelihood (*Table 9.2*). The likelihood of an unplanned event occurring is determined qualitatively, or when data is available, semi-quantitatively. It is also important to distinguish that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event.

Table 9.2 Definitions for Likelihood

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

9.1.2 Determining Impact Magnitude

Once impact's are characteristed they are assigned a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- extent
- duration
- scale
- frequency

Magnitude (from small to large) is a continuum. Evaluation along the continum requires professional judgement and experience. Each impact is

evaluated on a case-by-case basis and the rationale for each determination is noted. Magnitude designations for negative effects are: negligible, small, medium and large.

The magnitude designations themselves are universally consistent, but the definition for the designations varies by issue. In the case of a positive impact, no magnitude designation has been assigned as it is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact.

Some impacts will result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes are regarded as having no impact, and characterised as having a negligible magnitude.

In the case of impacts resulting from unplanned events, the same resource/ receptor-specific approach to concluding a magnitude designation is used. The likelihood factor is also considered, together with the other impact characteristics, when assigning a magnitude designation.

Determining Magnitude for Biophysical Impacts

For biophysical impacts, the semi-quantitative definitions for the spatial and temporal dimension of the magnitude of impacts used in this assessment are provided below.

High Magnitude Impact affects an entire area, system (physical), aspect, population or species (biological) and at sufficient magnitude to cause a significant measureable numerical increase in measured concentrations or levels (to be compared with legislated or international limits and standards specific to the receptors) (physical) or a decline in abundance and/ or change in distribution beyond which natural recruitment (reproduction, immigration from unaffected areas) would not return that population or species, or any population or species dependent upon it, to its former level within several generations (physical and biological). A high magnitude impact may also adversely affect the integrity of a site, habitat or ecosystem.

Moderate Magnitude Impact affects a portion of an area, system, aspect (physical), population or species (biological) and at sufficient magnitude to cause a measurable numerical increase in measured concentrations or levels (to be compared with legislated or international limits and standards specific to the receptors) (physical) and may bring about a change in abundance and/or distribution over one or more plant/animal generations, but does not threaten the integrity of that population or any population dependent on it (physical and biological). A moderate magnitude impact may also affect the ecological functioning of a site, habitat or ecosystem but without adversely affecting its overall integrity. The area affected may be local or regional.

Low Magnitude Impact affects a specific area, system, aspect (physical), group of localised individuals within a population (biological) and at sufficient magnitude to result in a small increase in measured concentrations or levels (to be compared with legislated or international limits and standards specific to the receptors) (physical) over a short time period (one plant/animal generation or less, but does not affect other trophic levels or the population itself), and localised area.

Determining Magnitude for Socioeconomic Impacts

For socioeconomic impacts, the magnitude considers the perspective of those affected by taking into account the likely perceived importance of the impact, the ability of people to manage and adapt to change and the extent to which a human receptor gains or loses access to, or control over socio-economic resources resulting in a positive or negative effect on their well-being. The quantitative elements are included into the assessment through the designation and consideration of scale and extent of the impact.

9.1.3 Determining Receptor Sensitivity

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity of the receptor. There are a range of factors to be taken into account when defining the sensitivity of the receptor, which may be physical, biological, cultural or human. Where the receptor is physical (for example, a water body) its current quality, sensitivity to change, and importance (on a local, national and international scale) are considered. Where the receptor is biological or cultural (i.e. the marine environment or a coral reef), its importance (local, regional, national or international) and sensitivity to the specific type of impact are considered. Where the receptor is human, the vulnerability of the individual, community or wider societal group is considered. As in the case of magnitude, the sensitivity designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity of receptor is low, medium and high.

For ecological impacts, sensitivity is assigned as low, medium or high based on the conservation importance of habitats and species. For the sensitivity of individual species, *Table 9.3* presents the criteria for deciding on the value or sensitivity of individual species.

For socio-economic impacts, the degree of sensitivity of a receptor is defined as the level of resilience (or capacity to cope) with sudden social and economic changes. *Table 9.3* and *Table 9.4* present the criteria for deciding on the value or sensitivity of biological and socioeconomic receptors.

Table 9.3 Biological and Species Value / Sensitivity Criteria

Value / Sensitivity	Low	Medium	High
Criteria	Not protected or listed as common / abundant; or not critical to other ecosystem functions (e.g. key prey species to other species).	Not protected or listed but may be a species common globally but rare in South Africa with little resilience to ecosystem changes, important to ecosystem functions, or one under threat or population decline.	Specifically protected under South African legislation and/or international conventions e.g. CITIES Listed as rare, threatened or endangered e.g. IUCN

Note: The above criteria should be applied with a degree of caution. Seasonal variations and species lifecycle stage should be taken into account when considering species sensitivity. For example, a population might be deemed as more sensitive during the breeding/spawning and nursery periods. This table uses listing of species (e.g. IUCN) or protection as an indication of the level of threat that this species experiences within the broader ecosystem (global, regional, local). This is used to provide a judgement of the importance of affecting this species in the context of project-level changes.

Table 9.4 Socio-economic Sensitivity Criteria

Sensitivity	Low	Medium	High
Criteria	Those affected are able to adapt with relative ease and maintain pre-impact status.	Able to adapt with some difficulty and maintain pre-impact status but only with a degree of support.	Those affected will not be able to adapt to changes and continue to maintain-pre impact status.

9.1.4 Assessing Significance

Once magnitude of impact and sensitivity of a receptor have been characterised, the significance can be determined for each impact. The impact significance rating will be determined, using the matrix provided in *Figure 9.1.*

Figure 9.1 Impact Significance

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	**Medium**	**High**
Magnitude of Impact	**Negligible**	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations are factored into the assignment of magnitude and sensitivity/vulnerability/ importance designations that enter into the matrix. *Box 9.1* provides a context for what the various impact significance ratings signify.

Box 9.1 Context of Impact Significances

An impact of **negligible** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of **minor** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of **moderate** significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of **major** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

9.1.5 Mitigation Potential and Residual Impacts

A key objective of an EIA is to identify and define socially, environmentally and technically acceptable and cost effective measures to manage and mitigate potential impacts. Mitigation measures are developed to avoid, reduce, remedy or compensate for potential negative impacts, and to enhance potential environmental and social benefits.

The approach taken to defining mitigation measures is based on a typical hierarchy of decisions and measures, as described in *Table 9.5*. The priority is to first apply mitigation measures to the source of the impact (i.e. to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e. to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Once mitigation measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures. The approach taken to defining mitigation measures is based on a typical hierarchy of decisions and measures, as described in *Table 9.5*.

Table 9.5 Mitigation Hierarchy

Avoid at Source; Reduce at Source: avoiding or reducing at source through the design of the Project (e.g. avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
Abate on Site: add something to the design to abate the impact (e.g. pollution control equipment).
Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g. traffic measures).
Repair or Remedy*:* some impacts involve unavoidable damage to a resource (e.g. material storage areas) and these impacts require repair, restoration and reinstatement measures.
Compensate in Kind; Compensate Through Other Means where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g. financial compensation for degrading agricultural land and impacting crop yields).

9.1.6 Residual Impact Assessment

Once mitigation measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

9.1.7 Cumulative Impacts

A cumulative impact is one that arises from a result of an impact from the Project interacting with an impact from another activity to create an additional impact. How the impacts and effects are assessed is strongly influenced by the status of the other activities (eg already in existence, approved or proposed) and how much data is available to characterise the magnitude of their impacts.

The approach to assessing cumulative impacts is to screen potential interactions with other projects on the basis of:

- projects that are already in existence and are operating;
- projects that are approved but not as yet built or operating; and
- projects that are a realistic proposition but are not yet built.

9.1.8 Specialist Methodologies

Specialist Study methodologies are included in *Annex D*.

10 ASSESSMENT OF POTENTIAL IMPACTS

10.1 INTRODUCTION

This Chapter identifies and evaluates the actual and potential environmental consequences of the proposed activity. Furthermore, the potential for mitigation of negative impacts and enhancement of positive impacts are described.

Impacts have been assessed based on the methodology provided in Chapter 4. Specialist study methodologies are provided in each study in *Annex D*.

10.2 SUMMARY OF IMPACTS TO BE ASSESSED

10.2.1 *Bio-physical and Socio-economic Impacts Identified*

The following impacts were identified in the Scoping Report as potentially significant:

Risk/Impact Grouping	Potential Impacts
Physical Presence and Footprint	• Site clearance for the construction of the power plant and pipeline servitude in green-field areas will result in removal of vegetation and habitat, thus resulting in an impact on terrestrial fauna. • Impact that the presence of the power plant and pipeline may have on terrestrial flora and fauna, cultural heritage and visual and landscape character.
Air Emissions	• Dust from site clearance and construction activities. • Emissions from the combustion of fuel in the power plant. • Engine emissions from construction and operational traffic. • Emissions of air pollutants from gas venting during commissioning, maintenance shutdowns and from process vents.
Noise	• Noise from construction of power plant and pipeline may have an impact on sensitive receptors. • Noise from power plant operation may have an impact on sensitive receptors. • Noise and vibration from construction and operation traffic along main transport/access routes.
Waste and Wastewater Management	• Non-hazardous and hazardous wastes will be generated that will require to be transported and disposed of in a manner protective of the natural and human environment. • Improper storage, handling and transport of solid and liquid wastes at the power plant can lead to loss of containment and spillages which could give rise to soil and ground water contamination.

Risk/Impact Grouping	Potential Impacts
Socioeconomic	*Community Health Safety and Security* • Equipment and activities will create noise and vibration and changes to air quality during construction, operations and demolition that could impact human health; • Movement of materials and workers during construction, operation and demolition could impact public safety; and • The presence of workers and opportunistic workers in the Project area could result in a change in the disease profile of the local population, communicable diseases and sexually transmitted infections.
	Worker Health & Safety • Hazardous construction, operational or decommissioning activities could impact worker health and safety; and • Handling of hazardous materials could impact worker health and safety.
	Local Community Demographics • Influx of workers from outside of the local Project area will result in a change in demographics of the local communities; and • The presence of a construction workforce hosted within the Project area will result in temporary changes to demographics.
	Local and Macro Economy • Procurement of goods and services required by the Project during construction, operation and decommissioning of the Project may enhance the local economy both directly and indirectly; and • The presence of construction, operation and decommissioning workers in the Project area may enhance the local economy through their purchase of local goods and services.
	Traffic • Transport of equipment and machinery (i.e. gas turbines) during the construction phase may impact on local traffic patterns; • Transportation of waste from the site and materials and equipment to the site during operation may impact on local traffic patterns; and • Decommissioning activities could also impact local traffic conditions.
	Cultural/Heritage Resources • Construction activities could have an impact on local cultural sites (paleontological); and • The presence of workers in the Project area and the transportation of materials and equipment to the construction sites may impact on cultural areas.
Non-Routine Discharges (accidental and emergency events)	• Leaks or accidental releases of diesel or chemicals during construction and operation activities could impact on soil and groundwater. • Accidental release of natural gas could be a risk to surrounding receptors.

Risk/Impact Grouping	Potential Impacts
Cumulative Impacts	A cumulative impact is defined as an impact that results from incremental changes caused by other past, present or reasonably foreseeable actions together with the Project. The cumulative impact assessment will consider the impact of the Project along with the impacts of other industrial developments in the area that may also impact on the same receptors and resources. The following cumulative impacts may result from the proposed development: • Air; • Noise; • Biodiversity; • Socio-economic effects; • Infrastructure and services; and • Traffic.

10.2.2 Bio-physical and Socio-economic Impacts Investigated

Further to the commencement of the impact assessment and the commissioning of specialist work, the following impacts have been identified as being of negligible significance and as a result have been screened out of the impact assessment. A description of these and reasons for their screening out is provided below and mitigation measures for the management of these are included in the EMPr:

- Waste management during all phases of the Project;
- Surface, groundwater and soil contamination;
- Impact to marine ecology due to seawater abstraction;
- Marine traffic impact due to LNG import.

Waste

Waste from the Project may arise from a range of sources during the Project life including the following:

- excavated material (e.g. rock, sand, vegetation);
- construction activities (rubble, packaging, etc.);
- fuel spills and the clean-up thereof;
- used generator and turbine lube oil (collected in a tank on site and then removed off-site in drums for controlled disposal);
- occasional oily sludge recovered from on-site collected road surface or hard-standing surface water treatment;
- spent gas turbine fabric air filter cartridges;
- spent gas turbine lube-oil filter cartridges;
- dried powdered sludge from sewerage treatment;
- dried sludge from brown water (ablutions and canteen washing detergent) treatment;
- spent office consumables (paper, printer cartridges etc.);
- organic waste food from canteen operations;

- organic cooking oil waste from canteen operations;
- glass waste and metal can waste from canteen operations;
- scrap steel and copper from irreparable mechanical equipment;
- scrap plastics from equipment packaging;
- occasional medical waste from on-site clinic;
- dry solids (mineral salts) recovered from the zero-discharge reverse osmosis process;
- spent resins from water demineralisation;
- waste solvents and grease from workshop equipment cleaning operations; and
- spent laboratory chemicals from water testing and water treatment (each product neutralised, (if acidic), separately hermetically packed, and labelled for disposal).

No waste material will remain on site or be disposed of or released to the environment as part of the Project activities. All wastes will be handled, stored and transported in accordance with the relevant legislation.

Measures for the minimisation and management of wastes have been included in the EMPr.

Surface, groundwater and soil contamination

Effective stormwater management on site during all phases of the Project will minimise the risk of surface and groundwater resources as well as soil contamination. Specifically during operation, all stormwater on site will be channelled towards storage tanks. A conceptual stormwater management plan is provided in the EMPr. Procedures for handling contaminated soils, which may result during the construction phase of the Project, is also detailed therein. Management measures for the protection of soil and groundwater

Marine Ecology

The seawater intake structure will be designed for a maximum feedwater abstraction capacity of approximately 20 to 45 m^3/day. This quantity of seawater is considered negligible and no significant impact to marine ecology is anticipated. To avoid impingement and entrainment of marine organisms seawater will be drawn into the pipeline at a velocity of 14 l/s, be screened through appropriate coarse and fine screens before being pumped to the power plant.

Marine Traffic

The power plant will be fuelled by LNG which is proposed to be imported via the import terminal planned by the DoE (1). For the fuelling of the power

(1) Should this terminal not proceed a separate EIA will be undertake by the project for the import of LNG.

station it is anticipated that the following number of LNG carriers will be required to enter the Port:

- Q Flex LNG Vessel 210 000 to 220 000 m^3 (14 to 16 ships pa.).
- Upper Conventional 145 000 to 210 000 m^3 (14 to 20 ships pa.).
- Conventional < than 140 000 m^3 more than 20 ships pa.

A maximum of 20 ships per year (or 1.67 per month) will therefore enter the Port. This is a negligible increase in marine traffic in the Port of Saldanha and has therefore not been assessed further. The marine components of the project, including the terminal itself, the offloading and regasification of LNG will be assessed in the EIA being undertaken by the DoE. (1)

Geotechnical

The Department of Environmental Affairs (DEA) raised comment regarding the need to assess geotechnical aspects associated with the Project. The consideration of geotechnical aspects is not an environmental or social impact assessment consideration, but a design engineering consideration. As a result geotechnical impacts have been scoped out of the impact assessment.

According to SANS code 10160-4 (Basis of Structural Design and Actions for Buildings and Industrial Structures – Part 4: Seismic Actions and General Requirements for Buildings) the project site is located with a Zone where natural seismic activity can occur. The detailed engineering design should therefore also consider seismic loading factors as part of the design.

A design level geotechnical investigation will be considered prior to finalising the detailed design. The scope of such a study would include but not be limited to:

- Soil sampling and geological core logging;
- Soil bearing capacity tests;
- Settlement analysis; and
- Laboratory testing.

The findings of the geotechnical study will be provided to the civil engineering design team who would then consider excavation methods and foundation design according to best practice. The present design has assumed that piling would be required under the foundations of heavy static and rotational loads as well as large tank foundations. Non-concrete vibro compaction will be considered rather than invasive drilling and concrete column piling.

Existing pipelines and industrial facilities (such as the Saldanha Steel Mill opposite the proposed Project site) in the area covering the same geological

(1) Or alternatively in a separate EIA to be undertaken by the project.

terrain indicates that engineering design can overcome any potential geotechnical constraints and that the area is suitable for development. The excavatability for the trenches is also not expected to be a problem because of the presence of existing underground pipelines. Test pit investigations along the proposed pipeline would determine the excavatability in detail.

Specialist studies undertaken as part of this EIA

Specialist input was obtained for the assessment of the following impacts:

- Air Quality;
- Climate Change;
- Noise;
- Flora
- Fauna;
- Avifauna;
- Traffic;
- Socio-economic;
- Heritage; and
- Risk Assessment.

10.3 AIR QUALITY

Relevant legislation and guidelines

The national ambient air quality standard (NAAQS) ((DEA, 2013a)) consists of a limit value and a permitted frequency of exceedance for an array of potential pollutants. The limit value is the fixed concentration level aimed at reducing the harmful effects of a pollutant. The permitted frequency of exceedance represents the tolerated exceedance of the limit value annually and accounts for high concentrations as a result of process upsets and meteorological variation. Compliance with the ambient standard implies that the frequency of exceedance does not exceed the permitted tolerance. The NAAQS relevant to the Project are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$) and benzene, as shown in *Table 10.1*.

Table 10.1 NAAQS for SO2, NO2, CO, O3, benzene and PM10 (DEA, 2009) and PM2.5 (DEA, 2012)

Pollutant	Averaging period	Limit value ($\mu g/m^3$)	Tolerance
SO_2	1 hour	350	88
	24 hours	125	4
	1 year	50	0
NO_2	1 hour	200	88
	1 year	40	0
CO	1-hour	30 000	88
	8-hr running mean	10 000	11

O_3	8-hr running mean	120	11
PM_{10}	24 hours	75	4
	1 year	40	0
$PM_{2.5}$	24 hours	65	4
		40	4
		25	4
	1 year	25	0
		20	0
		15	0
Benzene	1 year	5	0

Table 10.2 National limit values for dustfall rates in mg/m2/day as 30-day average (DEA, 2013c)

Area	Dustfall rate (D)	Permitted frequency of exceedance
Residential	D < 600	Two within a year, not in sequential months
Non-residential	600 < D < 1 200	Two within a year, not in sequential months

Baseline conditions

The West Coast is sparsely vegetated and is relatively dry, receiving an average annual rainfall of only 278 mm. It is naturally dusty, particularly during the drier summer months and prior to the winter rains when ploughing takes place in preparation for winter crops.

Ambient air quality in Saldanha Bay is also influenced by a number of anthropogenic sources of air pollution.

The effect of these emissions on ambient air quality is determined through ambient air quality monitoring. Despite the number of sources of air pollution in Saldanha Bay, ambient monitoring data from the Saldanha Bay Municipality (SBM) has shown that ambient concentrations of all pollutants are consistently below the NAAQS. Ambient monitoring by the SBM commenced in July 2014 and has continued reliably since then.

Without any major coal burning facilities in the area, the ambient hourly SO_2 concentrations are very low relative to the NAAQS of 350 µg/m^3 (*Table 10.1*), with hourly average concentrations consistently below 5 µg/m^3. Hourly ambient NO_2 concentrations are also very low relative to the NAAQS of 200 µg/m^3 (*Table 10.1*), with hourly average concentrations consistently below 10 µg/m^3.

Daily average PM_{10} concentrations are also relatively low compared to NAAQS of 75 µg/m^3, ranging between 22 and 30 µg/m^3. The maximum 24-hour average PM_{10} concentration of 69 µg/m^3 was recorded in March 2015. Ozone (O_3) is not emitted by any particular source, but is formed in a photochemical reaction involving NO_2 and volatile organic compounds. O_3 is

considered to be a regional pollutant. Ambient O_3 concentrations are relatively high compared with other pollutants in Saldanha Bay, but they are well below the 8-hour NAAQS of 120 µg/m^3. Typically hourly O_3 concentrations range between 20 and 30 µg/m^3.

10.3.2 Decreased Ambient Air Quality during the Construction and Decommissioning Phases of the Project

Impact Description

Most construction and decommissioning activities generate dust. The emission of particulates into the atmosphere is through vehicle dust entrainment, demolition, excavation, ground levelling, etc. The main environmental problem with dust that is generated from these activities is that it settles on surrounding properties and land which is often more of a nuisance problem than a health issue. The dust is generally coarse, but may include fine respirable particles (PM_{10}) and these are known to be a risk to human health.

Exhaust emissions from construction vehicles and equipment typically include particulates (including PM_{10}), carbon monoxide (CO), nitrogen oxides (NO_X), sulphur dioxide (SO_2) and volatile organic compounds (VOCs) including benzene.

The construction and decommissioning activities are typically short lived and the pollutants are released close to ground level with little or no buoyancy which limits their dispersion and the potential impacts to the site.

Impact Assessment

Air quality impacts during construction and decommissioning are predicted to be of *local* extent for all pollutants since these pollutants are released close to ground level, which limits their dispersion and the potential impacts, as described above.

The scale of the impact has been rated as Low as in the case of dust, SO_2, NO_2, PM_{10}, CO and benzene, impacts are expected to be within the site and ambient concentrations are expected to be well below the respective NAAQS.

Air quality sensitive receptors include, but are not limited to, schools, churches, residences, apartments, hospitals, day care facilities, elderly care facilities and nursing homes. These land uses do not occur in the area affected by the Project and as a result the receptor sensitivity on site is rated as low.

The frequency of the impact is related to whether the predicted exceedances of the limit values exceed the permitted number of exceedances provided in the NAAQS, i.e. the tolerance. In the case of dust, SO_2, NO_2, PM_{10}, CO and benzene, no exceedances of the NAAQS are expected. This impact is considered to be irreversible. See *Box 10.1.*

Proposed Mitigation

The following mitigation is proposed to minimise the impact:

- Covering of vehicle loads;
- Loading and unloading materials in wind-sheltered areas;
- Speed restrictions on site;
- Revegetation as soon as possible;
- Spraying of roads to minimise dust;
- Maintenance of vehicles and equipment.

Box 10.1 Decrease in ambient air quality during the during the Construction and Decommissioning Phases of the Project

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Short term
- **Scale:** Low
- **Frequency:** Rare
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE.
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will maintain the impact as **NEGLIGIBLE**

10.3.3 Decreased Ambient Air Quality during the Operational Phase of the Project

Impact Description

Emissions of air pollutants from the ArcelorMittal CCGT power plant will result during operations through the combustion of LNG resulting in NO_X, CO and CO_2 emissions and some methane (CH_4) (1). NOx and CO have been modelled as part of the air quality study and detailed in this impact assessment. Carbon dioxide (CO_2) and methane (CH_4) are emitted when LNG is combusted, but these are greenhouse gases and consideration of their effects is addressed under the contribution of the Project to climate change, which is detailed as a separate impact, see *Section 10.4*.

<u>NO_2 emissions</u>
The predicted annual average NO_2 concentration and the 99th percentile of the 1-hour concentrations at the points of predicted highest ground-level

(1) There is virtually no sulphur in LNG and therefore emissions of SO_2 have not been considered.

concentration were determined by dispersion modelling and are presented in *Table 10.3*.

With regard to NO_2, ambient concentrations are predicted from emissions of NO_X (NO_X=NO+NO_2). Emissions from combustion processes are dominated by NO_2, and furthermore, NO converts rapidly to NO_2 in the presence of N in the atmosphere. Comparing the predicted concentrations of NO_2 to the NAAQS is therefore somewhat conservative.

Table 10.3 ***Annual average NO_2 concentration and the 99th percentile of the predicted 1-hour concentration at the points of predicted maximum ground-level concentration in µg/m3***

Averaging period	Operational Phase
Annual	1.1
1-hour	40.7

Predicted annual average NO_2 concentrations during the operational phase of the Project are shown as isopleths in *Figure 10.1* and compared to the NAAQS of 40 µg/m^3. The 99th percentile of the predicted 1-hour NO_2 concentrations are also presented as isopleths in *Figure 10.2* and compared with the NAAQS of 200 µg/m^3. No exceedences are observed.

The predicted annual average NO_2 concentrations are well below the NAAQS. The NO_2 concentrations predicted are a maximum concentration of 1.1 µg/m^3. The maximum concentrations occur just to the north of the facility.

The 99th percentile of the predicted 1-hour NO_2 concentrations during operation are lower with a predicted maximum concentration of 2.1 µg/m^3, which does not exceed the NAAQS. The predicted maximum concentration of 2.1 µg/m^3 occurs close to the proposed site. No exceedences are observed.

Figure 10.1 Annual average NO_2

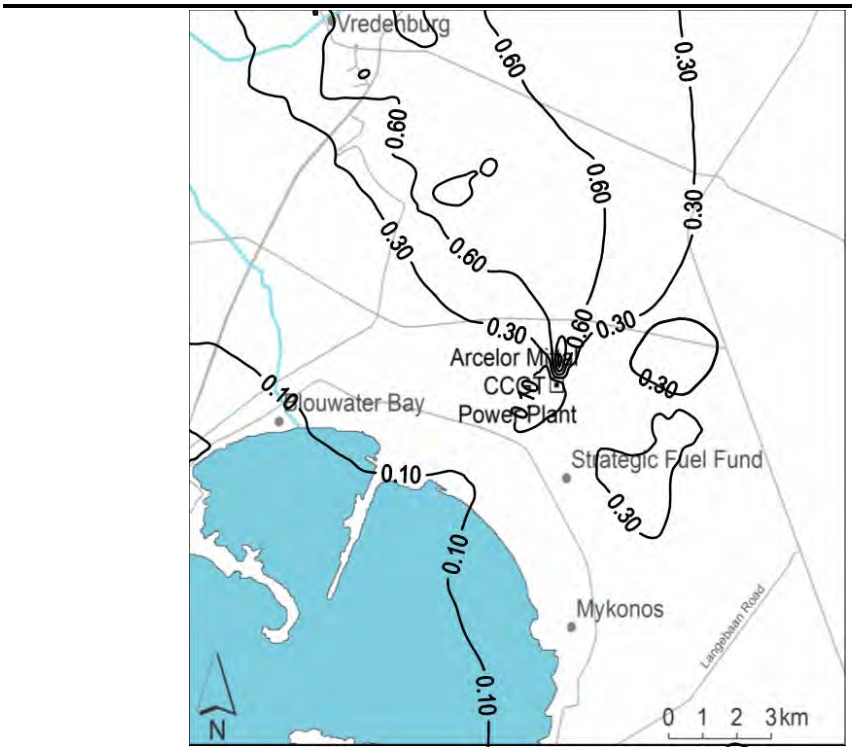
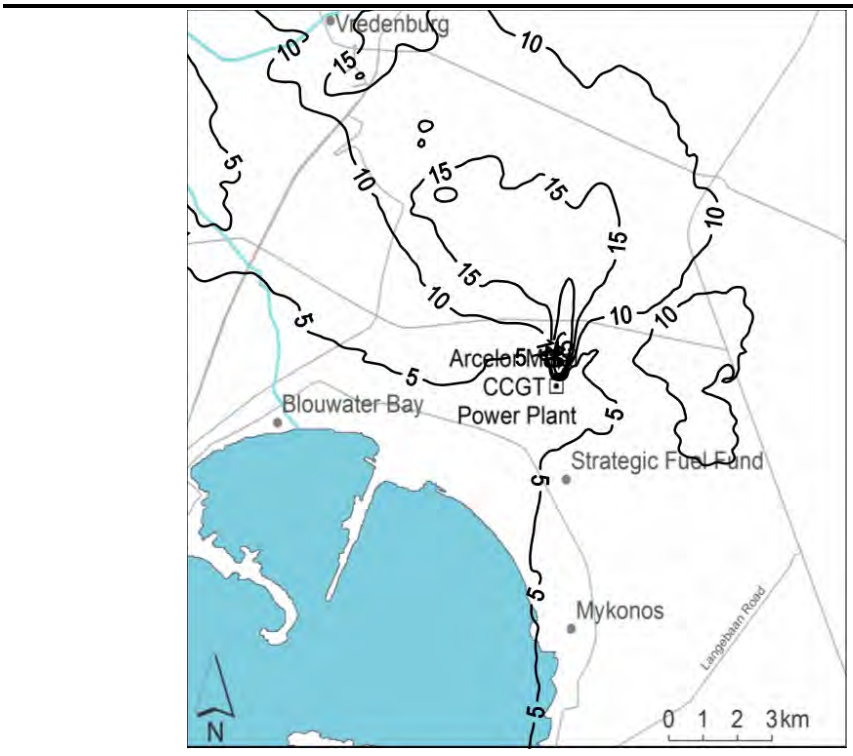


Figure 10.2 1-hour NO2



CO emissions

Predicted annual average and maximum 8-hour CO concentrations resulting from LNG combustion is very low and several orders of magnitude below the respective NAAQS. The concentrations at the points of predicted highest

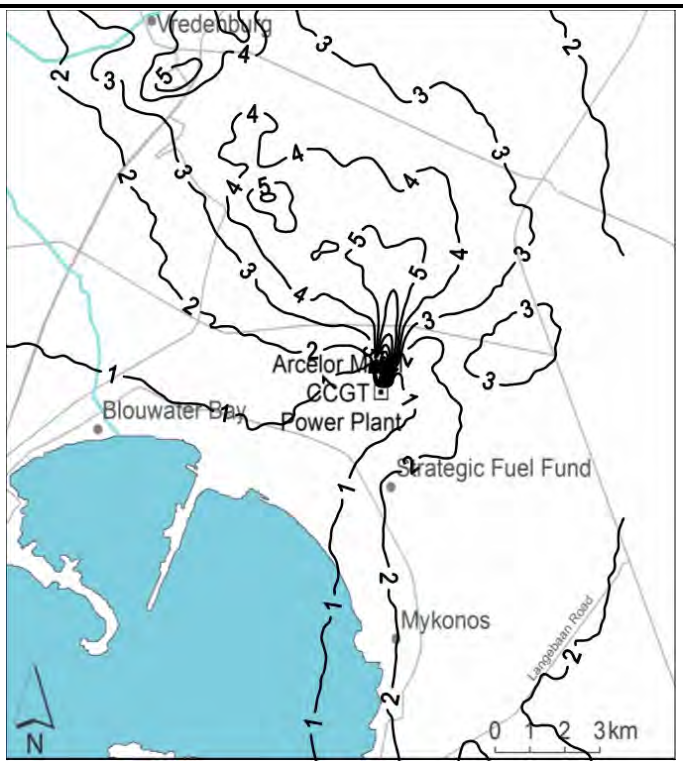
ground-level concentration are presented in *Table 10.4*. No exceedences are observed.

Table 10.4 Maximum predicted CO concentrations in µg/m3

Averaging period	Operational phase
8-hour	6.1
1-hour	12.0

Figure 10.3 Predicted 8-hour average CO concentrations (µg/m3) resulting from emissions from ArcelorMittal CCGT power plant (operation)

Figure 10.4 99th percentile of the predicted 1-hour CO concentrations (µg/m3) resulting from emissions from ArcelorMittal CCGT power plant (operation)



Impact Assessment

The impacts are predicted to be of local extent for all pollutants.

The scale of the impact is related to whether the predicted ambient concentrations of the pollutants exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. For all pollutants the predicted ambient concentrations are well below the respective NAAQS and the scale of the impact is scored low.

The sensitivity of receptors is rated as low as detailed for the construction phase impacts above.

The frequency of the impact is related to whether the predicted exceedances of the limit values exceed the permitted number of exceedances provided in the NAAQS, i.e. the tolerance. No exceedances of the NAAQS are expected. This impact is considered to be irreversible.

Proposed Mitigation

The following mitigation measures are proposed:

- Development and implementation of servicing programmes for all operational components of the facility.

- Stocking of critical components to ensure the availability of spares in the event of mechanical faults.

Box 10.2 Decreased ambient air quality during the Operational Phase of the Project

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Low
- **Frequency:** Rare
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR

10.3.4 Residual Impacts

A summary of the impact of air emissions during the construction and operation phases of the Project is provided in *Box 10.1* and *Box 10.2*.

Table 10.5 Pre- and Post- Mitigation Significance for Air Quality

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Decreased ambient air quality	Construction	Negligible	Negligible
Decreased ambient air quality	Operation	Minor	Minor

10.4 CLIMATE CHANGE

In the context of climate change impacts associated with GHG emissions from the Project, extent, duration, and frequency are the same irrespective of the Project context and the scale of its GHG emissions, and therefore do not form a good basis on which to assess the significance of the impacts associated with GHG emissions. Specifically, the extent of GHG (climate change) impacts is global, the duration of the impact is permanent (CO_2 has a residence time in the atmosphere of approximately 100 years), and the frequency of the impact is constant since GHG emissions will be produced throughout the lifetime of the plant.

As such, GHG impact significance is determined on the basis of the assessment of the scale of the GHG emissions from the power plant using benchmarks from international lender standards, further informed by reference benchmarks on the GHG intensity of electricity production for similar facilities and according to the grid emissions factor in South Africa, as

well as an analysis of the Project's alignment with South Africa's energy and climate change policies.

Table 10.6 summarises the Project's estimated annual GHG emissions during Operations (Phase 1 and 2). Emissions associated with the construction and eventual decommissioning of the Project are excluded from the assessment, since these are likely to be insignificant in the context of the Project's operational emissions arising from the combustion of LNG for power generation.

Total estimated annual emissions for the first phase of the Project (210 MW), assuming 8 400 operating hours per year, are 920 712 t CO_2e (0.92 Mt t CO_2e). For the second Phase (1 317 MW), annual emissions are estimated to be 3 677 050 t CO_2e (3.68 Mt t CO_2e). Cumulatively, after the completion of Phase 2, total annual emissions from both Phases (i.e. with five Trent60s and three SGT6-4000F turbines running concurrently) are estimated to be 4 597 761 t CO_2e. Assuming the same load factor and operating patterns, and not factoring in a decrease in thermal efficiency over time, total (cumulative) estimated emissions over the 30 year lifetime of the 1 507 MW [(1)] plant are in the range of 138 Mt CO_2e.

Table 10.6 Estimated GHG emissions arising from the operation of the Power Plant

Operational activity	Estimated Annual Emissions in Phase 1 (210 MW) (t CO_2e)	Estimated Annual Emissions in Phase 2 (1 317 MW) (t CO_2e)	Estimated Annual Emissions Phase 1 + 2 (1 507 MW) t CO_2e)	Data Source, Notes and Assumptions
Natural gas combustion for power production	920 633	3 676 971	4 597 604	Natural gas combustion volumes estimated based on: 16 327 920 GJ per year (Phase 1) and 65 213 074 GJ per year (Phase 2) (Engineer calculation); Lower Heating Value (LHV) for natural gas of 35 924 kJ / Nm^3 [(2);] and natural gas emissions factor of 2.0255 kg CO_2 / m^3 (ERM calculation based on API Compendium methodology) (API, 2009)

(1)Note that the total capacity according to the 210 MW (Phase 1) + 1 317.3 MW (Phase 2) is 1 527.3 MW. The slight discrepancy between this figure and the 1 507 MW mentioned for the whole plant is due to the estimated parasitic loads of the plant. This value will be confirmed upon final selection of the power plant equipment, and this report refers to an overall capacity of 1 507 MW.

(2) Response from PowerConsult to ERM on ERM's GHG Data Request – 26 June 2016.

Operational activity	Estimated Annual Emissions in Phase 1 (210 MW) (t CO_2e)	Estimated Annual Emissions in Phase 2 (1 317 MW) (t CO_2e)	Estimated Annual Emissions Phase 1 + 2 (1 507 MW) t CO_2e)	Data Source, Notes and Assumptions
Propane combustion in Gensets for back-up power	79	79	158	Estimated annual propane consumption based on one black start event every 5 years, assuming: average site load 2.5 MW; 220 kg propane per MWh generated; and 10 days' outage per event (Source: Response to ERM GHG data request by PowerConsult [1]. Applies IPCC 2006 Net calorific values (47.3 MJ / kg), carbon content (17.2 kg C / GJ, and CH_4 (0.001 kg CH_4 / GJ) and N_2O (0.0001 kg N_2O / GJ) emissions factors for Propane (IPCC, 2006a; IPCC, 2006b).
Total	**920 712**	**3 677 050**	**4 597 761**	

Table 10.7 illustrates the thermal efficiency of the plant, and the emissions intensity of grid electricity generated (using annual estimated emissions above and annual estimated generated electricity in MWh).

Table 10.7 Saldanha Gas-Fired Power Plant GHG emissions intensity and thermal efficiency

	Phase 1 (210 MW)	Phase 2 (1 317 MW)	Phase 1 + 2 (1 507 MW)	Data Source, Notes and Assumptions
Total estimated annual emissions (t CO2e)	920 712	3 677 050	4 597 761	Estimated total annual GHG emissions from the plant (calculations in *Table 10.6*)
Total annual electricity generation (MWh)	1 802 598	11 065 320	12 867 918	Plant net power (214.6 MW Phase 1 + 1 317.3 MW Phase 2) * 8 400 (annual operating hours)
Electricity emissions intensity (t CO_2e / MWh, or kg CO_2e / kWh)	**0.51**	**0.33**	**0.36**	Total annual emissions divided by total annual electricity output
Thermal efficiency	**39.93**	**58.30**	**56.51**	Thermal efficiency for Phase 1 and 2 using lower heating values (LHV) (Source: Response to ERM GHG data request) [2]

It should be noted that the GHG intensity factor, 0.36 t CO_2e per MWh for Phase 1 and 2 combined, reflects the emissions intensity of electricity generated by the plant for distribution. The total MWh output used to

[1] Email to ERM from Adrian Venzo, PowerConsult, 28 June 2016
[2] Response to ERM's information request from PowerConsult, 23 June 2016

calculate the emissions intensity excludes auxiliary power consumption by the plant, and excludes losses from transmission and distribution.

Finally, it is important to note that two of the Project's objectives relate to 'Education' and 'Demonstrating Technology', and that the Project plans to install 400 kW of renewable energy – namely solar PV – which will be used to provide stand-by emergency DC power and will power various features and activities including the main building LED lighting as well as the security lighting. The use of renewable (low carbon) energy to power these auxiliary processes will help to further reduce the emissions intensity of the plant.

Impact Description

The Project will result in the emission of greenhouse gases (GHGs) predominantly during the operational phase of the project, contributing to global climate change.

Impact Assessment

Contribution of the Project to South Africa's national GHG inventory

Table 10.8 illustrates the magnitude of the Project's emissions relative to South Africa's national GHG emissions.

Table 10.8 Estimated GHG Emissions from the 1 507 MW Gas-Fired Power Plant Relative to Projected GHG Emissions for South Africa

Year	Estimated annual emissions – South Africa (t CO_2e)– PPD Lower Range	Estimated annual emissions – South Africa (t CO_2e)– PPD Upper Range	Estimated annual emissions – Saldana Gas-Fired 1 507 MW Project (t CO_2e)*	Saldana Gas-Fired 1 507 MW Project % contribution to South Africa's projected national GHG emissions (as a % of upper and lower Range PPD trajectory)
2020*	398 000 000	583 000 000	4 597 761	0.8 – 1.2%
2025	398 000 000	614 000 000	4 597 761	0.7 – 1.2%
2030	398 000 000	614 000 000	4 597 761	0.7 – 1.2%
2035	398 000 000	614 000 000	4 597 761	0.7 – 1.2%
2040	336 000 000	552 000 000	4 597 761	0.8 – 1.4%
2045	274 000 000	490 000 000	4 597 761	0.9 – 1.7%
2050	212 000 000	428 000 000	4 597 761	1.1 – 1.2%

* Assumes Phase 2 will have commenced operations by 2020
Source: DEA (2011) and DEA (2014a) (estimated annual emissions for South Africa using lower and upper ranges of PPD). A linear decline to INDC targets by 2050 from 2035 levels is assumed.

As illustrated above, the Project's GHG emissions are estimated to comprise 0.8 – 1.2% of South Africa's national emissions in 2020, rising to 1.1 – 1.2% in 2050.

Scale of the Project's Emissions relative to GHG Magnitude Scale from Wider Standards

Various international lender organisations including the IFC, EBRD and EP, give guidance on the scale of a Project's GHG emissions based on thresholds of annual emissions that trigger requirements for quantifying, reporting and mitigating Project GHG emissions. The magnitude scale derived from these organisations is illustrated in *Table 10.9*.

Table 10.9 Magnitude scale for project-wide GHG emissions based on wider standards

Project-Wide GHG Emissions / annum	Magnitude Rating
>1 000 000 tonnes CO_2e	Very Large
100 000 – 1 000 000 tonnes CO_2e	Large
25 000 – 100 000 tonnes CO_2e	Medium
5 000 – 25 000 tonnes CO_2e	Small
<5 000 tonnes CO_2e	Negligible

Based on the magnitude scale above, and considering the estimated annual GHG emissions from the final 1 307 MW Project (4 597 761 t CO_2e), the magnitude of the project's GHG impact is considered to be **Very Large**. It should be noted that, in the absence of abatement technologies such as Carbon capture and storage (CCS) (which has historically almost exclusively been applied to coal – rather than gas - fired power plants), most if not all fossil-fuel based power plants will fall into this category by nature of their significant GHG emissions.

Benchmarking performance against other gas-fired power plants

The Project's estimated emissions intensity and stated thermal efficiency are compared to benchmarks for alternative gas-fired power plant technologies in *Table 10.10* below.

Table 10.10 Benchmarking emissions intensity and thermal efficiency of the Project against alternative gas-fired power plant technologies

Coal-fired power plant name / technology	Thermal efficiency (LHV, net)	CO_2e intensity factor (LHV, net)	Reference
The Project	39.93% (Phase 1); 58.30% (Phase 2); 56.51% (combined)	0.51 kg CO_2e / kWh (Phase 1); 0.33 kg CO_2e / kWh (Phase 2); 0.36 kg CO_2e / kWh (combined)	ERM calculations – see *Table 10.7*
Open cycle gas turbine (OCGT)	30 – 40%	0.48 – 0.58 kg CO_2e / kWh	IEA ETSAP (2010), C2ES (n.d.), IPIECA (n.d.)
Closed cycle gas turbine (CCGT)	50 – 60%	0.34 – 0.40 kg CO_2e / kWh	IEA ETSAP (2010), C2ES (n.d.), IPIECA (n.d.)
CCGT with Carbon capture & storage (CCS)*	Reduction of 7-8%	0.04 kg CO_2e / kWh	IEA GHG (2012)

* Based on a techno-economic study on CO_2 capture at natural gas fired power plants modelled using plant simulation software. Reflects results for post-combustion capture technologies.

The results from the benchmarking assessment highlight the following key messages:

- Thermal efficiency for Phase 1 (comprising six Siemens Trent60, OCGT plants) is reported to be 39.93% (net), and the emissions intensity is estimated to be 0.51 tCO_2e/MWh. This is within the expected range and is at the higher end of what can be expected (i.e. the proposed plant has relatively high thermal efficiency and low GHG intensity) for OCGT technologies;

- Thermal efficiency for Phase 2 (comprising three Siemens SGT5-4000F CCGT plants) is reported to be 58.30% (net), and emissions intensity is estimated to be 0.33 tCO_2e/MWh. This is on the higher end of what can be expected for CCGT technologies (i.e. relatively high thermal efficiency and low GHG intensity), and represents a significant improvement on Phase 1 from a GHG emissions perspective; and

- There is the potential for CCS to reduce the GHG intensity of fossil fuelled power plants significantly, though with a penalty on thermal efficiency which decreases due to the additional auxiliary power required for the carbon capture technologies. However, as noted, CCS technologies have to date almost exclusively been applied at coal-fired power plants, and the technology has not yet been demonstrated in South Africa, so this is not at present considered to be a viable option for the Saldanha Steel gas-fired power plant.

Implications of the Project on the South African grid emissions factor

The GHG intensity factor for the plant is estimated to be **0.51 t CO_2e / MWh** in Phase 1 and **0.33 t CO_2e / MWh** in Phase 2, based on total estimated annual GHG emissions and total electricity generated and sent to the grid (i.e. excluding plant auxiliary consumption and any losses from transmission and distribution). For Phase 1 and 2 combined, based on total estimated annual GHG emissions and total electricity generated, the emissions intensity is estimated to be **0.36 t CO_2e / MWh.**

By comparison, the emissions intensity of the electricity generated by Eskom (representing 95% of electricity generated and distributed in the South African electrical grid), for the period 1 April 2014 to 31 March 2015, as published by Eskom, was **1.01 t CO_2e / MWh** (further discussion in the specialist study in *Annex D*). This factor is based on total GHG emissions from Eskom facilities (noting that 90% of Eskom's power in 2014-15 was generated from coal and the remaining 10% from low-carbon energy sources), and total electricity generated and sent to the grid, excluding Eskom (auxiliary) consumption and excluding transmission and distribution losses.

The above analysis suggests that the emissions intensity of the electricity generated by the Project represents a significant improvement relative to the current grid emissions factor for South Africa. It also represents an

improvement relative to the emissions intensity of Eskom's gas power plants, which have historically run on liquid fuels (diesel and kerosene), and which in 2011 were reported to have an average intensity of **0.82 t CO_2e / MWh.**

Alignment with South Africa's climate change policy and international GHG mitigation commitments.

There is a clear mandate from the DoE for the procurement of additional capacity (3 126 MW) from gas-fired power plants under the Gas to Power Program and in alignment with the electricity generation plans set out in the IRP 2010-2030 (2010). The alignment between IRP 2010-2030 (2011) and the Government's Peak, Plateau and Decline (PPD) GHG emissions trajectory (which forms the basis of South Africa's climate change strategy and international GHG mitigation commitments) is undertaken in order to understand the project's alignment with South Africa's climate change mitigation commitments. An assumption is made that this project forms part of the allocation to gas-fired power plants under the IRP, and that electricity generation and new power projects will be aligned to the IRP 2010-2030 and not exceed it. The substantial changes in the economic and electricity landscape since 2011, when the IRP 2010-2030, should also be noted.

Noting the above, the DEA's Mitigation Potential Analysis study conducted in 2014, more aggressive decarbonisation of South Africa's energy supply will be needed in future iterations of the IRP if the targets set out in the PPD are to be achieved. Whilst this introduces some uncertainty as to the level of electricity generation that will come from coal post-2030, the introduction of new gas-based power will help to bring about the transition to a lower carbon energy mix required in order to meet the country's climate change commitments.

Project GHG impact significance rating

The above analysis shows that the magnitude of the Project's GHG emissions, estimated to be 4 597 761 t CO_2e annually during operations on completion of Phase 2, is '**Very Large**', as per the benchmarks from international lender standards which apply the highest rating ('Very Large') to projects emitting >1 000 000 t CO_2e per annum. Relating this to the impact significance scale being used for the project, this translates to an overall significance rating of **Major (Negative)**. As noted, in the absence of abatement technologies such as CCS, most (if not all) coal and gas power plants will fall into this category by nature of their significant GHG emissions.

Whilst the Project's GHG emissions and therefore climate change impacts are significant, these findings should be considered in the context of the following positive impacts associated with the Project in relation to efficiency and impact on the South African average grid factor:

- The power plant (notably Phase 2 which uses combined cycle technologies) has a high thermal efficiency (Phase 2: 39.93%; Phase 2: 58.3%) and low emissions intensity (Phase 1: 0.51 t CO_2e / MWh; Phase 2:

0.33 t CO_2e / MWh) both in terms of what is achievable for gas-fired power plants, and also when compared to coal-fired power plants [1]; and

- The emissions intensity of electricity generated by the power plant (0.51 t CO_2e / MWh in Phase 1 and 0.33 t CO_2e / MWh in Phase 2, or 0.36 t CO_2e / MWh for Phases 1 + 2 combined) is a significant improvement on the average emissions intensity of Eskom's plants of 1.01 t CO_2e / MWh. With electricity generated in Phase 2 likely to feed into the national grid, this Project will therefore help to contribute to a reduction in the average grid emissions intensity.

Finally, it is also important to note that the Project is being developed in line with South Africa's energy policy, which (through the IRP 2010-2030) seeks to increase installed capacity in order to meet increasing demands on the grid, and which (through the GUMP and the Gas to Power IPP Programme) seeks to initiate the development of South Africa's gas economy.

Proposed mitigation

The following specific emissions management measures are suggested:

- It is important that the plant's thermal efficiency is being maximised throughout the life of the plant in order to reduce the gas consumption and therefore GHG emissions per unit of electricity (i.e. kWh or MWh) generated. The plant should seek to identify specific measures that can be implemented in order to maximise thermal efficiency and therefore minimise GHG intensity over time. This will need to be based on a plant specific assessment informed by the operations and maintenance (O&M) requirements for the equipment in question, and assessments should be carried out upon final selection of the equipment and, subsequent to the commencement of operations, periodically.

- Whilst noting that, at present, the assumption is for the plant to operate for 8 400 hours per year (96% load factor) throughout its lifetime, it will be important to manage any changes to operating philosophy should these arise for example as a result of changes in grid dispatch rules (this will mainly be applicable to the three Siemens SGT5-4000F turbines in Phase 2 which are likely to feed electricity into the grid). Whilst noting that any reduction in the operating time or load factor (i.e. annual power generation in MWh) is likely to result in decreased total annual emissions from the plant, such changes to cycling philosophies could have an adverse impact on thermal efficiency and GHG intensity per MWh generated as a result of increased start-ups and wear and tear on the plant. As such, the potential impact of any future changes in operating

[1] For comparative purposes, coal-fired power plants have thermal efficiencies in the range of 30 – 38 % (subcritical plants) or 38 – 45 % (plants using supercritical steam technologies), and corresponding emissions intensities of > 0.88 t CO2e / MWh (subcritical plants), or 0.67 – 0.88 t CO2e / MWh (supercritical plants). Source: IEA (2012a), IEA (2012b), and Michener (2012).

philosophy should be investigated and managed for example through upgrades to plant hardware and modifications to operating practices, as applicable.

- The Project documents note the potential for converting at least two of the 42 MW Trent60 OCGTs in Phase 1 to combined cycle at a later stage for improved efficiency [1]. Whilst noting that the technological and economic feasibility of such a change will need to be assessed when that time comes, it is recommended that the option to make such a change is reviewed periodically and implemented when possible, and on as many of the six Trent60 turbines as is feasible. This will allow the Project to benefit from the much improved efficiencies and reduced emissions associated with the use of combined cycle technologies, and will improve the GHG profile of the plant.

- The development and implementation of a GHG management plan is critical if GHG emissions from the plant are to be managed over time. Since GHG emissions are primarily driven by the fuel consumption at the plant and are closely linked to the plant's heat rate and thermal efficiency, this can take the form of a combined thermal efficiency and GHG management plan. Key elements of a thermal efficiency / GHG management plan include:

    - Development of an overarching policy statement indicating the Plant's commitments with respect to minimising GHG emissions and implementing actions to ensure optimum emissions management;
    - Measuring GHG emissions on an annual basis [2], which will require data on:
        - the total amount of gas consumed, its chemical properties and GHG emissions factor; and the consumption of any other fuels such as LPG for the black starts; and
        - Plant heat rate / thermal efficiency should be closely monitored over time as this is closely correlated to the GHG intensity of the plant.
    - Setting short, medium and long-term targets relating to maximising and maintaining heat rate / thermal efficiency and GHG intensity (t CO_2e per MWh generated) over time, against which performance can be assessed;
    - Tracking South Africa's evolving GHG and energy related regulations, including the implications / requirements for the Plant of the proposed carbon tax, GHG reporting regulations, and energy reporting regulations, all of which are currently in draft form but likely to be finalised in 2016 or 2017;

[1] Updated Information for EIA Input and Consideration: 1 500 MW Saldanha Gas-to-Power Project. PowerConsult. 12 June 2016

[2] For example, IFC Performance Standard 3 requires that 'For projects which are expected to or currently produce more than 25 000 tonnes of CO_2e-equivalent annually'… 'Quantification of GHG emissions will be conducted by the client annually in accordance with internationally recognized methodologies and good practice'

- Identifying and implementing heat rate improvement / GHG reduction projects, based on any deviations from expected heat rate and knowledge of required maintenance or upgrades. Internal and external energy audits should be used to help identify opportunities for performance improvement, and a business case can be developed for each area of opportunity to help prioritise projects. More significant projects can be implemented during the major maintenance overhauls as scheduled by the Plant;
- Allocating responsibility to key individuals such that someone (or a team of individuals) is responsible and accountable for managing and reporting on the GHG performance of the plant;
- Communicating the Plan, including its key objective and any actions being taken, to staff working at the plant to ensure buy-in;
- Encouraging employee participation in the GHG management plan, including contribution of ideas relating to opportunities for improvement; and
- Reporting progress over time with respect to annual gas consumption and GHG emissions, GHG reductions / heat rate improvements achieved, and progress against targets set.

The Department of Energy (DoE) is currently developing an Energy Efficient Monitoring System (EEMS) to track the efficient consumption of energy within South Africa and the trends involved. The DoE will need reliable data from all legal entities operating in the most intensive sectors of the economy and they have set certain thresholds, that if exceeded will require certain steps to be taken:

- Companies using 400 terajoules or more per annum will be required to submit a detailed energy management plan; and
- The energy management plan must include an energy baseline determined in accordance with SANS 50001, as well as areas of energy efficiency savings potential and energy performance indicators. Additionally, it will be required to submit a list of technically and financially viable measures that can be put in place to meet the savings potential

- The Project plans to make use of solar PV energy to meet some of the plant's auxiliary load requirements. As a low or 'no' carbon form of energy, solar PV provides a means of reducing the emissions intensity of the plant and of the electricity it produces. Renewable energy can play a key role in the site's GHG emissions management plan and further opportunities to install more renewable capacity on-site should be investigated going forwards.

Box 10.3 Contribution to Climate Change

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: High

Impact Magnitude: Very Large

- **Extent:** Transboundary/International
- **Duration:** Long term
- **Scale:** High
- **Frequency:** Rare
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MAJOR
IMPACT SIGNIFICANCE (POST-MITIGATION): MAJOR

10.4.2 Residual Impacts

Whilst the above mitigation measures will help to ensure that GHG emissions are minimised as far as possible, the only mitigation technology that is likely to achieve deep cuts on GHG emissions from a combined-cycle gas power plant is CCS, which as discussed has yet to be demonstrated in South Africa. Thus the residual (post-mitigation) impact rating for the project will remain as Major (Negative).

A summary of the impact of climate change during the operation phase of the Project is provided in *Box 10.1* and *Box 10.2*.

Table 10.11 Pre- and Post- Mitigation Significance for Climate Change

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Contribution to climate change	Operation	Major	Major

10.5 INCREASED NOISE LEVELS

Relevant legislation and guidelines

In South Africa, the guideline for environmental noise is SANS 10103:2008. It defines land use districts and acceptable sound levels for day and night time noise.

Figure 10.5 Acceptable Sound Levels for Noise in Districts (SANS 10103:2008)

1	2	3	4	5	6	7
Type of district	Equivalent continuous rating level ($L_{Req,T}$) for noise dBA					
	Outdoors			Indoors, with open windows		
	Day/night $L_{R,dn}$[a]	Daytime $L_{Req,d}$[b]	Night-time $L_{Req,n}$[b]	Day/night $L_{R,dn}$[a]	Daytime $L_{Req,d}$[b]	Night-time $L_{Req,n}$[b]
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

SANS 10103:2008 also provides a guideline for estimating community response to an increase in the general ambient noise level caused by an intruding noise. If Δ is the increase in sound level, the following criteria are of relevance:

- **Δ ≤ 3 dBA:** An increase of 3 dBA or less will not cause any response from a community. It should be noted that for a person with average hearing acuity an increase of less than 3 dBA in the general ambient noise level would not be noticeable.

- **3 < Δ ≤ 5 dBA:** An increase of between 3 dBA and 5 dBA will elicit 'little' community response with 'sporadic complaints'. People will just be able to notice a change in the sound character in the area.

- **5 < Δ ≤ 15 dBA:** An increase of between 5 dBA and 15 dBA will elicit a 'medium' community response with 'widespread complaints'. In addition, an increase of 10 dBA is subjectively perceived as a doubling in the loudness of a noise. For an increase of more than 15 dBA the community reaction will be 'strong' with 'threats of community action'.

Note that an increase of more than 7 dBA is defined as a disturbing noise and prohibited (National and Provincial Noise Control Regulations).

International guidelines have also been considered in this impact assessment. The International IFC (Equator Principle) General EHS Guidelines for Residential; Institutional and Educational receptor types stipulates ambient noise levels as:

- Use of LReq,D of 55 dBA during the daytimes; and
- Use of LReq,N of 45 dBA during the night-times.

Baseline conditions

The area to the south, west and north of the proposed Project site is used for industrial purposes, with ambient sound levels west and north reflecting this industrial use.

The closest potential noise-sensitive receptors are located more than 2,000 m to the south-east. See *Figure 10.6*.

The following measurements have been recorded at sites in close proximity to the Project site, see *Table 10.12* and then through single measurements in the Project area, *Table 10.13.* Measurement locations are shown in *Figure 10.6*.

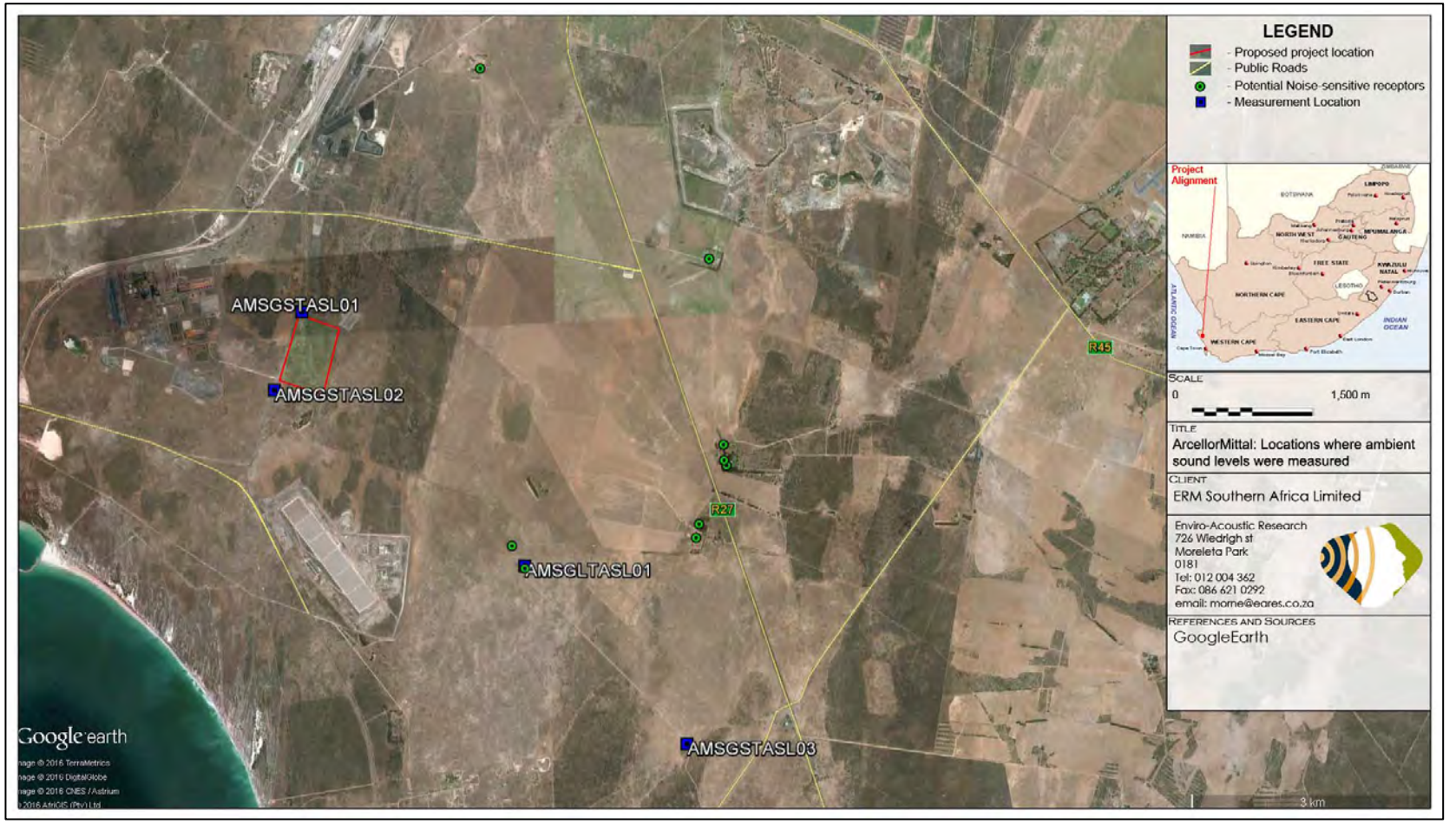
Table 10.12 Ambient Sound Level Measurements

Measurement	Day time	Night time
$L_{Aeq,10min}$ values	37 to 77 dBA	40 to 55 dBA
$L_{Aeq,I}$ arithmetic mean	49 dBA	47 dBA
$L_{Aeq,I,}$ equivalent sound levels	61 dBA	47-49 dBA
$L_{Aeq,10min,f}$	35to 74 dBA	38 to 54 dBA
$L_{Aeq,f}$ arithmetic mean	47 dBA	46 dBA
$L_{Aeq,f,}$ equivalent sound levels	55, 58 and 48 dBA	48 and 46 dBA
L_{FA90}	26 to 54 dBA90	23 to 50 dBA
L_{FA90} average	37 dBA	35 dBA
LIAeq - LFAeq average difference	2.6 dBA	1.3 dBA

Table 10.13 Results of single measurements of ambient sound levels

Measurement location	$L_{Aeq,i}$ level (dBA)	$L_{Aeq,f}$ level (dBA)	L_{A90} Level (dBA90)
AMSGSTASL01	76	73	52
Daytime	76	73	50
AMSGSTASL01	51	47	45
Night-time	52	48	45
AMSGSTASL02	75	72	51
Daytime	75	72	51
AMSGSTASL02	49	46	45
Night-time	51	47	46
AMSGSTASL03	49	47	39
Daytime	47	45	37
AMSGSTASL03	37	29	24
Night-time	32	24	20

Figure 10.6 Locations where ambient sound levels were measured



Given the ambient noise level measurements, the SANS 10103:2008 rating levels typical of a Rural Noise District have been considered for the noise impact assessment for this Project:

- Rating Level during the day (LReq,D) of 45 dBA; and
- Rating Level during the night (LReq,N) of 35 dBA.

10.5.2 Increased Noise Levels during the Construction Period

Impact Description

Noise levels are expected to increase as a result of construction activities on site. These activities include:

- Numerous road trucks that deliver various construction equipment;
- Earthworks using a combination of one or more graders, bulldozers, excavators and front-end-loaders for the clearing of vegetation, the levelling of the ground surface as well as developing access roads;
- The development of laydown areas for equipment and material;
- Dump or road trucks to deliver road building material as well as equipment used in road construction (grader, vibratory steel drum roller, bitumen sprayer, paver, roller and water truck);
- The use of one or more backhoe-loaders for the digging of trenches, foundations and assist in the installation of security fencing;
- Piling activities if required;
- The development of onsite batching plants or the delivery of ready-mix concrete using trucks, formwork, rebar construction and the pouring of concrete;
- Construction of buildings and installation of power generation structures and components (road trucks, cranes, welding, various impulsive sounds); and
- Cleaning of site, loading and removal of unused construction equipment.

Construction activities are highly variable, taking place at different locations, using various equipment, each piece of equipment operating under a different load. As a result, noises generated during the construction phase are highly variable and cannot be defined. The approach taken in this assessment is to assume a number of construction activities at numerous locations using various equipment, all operating at full load.

The location of activities that are likely to generate noise during the construction phase of the Project can be seen in *Figure 10.7*.

Impact Assessment

The anticipated ambient noise levels during the construction phase of the Project have been modelled using a sound propagation model. This has been presented in this report for the night-time noise impact only given that noise generated during the day by construction activities may be masked by other noises from a variety of sources surrounding potentially noise-sensitive developments. The night-time noise impact has therefore been used as the worst case scenario. It should be noted however that construction during the night is not anticipated and working hours are likely to be 6am until 6pm. The results thereof can be seen in *Figure 10.8*.

It is anticipated that the change in ambient noise levels will be negligible. Ambient noise levels are not expected to exceed the 35 dBA guideline at any of the identified receptors, although the construction phase sound levels may impact on the ambient noise levels for an area of 2 500 m from the proposed activity. This impact is considered to be irreversible.

Proposed Mitigation

Based on the modelling of the worst case scenario no mitigation measures are required.

Box 10.4 Increase in Ambient Noise Levels during the Construction Phase (Night time)

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium to High

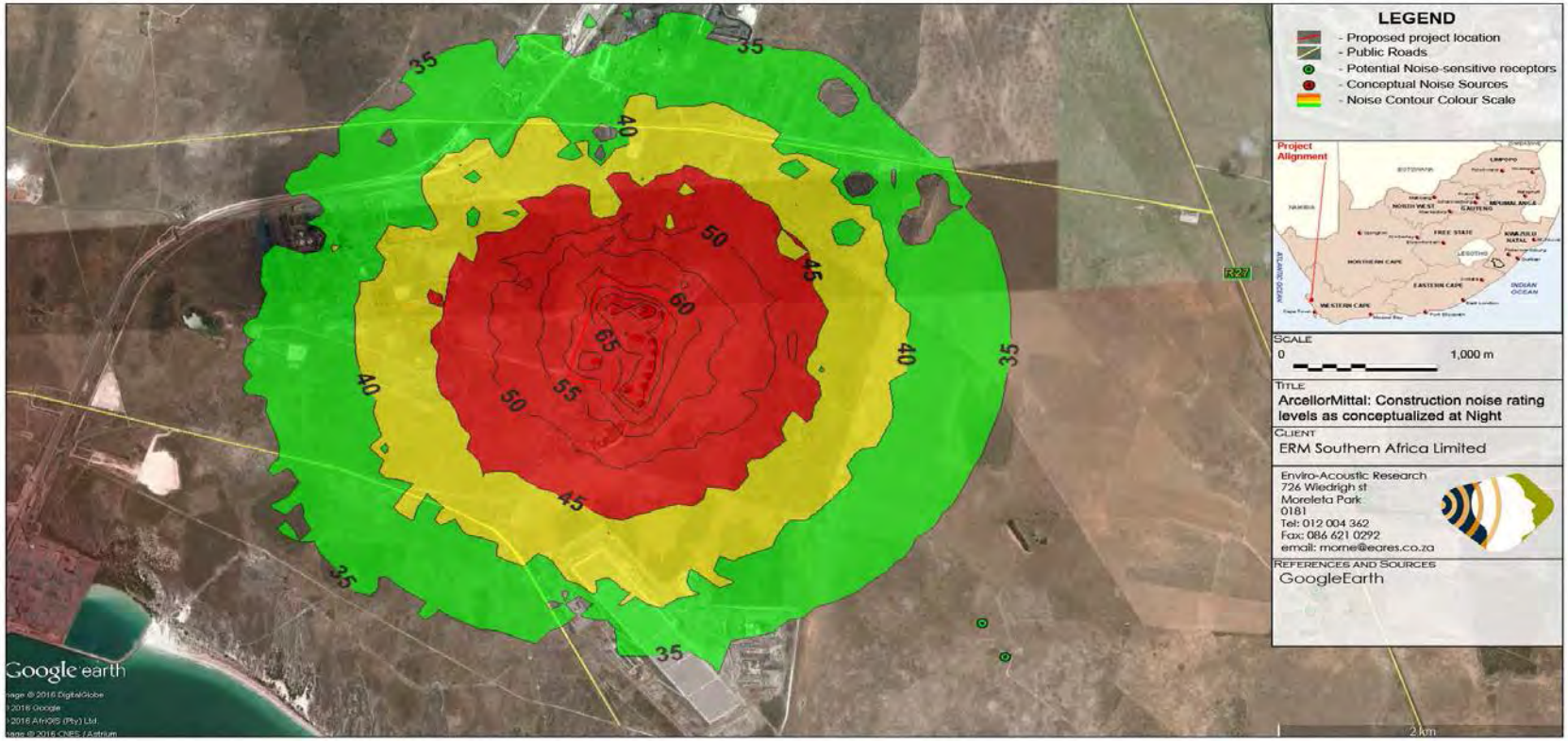
Impact Magnitude: Small

- **Extent:** Local
- **Duration:** Short term
- **Scale:** Low
- **Frequency:** Constant
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGIBLE. NO MITIGATION REQUIRED

Figure 10.7 Location of activities that are likely to generate noise

Figure 10.8 Contours of Noise Rating Levels for night-time construction activities



10.5.3 Increased Noise Levels during the Operational Phase

Impact Description

The operational phase of the Project will be undertaken over two phases and two different power generating regimes could be adopted depending on the supply agreement that is signed with Eskom.

The two development phases are: Phase 1 - the initial period to provide power to meet the demand for ArcelorMittal Saldanha Steel via an open cycle process; and Phase 2 - the second phase to supply additional power to feed other consumers via a combined cycle process. Both Phases will produce a mix of base load and peaking power.

Phase 1: Five Siemens Trent 60 50 MW open cycle gas turbines and ancillary equipment for peak power generation (six will be constructed with one turbine as backup).

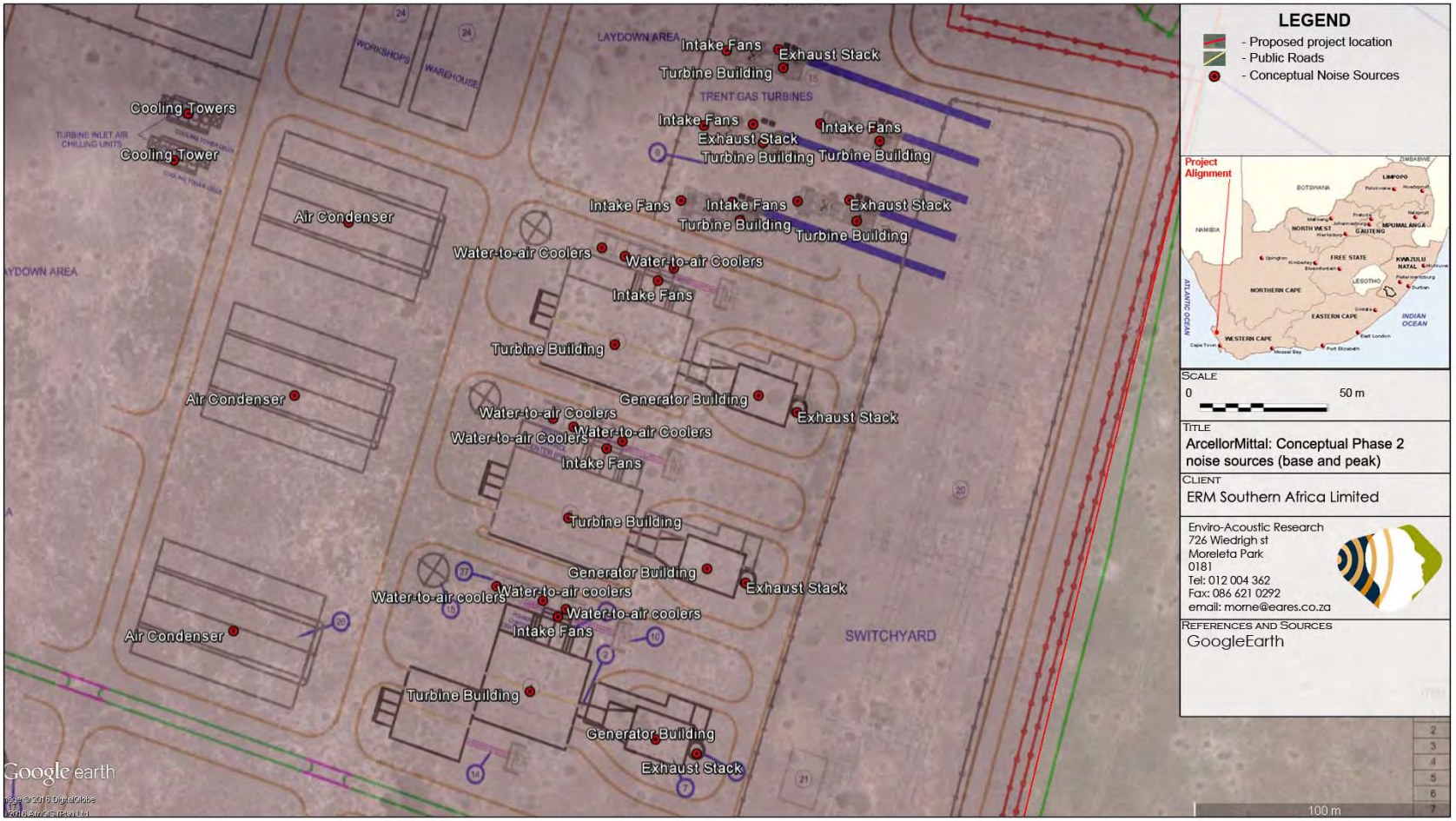
Phase 2: Three complete Siemens SGT5-4000F combined cycle power plants and ancillary equipment (gas turbines, heat recovery boilers, steam turbines, steam turbine condensers).

Both of these have been assessed for the operational phase impact and the following noise sources have been identified:

- The air intake fans;
- Fans located on the air and steam condensers;
- Gas turbine, steam turbine and generator (normally within building);
- Ventilation fans located on the turbine generator building; and
- Exhaust and flue stacks.

These sources can be seen in *Figure 10.9*.

Figure 10.9 Conceptual Noise Sources – Operational Phase



Noise will also be generated during the start-up and commissioning phase of the power plant, as follows:

- Hot commissioning and clean-out of the heat recovery boiler hot–path exchanger bundles and the super-heater piping using high pressure, high temperature steam in order to clean the pipe internals of all welding debris and mill scale. The high pressure steam would be vented to atmosphere, generating high noise levels for around 2 - 4 hours per day over 2 – 4 days.

- Hot commissioning of steam piping running from heat recovery steam generation (HRSG) to steam turbines, during 'blow-out' operations to clean the pipe internals of all debris and mill scale. High pressure steam will be blown through the live steam line and vented to atmosphere. This process could last for 3 – 4 hours per day for up to 2 – 4 days.

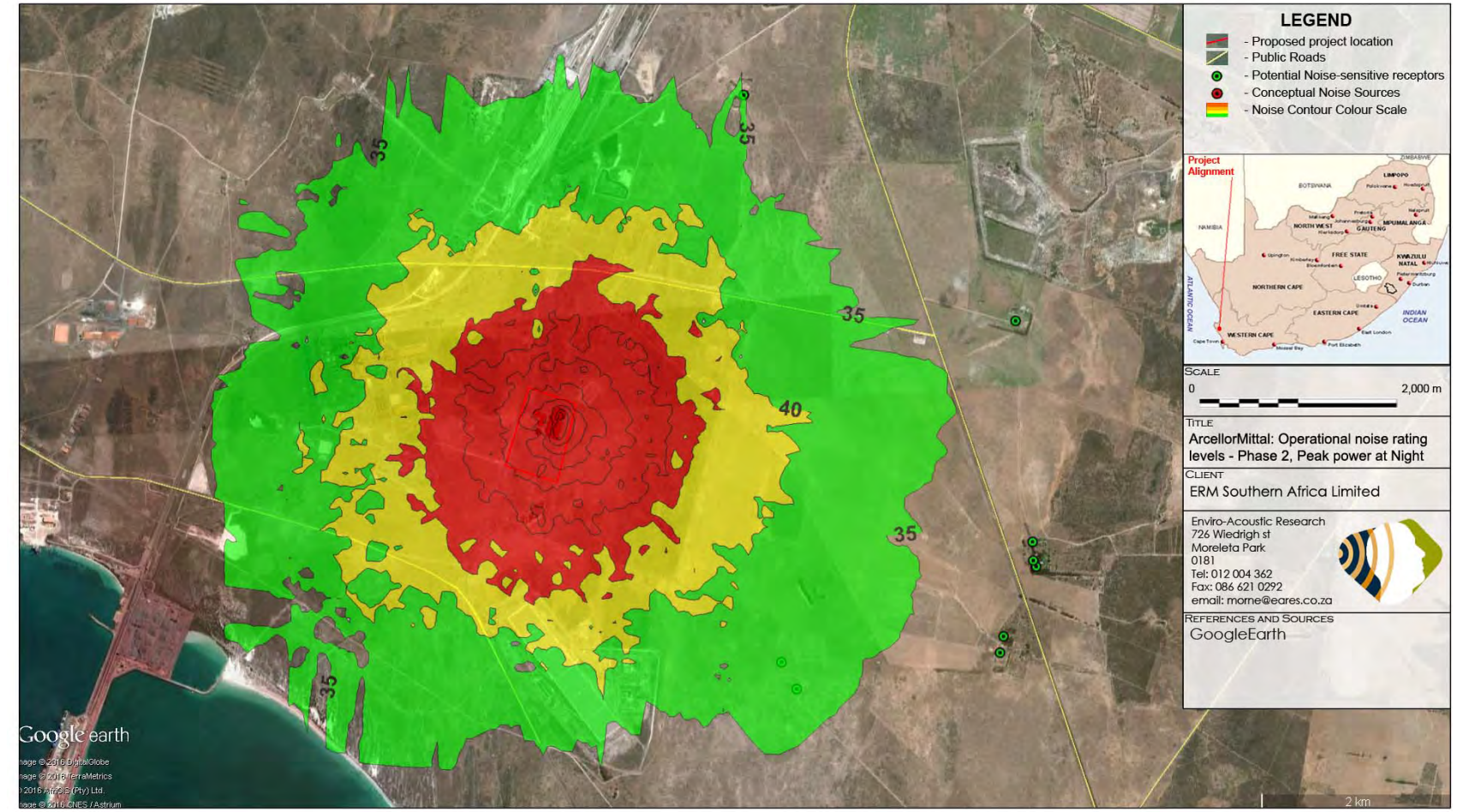
- Testing of high pressure steam safety valves during commissioning could generate a sound pressure level of 160 dBA. This state would be sustained intermittently only for a few minutes at a time over a one hour period at most.

These can be considered temporary noises, and excluding the testing of the safety valves, the noise levels are similar to the noises modelled for the operational phase of the Project. Noises from the testing of the safety valves will be high, but very temporary and the testing will be taking place during the day, when noises are of lower concern than noises at night.

Impact Assessment

The anticipated ambient noise levels during the operation phase of the Project have been modelled using a sound propagation model. This has been presented in this report for the night-time noise impact only given that daytime levels are anticipated to be lower and noise generated during the day by the power plant may be masked by other noises from a variety of sources surrounding potentially noise-sensitive developments. The worst case scenario in terms of noise generation during the operational phase has also been modelled, namely that of peaking power production throughout the night. The results thereof can be seen in *Figure 10.10*.

Figure 10.10 Contours of Noise Rating Levels for night-time operational activities (peaking power)



It is anticipated that the change in ambient noise levels will be negligible during Phase 1 of the Project and low during Phase 2, with the 35 dBA ambient guideline being slightly exceeded (by less than 3 dBA) at two sensitive receptors. Operational phase sound levels may impact on the ambient noise levels for an area of 3 000 m from the Project site. This impact is considered to be irreversible.

Proposed Mitigation

Given that the impact is anticipated to be Minor, monitoring is proposed if there are noise complaints or if people in the future settle closer than 2,000 m from the power plant.

Box 10.5 Increase in ambient noise levels during the Operation Phase (Night time)

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium to High

Impact Magnitude: Small

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Low
- **Frequency:** Constant
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR

10.5.4 Increased Noise Levels during Decommissioning Phase

Decommissioning starts when power generation stops, signalling the beginning of the dismantling of the equipment. Activities that can take place include:

- Dismantling of all equipment;
- Removal of all remaining redundant infrastructure (buildings and structures, dams, workshop, access roads, possibly the offices and other buildings, etc.);
- Removal of any contaminated soil;
- The rehabilitation of disturbed areas including the necessary ripping of compacted soils and the shaping of rehabilitated areas to ensure free drainage;
- Seeding of disturbed areas (if necessary to re-establish vegetation); and
- Monitoring and maintenance of the rehabilitated areas.
- Final decommissioning activities will have a noise impact lower than either the construction or operational phases. This is because decommissioning and closure activities normally take place during the day using minimal equipment (due to the decreased urgency of the Project). While there may be various activities, there is a very small risk for a noise impact.

10.5.5 Residual impacts

A summary of the impact of noise levels during the construction and operation phases of the Project is provided in *Table 10.14*.

Table 10.14 Pre- and Post- Mitigation Significance for Noise

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Increase in ambient noise levels	Construction	Negligible	Negligible
Increase in ambient noise levels	Operation	Minor	Minor

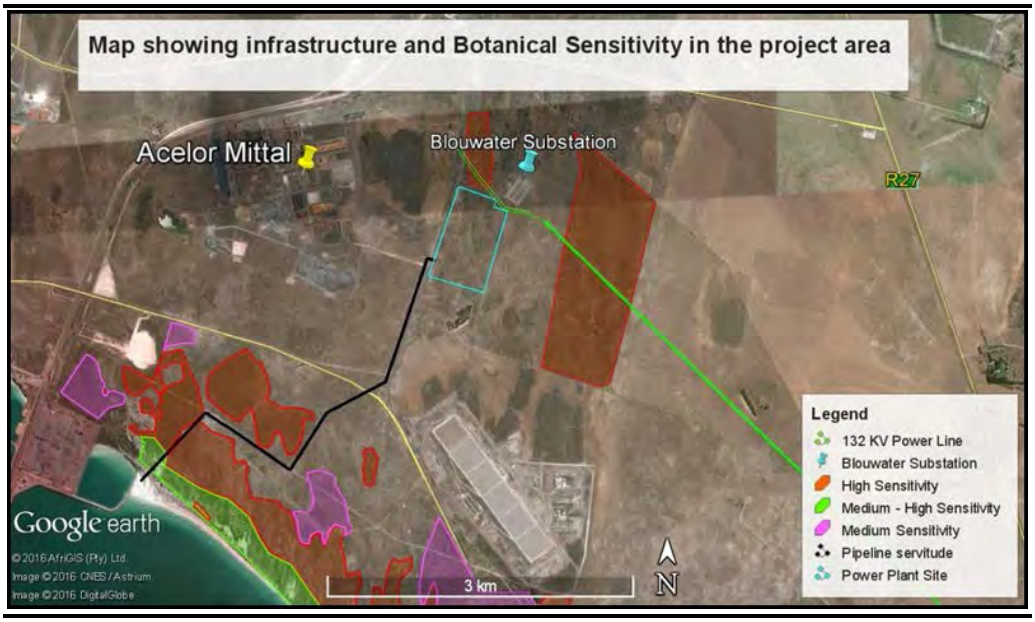
10.6 IMPACT ON FLORA

The study area is within the planning domain of the Saldanha Fine Scale Conservation Plan (Pence 2008). This important reference indicates that the majority of the Project area is a terrestrial Critical Biodiversity Area (CBA). Critical Biodiversity Areas are regarded as essential areas for the achievement of regional conservation targets, and are designed to ensure minimum land take for maximum result (Maree & Vromans 2010). It should be noted that the CBA mapping process in this area unfortunately suffered from a lack of groundtruthing and misinterpretation of the satellite imagery, and is therefore not considered particularly accurate or useful for planning purposes, and was in fact redone by Helme (2011) for the IDZ feasibility project. All ecological

assessments in this area should thus be based on detailed groundtruthing, as has been the case for the current study.

Figure 10.11 summarises the conclusions of the baseline floral studies by identifying and describing areas of botanical conservation value.

Figure 10.11 Areas of Botanical Conservation Value



- Areas of high sensitivity in the Project area are associated with:

    - Relatively intact examples of the locally restricted vegetation type Saldanha Limestone Strandveld (Helme & Koopman (2007)) found south of the coast road to Saldanha. These areas are considered ecologically irreplaceable, on account of the presence of relatively intact examples (with both high species diversity and high structural heterogeneity) of the Saldanha Limestone Strandveld, and due to the presence of regionally endemic plant Species of Conservation Concern (SCC). Conservation of such areas would contribute significantly to species and/or ecological process targets for the region, and should be considered No Go areas for development. Saldanha Limestone Strandveld habitat surrounds the pipeline footprint which has been specifically aligned to avoid these areas.

- Areas of medium-high sensitivity are associated with:

    - The Spreeuwal dune area. This area is largely pristine, apart from some alien plant invasion, and has high plant diversity and a high level of structural (growth form) diversity. It does not support many known populations of plant SCC. The pipeline will partially fall within this dune area.

- Areas of medium sensitivity are associated with:

    - Areas of Saldanha Limestone Strandveld that has been partly disturbed, but rehabilitated naturally to some degree. Populations of plant SCC may be present, although in limited numbers. These areas have been avoided in the placement of all project infrastructure.

- Areas of low sensitivity are associated with:

    - Areas that have been cultivated or ripped, have little botanical diversity or significant populations of plant SCC. The power plant site is characterised as being of low sensitivity.

10.6.1 Loss/Disturbance of Flora during the Construction Phase

Impact Description

Flora may be impacted in the following ways during the construction phase of the Project:

- Clearing of the vegetation on the proposed power plant site (50 ha);
- Clearance of a 36 m wide servitude for the pipeline, for a distance of 4 km; and
- Potential introduction of alien invasive vegetation.

Impact Assessment

Up to 50 ha of degraded but partly natural vegetation will be permanently lost within the power plant site, all of it during the construction phase of the Project. No plant SCC are known to occur in this area, and the vegetation in the area is deemed to be of Low sensitivity. The magnitude of the impact is likely to be Low – Moderate as a result. The loss of flora in the plant footprint area during the construction phase cannot easily be mitigated (irreversible).

Although only 4 km long the disturbance corridor of the pipeline will be up to 36 m in width in most areas. For about 80 percent of the route this passes through Low sensitivity habitat where this will have only a Low negative impact. In about 800 m (20 percent) of the route the corridor passes through High or Medium – High sensitivity habitat, where a number of plant SCC may be present. The magnitude of the impact in this more sensitive area is **Moderate**, and most of the impact should be of a long term nature (5-19 yrs) rather than a permanent impact, as the corridor should rehabilitate naturally over this period (partially reversible). However, disturbance favours certain species, and the more sensitive ones are unlikely to return to the disturbed habitat. See *Box 10.6*.

Proposed Mitigation

The following measures are proposed to minimise the impact:

- It is recommended that the pipeline construction corridor in the area within and between the High and Medium – High sensitivity areas should be minimised and kept as narrow as possible, and should ideally be less than 25 m wide in this area, or 30 m at most. The approved development footprint in this area must be surveyed and clearly demarcated with wire or coloured rope, and strung with warning signs, prior to any construction.
- Carrying out a search and rescue programme from the Medium – High and High sensitivity areas prior to construction, and use of these plants in the active rehabilitation of the disturbed corridor, will help speed up habitat recovery.

Box 10.6 Loss/Disturbance of Flora during the Construction Phase

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low to Medium

Impact Magnitude: Low to Moderate

- **Extent:** Local
- **Duration:** Long term to Permanent
- **Scale:** Low to Moderate
- **Frequency:** Once-off
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR TO MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will reduce the impact to **MINOR**

10.6.2 Disturbance of Flora during Operation

Impact Description

Flora may be impacted in the following ways during the operation phase of the Project:

- Potential introduction and spread of alien invasive vegetation; and
- Disturbance of ecological connectivity.

Impact Assessment

Operational phase botanical impacts of this Project are likely to be of very minor significance. The primary operational phase impact is loss of ecological connectivity, related mainly to the 50 ha power plant site. A secondary operational phase impact could be the proliferation of invasive alien plants in the pipeline route and around the power plant, facilitated by the soil disturbance during construction.

The loss of ecological connectivity in the power plant area is likely to be of Low negative botanical significance, as the site does not break a key ecological

corridor, with adequate natural or partly natural areas still surrounding the site. The pipeline will not have any significant negative impacts on botanical connectivity.

The alien invasive plant issue is one that can be successfully mitigated, by means of ongoing alien invasive plant management around the power plant, and in the servitude. After mitigation this could be reduced to a Very Low negative level in all areas assessed. See *Box 10.7.*

Impacts on flora during operation as a result of the proposed power plant are considered to be irreversible as construction phase activities would have impacted on connectivity and no rehabilitation of the site is proposed until post closure of the facility. For the pipeline, the impact is considered to be partially reversible.

Proposed Mitigation

The following measures are proposed to minimise the impact:

- Rehabilitation of pipeline corridor with rescued material and additional species brought in; and
- ongoing alien invasive plant removal within all corridors and on site.

Box 10.7 Disturbance of Flora during the Operation Phase

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low to Medium

Impact Magnitude: Very low to Low

- **Extent:** Local
- **Duration:** Long term to Permanent
- **Scale:** Low to Moderate
- **Frequency:** Ongoing
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE TO MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will reduce the impact to **NEGLIGIBLE TO MINOR**

10.6.3 Floral Impacts during the Decommissioning Phase

No further floral impacts are anticipated on the power plant site as a result of decommissioning activities. Should the pipelines be removed during the decommissioning phase, the floral impacts along the pipeline route would mirror that of the construction phase.

10.6.4 Residual Impacts

A summary of the impacts on flora during the construction and operation phases of the Project are presented below.

Table 10.15 Pre- and Post- Mitigation Significance for the Disturbance/Destruction of Flora

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Destruction/disturbance of flora	Construction	Minor to Moderate	Minor
Disturbance of flora	Operation	Negligible to Minor	Negligible to Minor

10.7 IMPACT ON FAUNA

The sensitivity map for the proposed power plant site and pipeline corridor is depicted *Figure 10.12*. The gas pipeline follows an existing road for the large part, which means its impact is fairly low. The area towards the coast is deemed to have the highest sensitivity on account of the better condition of the vegetation and sensitivity of the habitat within this area, but the extent of sensitive dune area on the existing proposed route is low, and the remaining habitat is historically overgrazed and fairly degraded in places. The natural but highly disturbed and transformed vegetation of the power plant is considered low sensitivity, given the low cover and low diversity.

Baseline conditions in the Project area can be summarised as follows:

- Although there are potentially 52 different terrestrial mammals in the area, there has been significant transformation and a lower number are likely to be present.
- Habitat variety is limited and there are no wetlands or rocky outcrops present.
- The following mammals were observed during the site visit: Cape Golden Mole, Cape Dune Mole Rat, Cape Porcupine, Bush Vlei Rat, Cape Gerbil, Cape Grey Mongoose, Bat-Eared Fox, Four-striped Grass Mouse and Steenbok.
- The majority of mammals are smaller mammals and tolerant of habitat fragmentation.
- Two listed species occur at the site namely the White-tailed Mouse *Mystromys albicaudatus* (EN) and Honey Badger *Mellivora capensis* (EN). Given the power station site is previously transformed, there is a lack of cover and adequate food resources for the Honey Badger. The White-tailed Mouse is potentially present with a low likelihood, given the low vegetation cover. The small footprint of the pipeline is not likely to have a high impact on mammal fauna.
- According to the SARCA database, 45 reptiles have been recorded in the area, which corresponds well with distribution records from the literature

As with mammals, a large proportion of these are not likely to occur at the site on account of a lack of suitable habitat and in particular the lack of any rocky outcrops.

- Species observed during the site visit include Cape Skink *Mabuya capensis* and Angulate Tortoise *Chersina angulata*, which was observed to be abundant at the site. The Cape Girdled Lizard *Cordylus cordylus* and the Brown House Snake were also observed at the site.
- Of concern is the fact that five listed species are known from the area including the Large-scaled Girdled Lizard *Cordylus macropholis*, Black Girdled Lizard *Cordylus niger*, Gronovi's Dwarf Burrowing Skink *Scelotes gronovii*, Kasner's Dwarf Burrowing Skink *Scelotes kasneri* and Bloubergstrand Dwarf Burrowing Skink *Scelotes montispectus*, all of which are listed as Near Threatened. The majority of these are however not likely to occur at the site as they are associated with coastal dunes and in the case of the Large-scaled Girdled Lizard the strand line. Although there are still some dunes remaining within the proposed pipeline corridor, the extent of the impact of the pipeline on this habitat is likely to be low, especially if the alignment can be placed within existing disturbance footprints. The Black Girdled Lizard is restricted to two isolated populations, one on the Cape Peninsula and the other on coastal rocks around Saldanha. Given the localised distribution of this species impact on it would be undesirable, but as there were no rocky outcrops within the site, it is not likely that this species occurs at the site or would be impacted by the development.
- The site lies within or near the range of 8 amphibian species, which along with the general lack of water or wetlands at the site suggests that frog diversity is likely to be fairly low. The only listed species which may occur at the site is the Cape Caco *Cacosternum capense*, which is restricted to low lying flat or gently undulating areas with poorly drained clay or loamy soils. Given the sandy soils at the site and the lack of suitable pans for breeding, it is not likely that this species occurs at the site.
- Species which are likely to occur at the site are likely to those less dependent on perennial water including the Cape Sand Toad *Vandijkophrynus angusticeps*, Sand Rain Frog *Breviceps rosei rosei* and Cape Sand Frog *Tomopterna delalandii*.

Figure 10.12 Areas of Faunal Sensitivity

10.7.1 Loss of Faunal Habitat during the Construction and Decommissioning Phases

Impact Description

Some loss of vegetation is an inevitable consequence of the development. As a result some habitat will no longer be available for use as a result of transformation or the presence of permanent infrastructure. This potentially includes the habitat for 5 red-listed reptiles, two red data-listed mammals and one listed amphibian.

This impact is likely to be very low for the operational phase of the Project given that no additional habitat will be lost. This impact has therefore only been assessed for the construction and decommissioning phases.

Impact Assessment

The extent of the habitat is likely to be low as the footprint will be onsite and limited in extent.

The impact will be medium to long term in duration as the disturbed areas will take time to recover and/or this will only take place during project decommissioning.

The scale is rated as Low to Moderate as the extent of sensitive dune area on the existing proposed route is low and the remaining habitat is historically overgrazed and fairly degraded in places. Faunal habitat diversity to low. The sensitivity of the fauna environment is considered Low to High, given that this entails red-listed species.

The impact is considered irreversible.

Proposed Mitigation

The following measures are proposed to minimise the impact:

- Demarcate all areas to be cleared with construction tape or similar material.
- ECO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially in the vicinity of sensitive features.
- All vehicles to remain on demarcated roads and no driving in the veld should be allowed except where necessary along the power line/pipeline route during construction when all vehicles should follow the same track.
- No fuelwood collection on site.
- No fires should be allowed on-site.
- Sensitive habitat features should be avoided.

Box 10.8 Faunal habitat loss during the Construction and Decommissioning Phases

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low for power plant; High for pipeline

Impact Magnitude: Low

- **Extent:** on-site
- **Duration:** Long term to Permanent
- **Scale:** Low to moderate
- **Frequency:** Once-off
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will reduce the impact to **MINOR**

10.7.2 Direct Faunal Impacts during the Construction and Decommissioning Phases

Impact Description

Smaller fauna such as many reptiles would either seek shelter or not be able to move away from construction activity sufficiently quickly during construction and would be killed by vehicles and earth-moving machinery. In addition, the presence of a work force on the site during construction would pose a risk to species such as snakes, tortoises and mammals which would be vulnerable to poaching for food, trade or killed out of fear and superstition. During the operational phase, the activity would be much lower.

During the operational phase of the project, it is envisaged that this impact will be negligible given that the majority of the species would have already migrated away from the area.

Impact Assessment

The extent of the habitat is likely to be local.

The impact will be short term as will only take place during the Construction Phase of the Project.

The scale is rated as Low to Moderate given that the extent of sensitive dune area on the existing proposed route is low, and the remaining habitat is historically overgrazed and fairly degraded in places. Faunal habitat diversity is low.

The impact is considered reversible.

Proposed Mitigation

The following measures are proposed to minimise the impact:

- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- No activity should be allowed in the veld between sunset and sunrise.
- Any dangerous fauna (snakes, scorpions etc) that are encountered during construction should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- Holes and trenches should not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.
- If there is any part of the site that needs to be lit at night for security reasons, then this should be with low-UV emitting types which do not attract insects.

Box 10.9 Direct faunal impacts during the Construction and Decommissioning Phases

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low for power plant; High for pipeline

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Short term
- **Scale:** Low to Moderate
- **Frequency:** Ongoing during the Construction Phase
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will reduce the impact to **NEGLIGIBLE**

10.7.3 Habitat degradation for Fauna during Construction and Operation

Impact Description

The noise and activity during the construction and operation of the pipeline and power plant would generate a lot of noise which will deter many animals from the area, or will curb the activity of those less able to move away, but in the long-term the operation of the pipeline and power plant would be of minimal disturbance to fauna. There is also the risk that construction would result in accidental spills of oil or chemicals and generate pollution. Amphibians in particular are very sensitive to such pollutants and should such pollution enter the breeding habitat the local amphibian population is highly likely to decline.

Impact Assessment

The extent of the habitat is likely to be local.

The impact will be long term as will only continue through the operational phase of the Project.

The scale is rated as Low.

The impact is considered reversible as with mitigation further degradation to the habitat can be avoided.

Proposed Mitigation

The following measures are proposed to minimise the impact:

- Personnel should not be allowed to roam into the veld.
- No activity should be allowed in the veld between sunset and sunrise.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Box 10.10 ***Habitat degradation for fauna during Construction, Operation and Decommissioning***

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low for power plant; High for pipeline

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Short to Medium term
- **Scale:** Low
- **Frequency:** Ongoing
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will reduce the impact to **NEGLIGIBLE**

10.7.4 Residual Impacts

A summary of the impacts on fauna during all phases of the Project is presented below.

Table 10.16 Pre- and Post- Mitigation Significance for the Impact on Fauna

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Loss of faunal habitat	Construction and Decommissioning	Moderate	Minor
Direct faunal impacts	Construction and Decommissioning	Minor	Negligible
Habitat degradation for fauna	Construction and Operation	Minor	Negligible

10.8 IMPACT ON AVIFAUNA

The area proposed for the power plant is characterised as the Strandveld shrubland habitat unit (Helme & Koopman (2007)) which is comprised of sparse shrub with scattered rock and succulent-dominated undergrowth. The habitat unit around the site is homogenous, lacking structural and compositional variation, and does not support a high diversity and abundance of bird species. One bird SCC – the Black Harrier *Circus maurus* – was recorded in and is known to favour this habitat unit.

The study area has already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises such as agriculture and industry, due to its close proximity to the town of Saldanha.

The proposed development is in close proximity to the West Coast National Park, Saldanha Bay Islands and Berg River Estuary Important Bird and Biodiversity Areas (IBAs) which have been identified in terms of the Important Bird and Biodiversity Areas Programme, a Birdlife South Africa Conservation Initiative.

10.8.2 Avifauna Habitat Loss Due to Construction Activities

Impact Description

Habitat loss may result from the following activities during the Construction Phase of the Project:

- Clearing of the vegetation on the proposed power plant site (50 ha); and
- Clearance of a 36 m wide servitude for the pipeline, for a distance of 4 km.

Extensive areas of vegetation (habitat) are to be cleared to accommodate the infrastructure required at these facilities, reducing the amount of habitat available to birds for foraging, roosting and breeding (Smallie, 2013).

This impact is likely to affect smaller bird species (i.e. larks and pipits) with small home ranges.

Impact Assessment

Overall, the avifauna of the study area and the broader impact zone are not considered unique and are typical of what occurs across large areas of the Fynbos Biome. However, because of the expected occurrence of numerous priority species in the study area and the nearby proximity of two IBAs, the sensitivity of the site, from an avian perspective, will be of **moderate** significance.

The scale is considered high given that the integrity of the avifauna habitat within the Project footprint area will be compromised. This impact is considered to be irreversible for the power plant site and partially reversible for the pipeline alignment if there is effective rehabilitation. See *Box 10.11.*

Proposed Mitigation

The following mitigation measures are proposed:

- Minimise project footprint;
- Existing roads for access to be utilised as far as possible;
- Briefing of site personnel; and

- Nesting sites to be reported to ECO and monitored to inform further action which may include avoiding the nests of there are eggs or chicks present.

Box 10.11 Avifaunal Habitat Loss Due to Construction Activities

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Moderate

- **Extent:** On site
- **Duration:** Short term
- **Scale:** High
- **Frequency:** Once-off
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): Mitigation measures will reduce the impact to **MINOR.**

10.8.3 Disturbance to Avifauna during Construction

Impact Description

Construction of CCGT power plants requires a significant amount of machinery and labour to be present on site for a period of time. For shy, sensitive species or ground-nesting birds resident in the area, construction activities are likely to cause a temporary disturbance or even result in displacement from the site entirely. Birds are particularly sensitive to disturbance during the breeding season.

In addition, certain bird species may seek to benefit from the plant, using the erected structures as prominent perches, sheltered roost sites or even nesting sites, and possibly foraging around the infrastructure. This may result in the fouling of critical components of the plant, bringing local bird populations into conflict with facility operators.

Impact Assessment

As detailed in *Section 10.6* above, the sensitivity of the site is considered to be moderate. The scale is considered high given that the integrity of the avifauna habitat within the Project footprint area will be compromised. This impact is considered to be partially reversible.

Proposed Mitigation

The following mitigation measures are proposed:

- ECO to be notified of roosting, nesting or breeding sites to inform further action which may include avoiding the nests of there are eggs or chicks present.;
- Laydown areas to be as close to the site as possible;
- Disturbance footprint to be restricted;
- Existing roads to be utilised; and
- Speed limit of 50 km/h adhered to on internal roads.

Box 10.12 Disturbance to Avifauna during the Construction Phase

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** On site
- **Duration:** Short term
- **Scale:** High
- **Frequency:** Ongoing
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation this impact will be reduced to **MINOR**

10.8.4 Avifauna Disturbance during Operation

Impact Description

Ongoing operation and maintenance activities at the facility are likely to cause some degree of disturbance to birds in the general vicinity.

Impact Assessment

As detailed above, the sensitivity of the site is considered to be moderate. The scale of this impact is considered medium as the ecological functioning and integrity of the site may improve from that of the construction phase with less frequent disturbance in the area. This impact is considered to be partially reversible. See *Box 10.13*.

Proposed Mitigation

The following mitigation measures are proposed:

- Measures to be put in place to discourage nesting on power infrastructure if problematic;
- No shooting, poisoning or harming of birds to control;
- Birds already with eggs and chicks allowed to fledge chicks before nests removed;

- Avifaunal specialist input to be sought if cannot be resolved;
- Restricted site access; and
- Use of existing roads and enforcement of speed limits.

Box 10.13 Disturbance to Avifauna during the Operation Phase

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Moderate

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Medium
- **Frequency:** Ongoing
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation this impact is reduced to **MINOR**

10.8.5 Avifauna Disturbance during Decommissioning

It is envisaged that the impact during the Decommissioning Phase will mirror that experienced for the Construction Phase. *Box 10.13*

10.8.6 Residual Impacts

A summary for the impact on avifauna during the construction and operation phases of the Project is presented in *Table 10.17* below

Table 10.17 Pre- and Post- Mitigation Significance for the Impact on Avifauna

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Avifaunal habitat loss during Construction	Construction	Moderate	Minor
Disturbance to avifauna during Construction	Operation	Moderate	Minor
Disturbance to avifauna during Operation	Operation	Moderate	Minor

10.9 ROAD AND TRAFFIC IMPACTS

Traffic operations at intersections are typically described in terms of the "Level of Service" (LOS). LOS is a qualitative measure of the effect of several factors on traffic operating conditions, including speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort, and convenience. It is generally measured quantitatively in terms of vehicular delay and described using a scale that ranges from LOS A to F, with LOS A representing essentially free-flow conditions and LOS F indicating over-capacity conditions with substantial congestion and delay.

Table.10.18 summarises the relationships between the average control delay per vehicle and LOS for signalised intersections, roundabouts and stop and yield controls.

Table.10.18 Level-Of-Service Definitions Based on Delay (Highway Capacity Manual of the Transport Board, 2010)

Level of Service		Control delay per vehicle in seconds (d) (including geometric delay)	
		Signals and Roundabouts	**Stop Signs and Give Way (Yield) Signs**
A	Good progression, few stops, short cycle lengths	$d \leq 10$	$d \leq 10$
B	Good progression and/or short cycle lengths, more vehicle stops	$10 < d \leq 20$	$10 < d \leq 15$
C	Fair progression, significant proportion of vehicles must stop	$20 < d \leq 35$	$15 < d \leq 25$
D	Congestion becomes noticeable; longer delays, high v/c ratio	$35 < d \leq 55$	$25 < d \leq 35$
E	At or beyond acceptable delay, poor progression, long queues	$55 < d \leq 80$	$35 < d \leq 50$
F	Unacceptable to drivers. Arrival volumes greater than discharge capacity, unstable unpredictable flows	$80 < d$	$50 < d$

The following key conclusions can be drawn from the baseline road conditions:

The site is well served by existing road infrastructure. The road intersections that may be impacted on by the proposed development are (see *Figure 10.13*):

1. R27 (TR 77/1) and R45 (TR 22/1);
2. R27 (TR 77/1) and TR 85/1; and
3. TR 85/1 and OP7644.

Figure 10.13 Location of Road Infrastructure

According to the results of the Signalised and Unsignalised Intersection Design and Research Aid software package[1] (SIDRA) it appears that the traffic operations at the existing intersections are currently operating at a LOS A in the AM and PM peak hours, respectively.

There are two proposed access points to the site: the northern access which is proposed on the west of the power plant off the OP7644 and 5.8 km from the studied intersection of the TR77/1 (R27) and TR85/1; and the southern access (and main access) into the development via a new access road off OP7644. This main entrance is located approximately 6.35 km from the intersection of TR85/1 and TR77/1 (R27).

10.9.1 Impact on Traffic Levels during Construction and Decommissioning

Impact Description

Traffic levels are expected to increase in the area of the site during the construction phase of the project. Additional vehicle movements during peak periods are anticipated to be in the order of 450 person trips during the peak hour, or 206 cars, 14 minibus taxis and two buses. The cars may enter the site and park in the open areas during construction. The minibus taxis and buses may collect and dispatch passengers in the vicinity of the site.

[1] SIDRA Version 5 Software, SidraSolutions, Australia, 2010.

It has been assumed that the site traffic will be distributed as follows: 55 percent originating from the east of Vredenburg, Velddrif and Langebaanweg areas, 20 percent from the southern Yzerfontein and Melkbosstrand areas, 20 percent from the Langebaan and Saldanha areas, and 5 percent from Vredenburg and Saldanha.

Anticipated truck traffic is likely to be in the order of 246 trucks per day or 20 trucks per hour which equates to one every three minutes.

Impact Assessment

Predictions of the level of service at the project affected intersections is provided in *Table 10.19*, *Table 10.20*, and *Table 10.21* below, with the extent of the impact being dependent on when the project is implemented. Volume to capacity is a measure of the saturation flow rate which should ideally be below 0.9.Three different scenarios have been presented on the basis of anticipated traffic level increases as a result of delays in commencing with construction:

Table 10.19 Traffic Operations at Intersection of R27 (TR 77/1) / R45 (TR 21/2) during Construction

Measures of Effectiveness	Intersection Type					
	Stop Controlled					
	Existing 2016 Scenario Without the project		Future 2018 Scenario Construction		Future 2019 Scenario Construction	
	Peak Hour		Peak Hour		Peak Hour	
	AM	PM	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A	A	A
Delay (Sec) Overall	6.9	7.0	6.9	7.5	7.1	7.7
Volume/Capacity (V/C) Ratio	0.208	0.248	0.324	0.384	0.341	0.404

Table 10.20 Traffic Operations at Intersection of R27 (TR 77/1) / TR 85/1 during Construction

Measures of Effectiveness	Intersection Type					
	Stop Controlled					
	Existing 2016 Scenario Without the project		Future 2018 Scenario Construction		Future 2019 Scenario Construction	
	Peak Hour		Peak Hour		Peak Hour	
	AM	PM	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A	A	A
Delay (Sec) Overall	4.1	4.2	6.0	6.3	6.1	6.4

Volume/Capacity (V/C) Ratio	0.104	0.142	0.328	0.376	0.340	0.389

Table 10.21: Traffic Operations at Intersection of TR 85/1 / OP7644 During Construction

Measures of Effectiveness	Intersection Type			
	Stop Controlled			
	Future 2018 Scenario		Future 2019 Scenario	
	Peak Hour		Peak Hour	
	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A
Delay (Sec) Overall	5.3	5.2	5.3	5.3
Volume/Capacity (V/C) Ratio	0.338	0.322	0.346	0.328

Therefore it is anticipated that the significance of the impact will be **negligible** and that the LOS of the three intersections will remain categorised as Level A. The vulnerability of the receptor is anticipated to be Low given that current service levels and access to the area is good. This impact is of short term duration and reversible. It is anticipated that decommissioning impacts will reflect those of the construction phase. See *Box 10.14.*

Proposed Mitigation

Although within an acceptable LOS in terms of capacity, the volume of construction traffic is considered to be intensive truck traffic and will need to be managed both in terms of surface damage as well as signage and marshalling at the delivery yard and at the site entrance. A road condition survey will need to be conducted prior to construction in order to gauge the damage to the road as a result of the intensive heavy traffic. Most of the damage is likely to occur within the proximity to the access to the site.

Planned turning lanes on the OP7644 are proposed for the development. These should be approved by the Road Authority. Minibus taxi embayment should also be provided on either side of the OP7644. Road condition survey to be undertaken.

Box 10.14 Impact on Traffic Levels during Construction

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Short term
- **Scale:** Low
- **Frequency:** Constant
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation this impact remains **NEGLIGIBLE**

10.9.2 Impact on Traffic Levels during Operation

Impact Description

Traffic levels are expected to increase in the area of the site during the operational phase of the project with the commuting of employees to and from work each day. Additional vehicle movements during peak periods are anticipated to be in the order of 177 person trips during the peak hour or 80 cars, the equivalent of five minibus taxis and one bus. The cars may enter the site and park in the open areas during construction.

The minibus taxis and buses may collect and dispatch passengers in the vicinity of the site. Site traffic distribution will be as anticipated during the construction phase of the project, although some heavy vehicle movements may remain.

Impact Assessment

Predictions of the LOS at the Project affected intersections is provided in the *Table 10.22, Table 10.23* and *Table 10.24* below, with the extent of the impact being dependent on when the project is implemented. Two different scenarios have been presented on the basis of anticipated traffic level increases as a result of the delay in commencing with operation:

Table 10.22 Traffic Operations at Intersection of R27/R45 during Operation

Measures of Effectiveness	Intersection Type			
	Stop Controlled			
	Existing 2016 Scenario		Future 2020 Scenario	
	Peak Hour		Peak Hour	
	AM	PM	AM	PM

Levels of Service (LOS)	A	A	A	A
Delay (Sec) Overall	6.9	7.0	7.1	7.4
Volume/Capacity (V/C) Ratio	0.208	0.248	0.273	0.334

Table 10.23: Traffic Operations at Intersection of R27 / TR 85/1 during Operation

Measures of Effectiveness	**Intersection Type**			
	Stop Controlled			
	Existing 2016 Scenario		**Future 2020 Scenario**	
	Peak Hour		**Peak Hour**	
	AM	**PM**	**AM**	**PM**
Levels of Service (LOS)	A	A	A	A
Delay (Sec) Overall	4.1	4.2	4.7	4.8
Volume/Capacity (V/C) Ratio	0.104	0.142	0.173	0.221

Table 10.24: Traffic Operations at Intersection of TR 85/1 / OP7644 during Operation

Measures of Effectiveness	**Intersection Type**	
	Stop Controlled	
	Future 2020 Scenario	
	Peak Hour	
	AM	**PM**
Levels of Service (LOS)	A	A
Delay (Sec) Overall	1.6	1.7
Volume/Capacity (V/C) Ratio	0.143	0.112

Therefore it is anticipated that the magnitude of the impact will be low to medium and that the Level of Service of the three intersections will remain categorised as Level A. The vulnerability of the receptor is anticipated to be Low given that current service levels and access to the area is good. See *Box 10.15*.

This impact is expected to be long term in duration, but following the life of the project, traffic levels will return to pre-construction levels (i.e. reversible).

Proposed Mitigation

Planned turning lanes on the OP7644 are proposed for the development. These should be approved by the Road Authority. Minibus taxi embayments should also be provided on either side of the OP7644.

Box 10.15 Impact on Traffic Levels during Operation

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low to medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Low
- **Frequency:** Constant
- **Likelihood:** n/a

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation this impact remains **MINOR**

10.9.3 Residual Impacts

A summary for the impact on traffic levels and road conditions as a result of the Project is provided in *Table 10.25*.

Table 10.25 Pre- and Post- Mitigation Significance for the Traffic and Road Condition Impacts

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on traffic levels during Construction	Construction	Negligible	Negligbile
Impact on traffic levels during Operation	Operation	Minor	Minor

10.10 EMPLOYMENT CREATION, SKILLS ENHANCEMENT AND LOCAL BUSINESS OPPORTUNITIES

The Project is expected to generate positive impacts on the local economy and livelihoods in terms of:

- employment and skills enhancement; and

- local business opportunities through the procurement of goods and services.

Positive impacts will be primarily associated with the construction phase and therefore temporary in nature. The termination of construction contracts will occur once construction activities are completed. Workers who have relocated to the area for the Project are likely to leave the area in search of other opportunities, especially if they are permanent employees of contractors and subcontractors.

Those who have worked on the Project will have an advantage when seeking alternative jobs on similar projects due to the experience and any training received through this Project. The area is characterised by a number of new industrial developments and is earmarked for other gas power projects which may offer alternative employment opportunities. This is considered within the cumulative impacts *Section 7.17*.

10.10.1 Construction and Decommissioning: Employment, Skills Enhancement and Local Business Opportunities

Impact Description

The construction phase will last approximately 48 months in duration (Phase One 15 -18 months; Phase Two 18 - 20 months) and it is expected that approximately 450 direct employment opportunities will be available during the peak of construction. The breakdown of skills required during the construction phase will be as follows:

- Skilled labour: 58 percent;
- Semi-skilled labour: 20 percent; and
- Unskilled labour: 22 percent.

Table 10.26 Estimated Employment Positions Available During Construction

Employment Position	Number of Positions
Admin	12
Engineers	8
Technicians	40
Skilled	210
Semi skilled	80
Unskilled	100
Total	**450**

It is assumed that the majority of skilled workforce will come from outside the Area of Direct Influence and Area of Indirect Influence, but that many of them will be South African. Given that almost half the population in the SBLM have some level of skills training, it is anticipated that many semi-skilled positions will be available to the local workforce, and that unskilled positions will also be available to the local workforce.

Indirect employment through the construction supply chain will be limited as the major components of the power plant are highly specialised and will be manufactured outside of South Africa. However, much of the balance of plant infrastructure for the Project will be procured within South Africa and where possible, from within the Local Municipality. Local procurement is going to benefit the hospitality and service industries primarily, such as accommodation, catering, cleaning, transport and security services. Local businesses will benefit during the construction phase as there will be increased spending within the area by the wage labour who will have improved buying power while employed by the Project.

Those who are able to secure employment on the Project will have the opportunity to improve their skills and experience through on-the-job training, and will thereby improve their opportunities for future employment.

Given that Saldanha Bay is ear-marked for further industrial development, with a focus on the oil and gas sector, the upskilling of the local workforce will put them in a favourable position to secure future employment.

Employment numbers during decommissioning are not known at this stage, but it is expected that the make-up of the workforce will be similar to the construction phase.

Impact Assessment

The creation of local employment opportunities, skills enhancement and local business opportunities will be a direct, indirect and induced impact. The duration will be short-term, for the duration of the construction phase and work contracts will vary in length, based on the type of work being performed. Employment will be created for South Africans at a local and regional level depending on skills and capacity availability, as such the extent will be regional. For those who are able to secure employment on the Project the scale will be medium, as they secure an income for the duration of their contract. The frequency of the impact will be constant for the duration of the construction phase. The magnitude of the impact will be positive.

Given the capacity of the local workforce to fill unskilled and semi-skilled employment positions, together with the opportunity to increase skills and work experience, the vulnerability is medium.

The significance of the impact is rated as **Moderate (+ve)**.

Proposed mitigation/ enhancement

The objective of mitigation is to optimise opportunities for employment of local people, wherever possible, or alternatively that employment of South Africans is prioritised over foreigners.

The following measures will be implemented to ensure that employment of local people is maximised:

- The Project will establish a recruitment policy which prioritises the employment of South African and local residents (originating from the Local Municipality) over foreigners. Criteria will be set for prioritising local residents and then other South Africans as part of the recruitment process.

- All contractors will be required to recruit in terms of the Project's recruitment policy, where practical.

- The Project will meet with the Local Municipality (and other appropriate institutions such as the Sakekamer) to access any available skills/employment-seekers database for the area. This database is to be updated and made available to the appointed contractors.

- The Project will advertise job opportunities and criteria for skills and experience needed through local media, at least three months ahead of recruitment. This information should also be provided to all relevant authorities, community representatives and organisations on the interested and affected party database.

- The recruitment policy and procedure should promote the employment of women as a means of ensuring that gender equality is attained.

- On-the-job performance and training will be monitored through performance reviews. Training needs will be identified and provided by the Project.

- No employment will take place at the entrance to the site. Only formal channels for employment will be used.

A local procurement policy will be implemented to ensure that local procurement is maximised, the policy will include:

- Reasonable targets for using local suppliers.

- A clause of none discrimination on any grounds of gender, ethnicity, religion.

- Criteria for monitoring local procurement and reporting on supplier performance management.

- Clearly communicate the criteria and tendering process prior to the commencement of construction activities; and

- The procurement policy and tendering requirements must be easily accessible to potential suppliers.

The following management measures will be implemented to enhance skills development and on-the-job training:

- Develop internal training 'certification' or reference letter provisions to those who receive internal training.

- Training plans will be developed according to each permanent employee' work agreement and relevant to their job description.

Residual impacts

A summary for the impact the construction and decommissioning phases of the Project is present below.

Table 10.27 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Employment Creation, Skills Enhancement and Local Business Opportunities	Construction and Decommissioning	Moderate (+ve)	Moderate (+ve)

Table 10.28 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities during Construction

Nature and Type: Direct, indirect and induced positive impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Positive

- **Extent:** Regional
- **Duration:** Short Term
- **Scale:** Large
- **Frequency:** Constant
- **Reversibility:** N/A
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE POSITIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measure will ensure the impact remains **MODERATE POSITIVE.**

10.10.2 Operation: Employment, Skills Enhancement and Local Business Opportunities

Impact Description

The power plant will be operated on a 24 hour, 7 days a week basis for the duration of the operation phase. It is anticipated that there will be approximately 95 employment positions available during this phase. As the plant will operate 24 hours a day, three full-time shifts will be created per day, and the breakdown of the skills required will be as follows:

- Skilled labour: 65 - 70 percent;
- Semi-skilled labour: 15 - 20 percent; and
- Unskilled labour: 10 - 15 percent.

A further breakdown of the employment opportunities is provided in *Table* 10.29.

Table 10.29 Estimated Employment Positions Available During Operation

Position	Number of Positions Available
Admin	4
Security	15
Warehouse and Stores	6
Medical	6
Plant Control	15
Engineers	9
Technicians	9
Skilled	9
Unskilled	9
Tuition and Training	4
Quality Control, Water	3
Canteen	6
Total	**95**

Similar to the construction phase, local workers are expected to be qualified to fill unskilled and semi-skilled positions at first, whilst a limited number of people may be sufficiently qualified for skilled positions. Semi-skilled and skilled positions will initially be recruited from elsewhere in the region and South Africa. Over time, however, local workers will be able to fill more of the semi-skilled and skilled positions as training will be provided by the Project to the local workforce, which will improve skills levels relevant to the Project.

During the operation phase the contracts that were in place during the construction phase will be terminated and procurement opportunities will be centred around maintenance activities, and providing goods and services to the Project. For those companies that meet eligibility criteria, become approved suppliers and enter the supply chain, there will be long-lasting and sustained benefits to the businesses and their employees through increased

experience, capacity and training. As such, during the operation phase there will be opportunity for local business growth and development

Impact Assessment

The creation of local employment opportunities, skills enhancement and local business opportunities will be a direct, indirect and induced impact. The duration will be long-term, for the duration of the operation phase. Employment will be created for South Africans at a local and regional level depending on skills and capacity availability, as such the extent will be regional. For those who are able to secure employment or procurement contracts with the Project the scale will be large, as they secure long-term, stable income. The frequency will be constant for the duration of the operation phase. The magnitude of the impact will be Positive.

Given the limited employment and procurement opportunities during the operation phase, together with the lack of appropriate skills in the ADI, the vulnerability is low.

The significance of the impact is rated as **Minor (+ve)**.

Proposed mitigation/ enhancement

The mitigation/ enhancement measure provided for the construction phase, will apply to the operation phase.

Residual impacts

A summary for the impact during the operation phases of the project is presented below.

Table 10.30 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Employment Creation, Skills Enhancement and Local Business Opportunities	Operation	Minor (+ve)	Minor (+ve)

Table 10.31 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities during Operation

Nature and Type: Direct, indirect and induced positive impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Positive

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Large
- **Frequency:** Constant
- **Reversibility:** N/A
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR POSITIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measures will ensure the impact remains **MINOR POSITIVE.**

10.11 IMPACTS ON COMMUNITY HEALTH AND SAFETY

The presence of the Project could affect the health, safety and security of the communities in the area of influence as a result of worker-community interactions, in-migration to the area, increased incomes in the local community that may be used for drugs, alcohol and prostitution, the risk of injury associated with construction and decommissioning activities, increased pressure on health care resources and changes to the environment. Any community concerns or perceptions with regard to reduced health and physical safety and security by the community need to be addressed.

There are numerous ways in which the development of the Project could impact on community and individual levels of health. The term "health" is used broadly to include physical and mental health and well-being. The expected impacts on community health, safety and security as a result of construction, operation and decommissioning of the Project are:

- Impacts associated with the presence of the Project workforce.
- Impacts associated with an influx of jobseekers.
- Impact on human health due to air emissions.

10.11.1 Construction, Operation and Decommissioning: Impacts Associated with the Presence of the Workforce and Jobseekers

Impact Description

An increase in disposable income within the Project area (among Project workers, both local and external) has been observed to result in a change in spending habits and behaviour resulting in increase in alcohol and drug abuse, increased incidences of prostitution and casual sexual relations, which

poses a threat to community health and safety. Anticipated impacts associated with the presence of the workforce are:

- Increased incidence of alcohol and drug use;
- Increase in the spread of HIV/ Aids and other STIs;
- Increased incidence of teenage or unwanted pregnancies; and
- Increase in prostitution.

It is estimated that there will be approximately 450 people employed during the peak construction phase. The Project will seek to maximise the employment of local people, thereby reducing the size of the external workforce in the ADI, however an external workforce will be required. The external workforce (largely comprised of semi-skilled and skilled workers) will be housed with the ADI, as onsite worker accommodation is not feasible for health and safety reasons given the Project site's close proximity to Saldanha Steel.

Experience from large infrastructure projects elsewhere in South Africa has shown that increased disposable income within the local workforce may result in increased incidences of illegal activities or antisocial behaviours such as prostitution and casual sexual relations as well as increased levels of substance abuse. Abuse of alcohol (and drugs, should this occur) often correlates with increased levels of criminal behaviour and violence (e.g. domestic violence) while under the influence of the substance. Such behaviour increases the number of people indirectly affected by, or vulnerable to, alcohol and drug abuse; and casual sexual relations could lead to an increased incidence of HIV/AIDS.

Further, it has been shown that members of an external workforce are likely to father children with local women while they are living in the Project Area. Given the temporary nature of the work, it is possible that both the women and children will be abandoned when the construction phase ends and the contractors move on, leaving single female-headed households.

A further impact associated with an influx of jobseekers is the potential for social tension, and increased competition for employment. The distribution of employment opportunities between locals and in-migrants often leads to tension and conflict, especially when locals perceive the migrants to be taking their jobs. Competition for jobs has been raised as a concern by some stakeholders.

Impact Assessment

The impacts related to the presence of the workforce and jobseekers in the Project Area will be indirect and negative as the presence of a mostly male workforce, with an increased disposable income may adversely impact on health, safety and security of the local community through a likely increase in illegal or antisocial behaviour. The impact will be experienced at a local level, within the ADI. While the workforce will be in the Project area for a limited

time during the construction phase, jobseekers may stay in the area. Those affected by antisocial behaviour, such as the victims of abuse, women with unwanted pregnancies and people living with HIV/ AIDS, the duration of the impact will be long-term. The scale of the impact will be large for those affected as it will lead to a fundamental change in their life, and/ or health status, particularly for those affected by violence, unwanted pregnancies or HIV/ AIDS. For those affected, the impact will be largely irreversible. The frequency of the impacts will not be uniform, but may be felt often. Given the above, the magnitude of the impact is considered medium.

The external workforce will be housed within the Saldanha Bay area, and will interact with the local community. The local workforce will come from residential areas within the ADI such as Diazville, White City and Saldanha.

Teenage pregnancies are already of concern in the region, and according to the WCDM, there has been a general increase in the numbers of recorded teenage pregnancies. The WCDM further notes that violence and substance abuse are also common in the District and that the HIV/ AIDS is increasing (see *Chapter 7*). In light of this, the vulnerability of receptors is considered medium, however, teenage girls are considered to be highly sensitive to this impact.

The significance of the impact is rated as **Moderate negative** overall, but the significance will be of **high** negative to those affected by unwanted pregnancies and HIV/ AIDS.

During the operation phase, there will be limited employment opportunities and the external construction workforce will likely leave the area. The number of local people with disposable income will decrease, as will the impacts associated with this. This impact will not be felt during the operation phase.

Proposed mitigation/ enhancement

The Project will develop an induction programme, including a Code of Conduct, for all workers directly related to the Project. A copy of the Code of Conduct is to be presented to all workers and signed by each person. The Code of Conduct must address the following aspects:

- respect for local residents and customs;
- zero tolerance of bribery or corruption;
- zero tolerance of illegal activities by construction personnel including: unlicensed prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting;
- no alcohol and drugs policy during working time or at times that will affect ability to work;
- description of disciplinary measures for infringement of the Code and company rules. If workers are found to be in contravention of the Code of Conduct, which they signed at the commencement of their contract, they will face disciplinary procedures that could result in dismissal.

The Project will implement a grievance procedure that is easily accessible to the local community, through which complaints related to contractor or employee behaviour can be lodged and responded to. The Project will respond in a serious manner to any such complaints. Key steps include:

- Circulation of contact details of 'grievance officer' or other key Project contact;
- Awareness raising among the local community regarding the grievance procedure and how it works; and
- Establishment of a grievance register to be updated and maintained by the Project.

The Project will develop and implement an HIV/AIDS policy and information document for all workers directly related to the Project. The information document will address factual health issues as well as behaviour change issues around the transmission and infection of HIV/AIDS.

Residual impacts

The implementation of the above mitigation measures would ensure that the construction phase significance is reduced to **Minor-Moderate** significance. A summary for the impact the construction phase of the Project is present below.

Table 10.32 Pre- and Post- Mitigation Significance for Impacts Associated with the Presence of the Workforce and Jobseekers

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts Associated with the Presence of a Workforce	Construction and Decommissioning	Moderate (-ve)	Minor - Moderate (-ve)

Table 10.33 Pre- and Post- Mitigation Significance for Impacts Associated with the Presence of a Workforce and Jobseekers

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Permanent
- **Scale:** Large
- **Frequency:** Constant
- **Reversibility:** Irreversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR - MODERATE NEGATIVE

10.11.2 Construction, Operation and Decommissioning: Pressure on Social Infrastructure and Services

Impact Description

It is generally accepted that large-scale infrastructure projects attract job-seekers into the Project Area. The Project is expected to stimulate in-migration as job-seekers enter the area with the intention of securing employment on the Project. In-migration of people will be further stimulated by possibility of business opportunities linked to the provision of goods and services to the Project, and by real or perceived opportunities arising from the general increase in economic activity in the area.

It is likely that a number of people will continue to stay in the area irrespective of whether they are able to secure employment and these people may move their families to the area. There is the possibility that people will return to their place of origin or move on to seek employment elsewhere if there are no employment opportunities for them, or when the construction phase is complete.

The expected impacts associated with an influx of jobseekers are:

- Pressure on existing social infrastructure – particularly housing, education and health facilities

The presence of the Project is likely to increase the rate of in-migration into the area, as people are attracted to the area in the hope of securing employment. The increase in population is expected to add pressure on existing infrastructure and services; specifically on housing services. Housing delivery has been slow in the SBLM and the housing backlog has been steadily increasing since 2001. The number of households on the waiting list for housing is currently estimated at 8,179 and the number of households affected

by the housing backlog is 6,730 (Saldanha Bay Local Municipality IDP, 2012). In-migrants will likely seek housing in Wards 3 and 4, where the SBLM is struggling to keep up with the local housing demand. This could be further exacerbated if job seekers decide to relocate their families to the area.

An influx of jobseekers and their families would place pressure on health and education facilities. SBLM has 14 medical facilities, but there are only two clinics located in the Saldanha Bay area (one in Ward 4 and the other in Ward 3). These already understaffed clinics would be placed under pressure to cope with the increase in population within their catchment.

Impact Assessment

The impacts related to pressure on social infrastructure and services will be an indirect impact. The impacts will be negative as they will place pressure on infrastructure and services and the local government, who will have to provide the services should the influx occur.

The impact will be experienced at a local level, within the ADI. The impacts will be long-term despite the fact that the period of influx may be limited to the construction phase, the associated impacts will continue to occur into the future. The scale of the impact will be medium, as the Project is not expected to attract large volumes of in-migration and the degree of change for local population will therefore be notable but will not dominate over existing conditions. The frequency of the impacts will not be uniform, but will felt often until in-migration stabilises and upgrades to infrastructure are undertaken. The impact is revisable as social infrastructure and services can be improved to address the impact. Given the information presented above, the impact will be medium in magnitude.

The population within the SBLM has been increasing at a rate greater than expected which has been attributed to the in-migration of people seeking economic opportunities. There is an existing housing backlog in the SBLM, and health services are under pressure. Therefore, the vulnerability of receptors is considered medium.

Therefore, the significance of the impact is rated as **Moderate negative,** the level of in-migration, and movement of job-seekers cannot be accurately predicted.

During the operational phase, there will limited employment opportunities and the Project is unlikely to attract further job seekers.

Proposed Mitigation Measures

The Project will implement a grievance procedure that is easily accessible to the local community, through which complaints related to contractor or employee behaviour can be lodged and responded to. The Project will respond in a serious manner to any such complaints. Key steps include:

- Circulation of contact details of 'grievance officer' or other key Project contact.
- Awareness raising among the local community regarding the grievance procedure and how it works.
- Establishment of a grievance register to be updated and maintained by the Project.

Implement management measures associated with the prioritisation of local labour, as outlined in *Section 10.10.1*

Residual impacts

The implementation of the above mitigation measures would ensure that the construction phase significance remains of Moderate significance. A summary for the impact the construction phase of the Project is presented below.

Table 10.34 Pre- and Post- Mitigation Significance for Impacts Associated with Pressure on Social Infrastructure and Services

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts Associated with Pressure on Social Infrastructure and Services	Construction	Moderate (-ve)	Moderate (-ve)

Table 10.35 Pre- and Post- Mitigation Significance for Impacts Associated Pressure on Social Infrastructure and Services

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Medium
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE

10.11.3 Construction and Decommissioning Phase: Impact on Human Health due to Air Emissions and Dust Generation

Impact Description

Most construction and decommissioning activities generate dust, which settles on surrounding properties and land, and is often more of a nuisance than a health issue. The dust is generally coarse, but may include fine respirable particles (PM_{10}) and these are known to be a risk to human health. Exhaust emissions from construction vehicles and equipment typically include particulates (including PM_{10}), carbon monoxide (CO), nitrogen oxides (NO_X), sulphur dioxide (SO_2) and volatile organic compounds (VOCs) including benzene. The creation of dust associated with vehicle traffic will be limited as most of the roads in the ADI are paved.

Impact Assessment

The impacts on human health due to air emissions and dust generation will be a direct, negative impact. The duration will be short-term, for the duration of the construction phase. The extent of the impact will be local, as the pollutants will be limited in dispersion and will occur onsite and around the main transport routes. Based on the outcomes of the Air Quality Specialist Report, *Section 10.3 of the EIR, and Annex D,* air emissions generated as a result of construction phase activities not expected to have an adverse effect on health, therefore the degree of change experienced by individuals will be negligible and the scale of the impact will be small. The impact is considered reversible. The frequency of the impact will vary depending on construction activities, but it will be often for the duration of the construction phase. Given the above factors, the magnitude of the impact is considered small.

The vulnerability of receptors is considered low as the Project site is located in an industrial area with no sensitive receptors located adjacent to the site. People living along transport routes have access to health care and would be able to seek medical attention if their health was adversely affect by air emissions.

Therefore it is anticipated that the significance of the impact will be **negligible.**

Mitigation

All of the mitigation measures outlined in *Section 10.3 of the EIR, and Air Quality Specialist Report, Annex D* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will ensure that the impact remains of negligible significance.

Table 10.36 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on Human Health due to Air Emissions and Dust Generation	Construction	Negligible	Negligible

Table 10.37 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Short-term
- **Scale:** Small
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGABLE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGABLE

10.11.4 Operations Phase: Impact on Human Health due to Air Emissions

Impact Description

The operation of the power plant will result in emissions due to the operation of combustion sources mainly the turbines and generators, which could result in decreases in air quality. Emissions of air pollutants from the ArcelorMittal CCGT power plant will result during operations through the combustion of LNG or CNG resulting in NO_X, CO and CO_2 emissions and some methane (CH_4). Increased emissions of any of these pollutants can result in negative implications for human health. Respiratory diseases and cardiovascular diseases are most likely to result. In order to protect human health, air quality standards have been established and emissions below these standards are considered to have a negligible impact on the health of communities.

Exhaust emissions from Project associated vehicles and equipment typically include particulates (including PM_{10}), carbon monoxide (CO), nitrogen oxides

(NO_X), sulphur dioxide (SO_2) and volatile organic compounds (VOCs) including benzene.

Impact Assessment

The impacts on human health due to air emissions and dust generation will be a direct, negative impact. The duration will be long-term, for the duration of the operation phase. The extent of the impact will be local, as the pollutants will be limited in dispersion, occurring onsite and adjacent to the site, as well as the main transport routes. Based on the outcomes of the Air Quality Specialist Report, *Section 10.3 of the EIR, and Annex D,* for all pollutants the predicted ambient concentrations are well below the respective National Ambient Air Quality Standards (NAAQS). Therefore, air emissions generated as a result of the operation phase is not expected to have an adverse effect on health - the degree of change experienced by individuals will be negligible and the scale of the impact will be small. The impact is considered reversible. The frequency of the impact will be constant, as the power plant will operate 24 hrs a day, 7 days a week. Given the above factors, the magnitude of the impact is considered medium.

The vulnerability of receptors is considered low as the Project Site is located in an industrial area with no sensitive receptors located adjacent to the site. People living along transport routes have access to health care and would be able to seek medical attention if their health was adversely affect by air emissions.

Therefore it is anticipated that the significance of the impact will be **Minor (-ve).**

Mitigation

All of the mitigation measures outlined in *Section 10.3 of the EIR, and Air Quality Specialist Report, Annex D* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will ensure that the impact remains of Minor significance.

Table 10.38 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on Human Health due to Air Emissions and Dust Generation	Operation	Minor (-ve)	Minor (-ve)

Table 10.39 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Small
- **Frequency:** Constant
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR

10.12 INCREASED NUISANCE FACTORS AND CHANGE IN SENSE OF PLACE

The Project Site is located within an industrial area, adjacent to the Saldanha Steel facility. The land immediately surrounding the site it utilised for industrial purposes, grazing or is vacant land. Within the broader area, much of the surrounding land to the north and east is utilised for agriculture, nature reserves and recreational activities, residential and holiday homes. There are existing visual intrusions around the Project Site, such as power lines, railway pylons, industrial and port facilities, therefore, the landscape should not be seen as pristine.

The Project will introduce a gas-fired power plant and associated infrastructure such as a substation and Operation and Maintenance (O&M) buildings into the area, within close proximity to existing industrial infrastructure. The construction and operation of the Project will lead to an increase in ambient noise, the generation of dust and increased traffic volumes, all of which have the ability to alter the sense of place of the existing environment.

10.12.1 Construction, and Decommissioning Phase: Increased Nuisance Factors and Change in Sense of Place

Impact Description

Impacts associated with air quality, traffic and noise have been assessed by specialists and are discussed in *Section 10.9 of the EIR, the Traffic Assessment Report (Annex D), the Noise Impact Assessment Report (Annex D) and Air Quality Specialist Report (Annex D).*

The Project will cause nuisance of the communities in the ADI due to noise, dust and vibration, as well as increased traffic volumes during construction and decommissioning.

Noise levels are expected to increase as a result of construction activities on site such as trucks that deliver construction equipment and materials; earthworks using heavy machinery, and site preparation, or piling activities if required.

Additional vehicle movements during peak periods are anticipated to be in the order of 600 person trips during the peak hour or 275 cars, the equivalent of 18 minibus taxis and two buses. The minbus taxis and buses will collect and dispatch the workforce in the vicinity of the site, including areas in the ADI (such as Ward 3 and 4) and AII (such as Vredenburg).

The anticipated ambient noise levels during the construction phase of the Project has been modelled and based on the results thereof, it is anticipated that the change in ambient noise levels will be negligible during construction. The construction phase sound levels may impact on the ambient noise levels for an area of 2 500 m from the Project Site, the Site located in an industrial area and ambient noise levels are not going to exceed the 35 dBA guideline at any of the identified receptors.

The increase in traffic volumes will be notable during peak traffic times in the morning and afternoon, and may frustrate other road users, but the increase in traffic will be manageable through the implementation of mitigation measures.

Dust associated with the Project will be largely limited to the Project site.

While each of the above mentioned impacts are considered to be largely manageable, the combined effect of the noise, dust and traffic impacts are likely to have a negative impact on the sense of place for some stakeholders.

Impact Assessment

The impacts associated with increased nuisance factors and change in sense of place during construction and decommissioning will be a direct, negative impact. The duration will be short-term, for the duration of the construction

phase. The extent of the impact will be local, limited to the site and immediate surrounds, as well as the local transport routes.

The scale of the impact will be medium. The impact is considered reversible. The frequency of the impact will vary depending on construction activities, but it will be often as it relates to nuisance factors, and constant as it relates to sense of place. Given the above factors, the magnitude of the impact is considered medium.

The vulnerability of receptors is considered small to medium, as traffic volumes in the area are low, and road users will find the increased traffic volumes frustrating. The construction phase sound levels may impact on the ambient noise levels for an area of 2 500 m from the Project site.

Therefore it is anticipated that the significance of the impact will be **Moderate negative.**

Mitigation

All of the mitigation measures outlined in *Section 10.9 of the EIR, the Traffic Assessment Report, the Noise Impact Assessment Report and Air Quality Specialist Report (Annex D)* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will result in the impact being of Minor significance.

Table 10.40 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Nuisance due to Noise, Dust and Vibration during Construction and Decommissioning	Construction	Moderate (-ve)	Minor (-ve)

Table 10.41 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place during Construction and Decommissioning

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Short-term
- **Scale:** Medium
- **Frequency:** Often to constant
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR NEGATIVE.

10.12.2 Operation Phase: Increased Nuisance Factors and Change in Sense of Place

Impact Description

The Project will cause nuisance to the communities in the ADI due to noise, dust and vibration, as well as increased traffic volumes during operation. This will affect the communities and households closest to the Project site and along the main access roads, as well as along the routes used to transport the workforce to and from the site on a daily basis.

During operation, the power plant will operate 24 hours a day, seven days a week. It is anticipated that the change in ambient noise levels will be negligible during Phase 1 of the project and low during Phase 2, with the 35dBA ambient guideline been slightly exceeded at two sensitive receptors. This noise will have a more constant characteristic and will be perceived as a humming sound. Operational phase sound levels may impact on the ambient noise levels for an area of 3,000 m from the proposed activity.

The Project associated traffic will decrease during the operations phase as there will be fewer people employed by the Project during this phase. Additional vehicle movements are associated with the commuting of employees to and from work each day. Additional vehicle movements during peak periods are anticipated to be in the order of 177 person trips during the peak hour or 80 cars, the equivalent of 5 minibus taxis and one bus.

The presence of the Project may alter the visual character of the landscape during the operation phase. While the Project Site is located in an industrial area, there are a number of tourism and recreational areas in the border surrounding areas, as listed above. *Figure 10.14* provides an analysis of the view shed of the Project, i.e. it indicated, based on topography and landscape features, where the Project will be visible from. It does not take into account how visible the how Project will be based on distance from the Project. Based

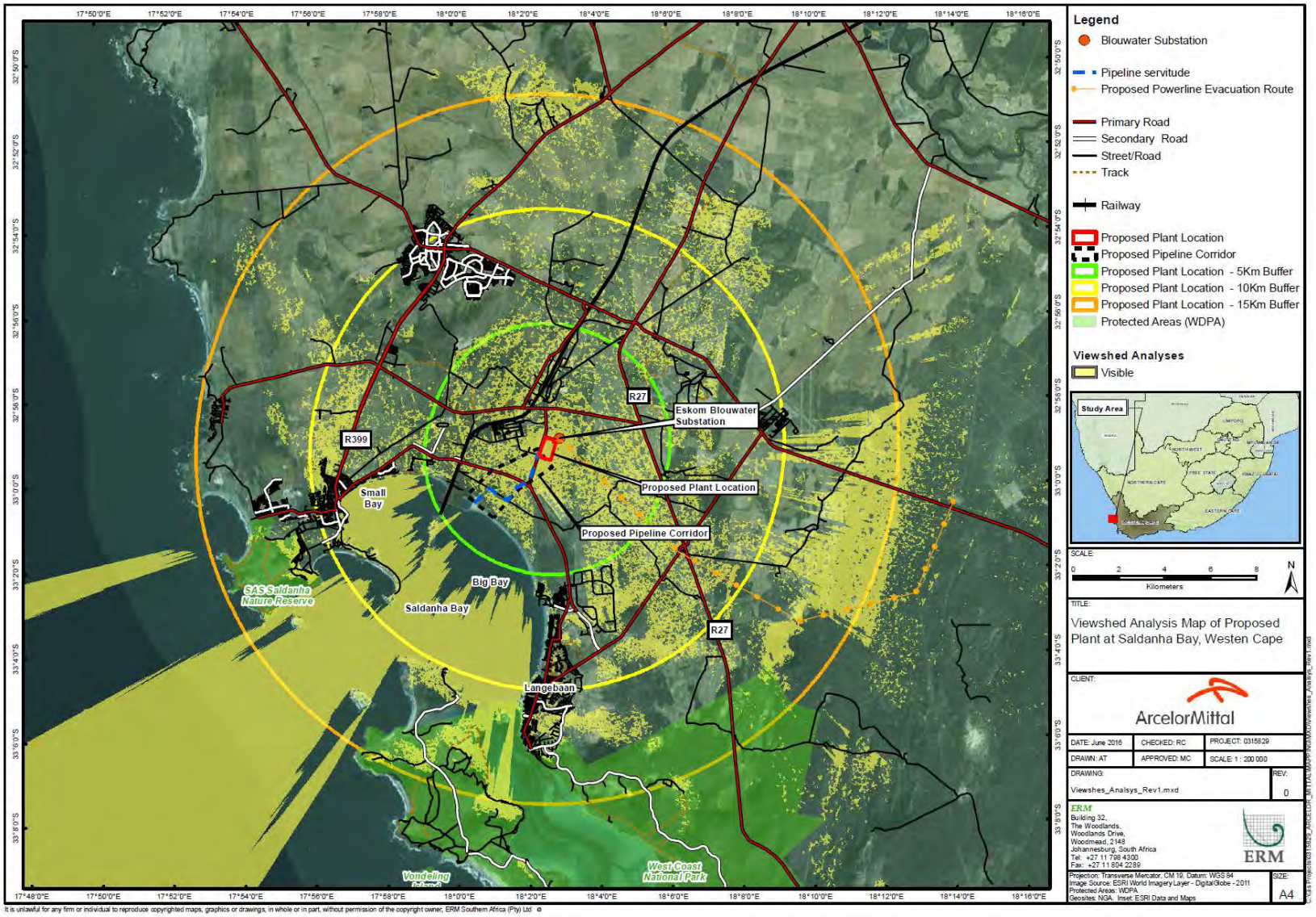
on *Figure 10.14* the Project may be partially visible from some sensitive areas, such as Langebaan, Mykanos, the West Coast National Park. It will also be visible from surrounding residential areas. Based on a Visual Impact Assessment for a similar power plant facility with an estimated height of 40 m in Saldanha Bay (M. Cilliers (PrLArch.) & D. Townshend (BL (UP)), it is noted that the vanishing threshold (1) is estimated at 8 km away during the day and 16 km away at night. The proposed facility is located in proximity to the following potentially affected receptors:

- 7 km from Blouwater Bay residential area;
- 8 km from Louwville residential area;
- 6.5 km from Mykonos tourism and recreational facilities;
- 6.5 km from the West Coast Fossil Park;
- 10 km from Langebaan residential area;
- 10 km from Langebaan Weg;
- 13 km from SAS Saldanha Contractual Nature Reserve;
- 14 km from Jacobsbaai residential area; and
- 20 km from the West Coast National Park.

The Project will be visible from a number of tourism and recreational areas, as well as residential area. Given the distance between the Project and the potential receptors (largely in excess of 6 km), it can be concluded that while the Project will be visible, it will not dominate the landscape or detract from the receptors experience in of the area

(1) This is the distance where no discernible impact is observed, even if the proposal is technically still visible.

Figure 10.14 View Shed for the Saldanha Steel Gas-fired Power Plant, not taking into Account Vanishing Threshold



Impact Assessment

The impacts due to increased nuisance factors and change in sense of place during operation will be a direct, negative impact. The duration will be long-term, for the duration of the operation phase. The extent of the impact will be local, limited to the site and immediate surrounds, as well as the local transport routes. It is anticipated that the change in ambient noise levels will be negligible during Phase 1 of the project and low during Phase 2, with the 35dBA ambient guideline being slightly exceeded at two sensitive receptors. The Project will be visible from a number of tourism and recreational areas, as well as residential area. Given the distance between the Project and the potential receptors (largely in excess of 6 km), it can be concluded that while the Project will be visible, it will not dominate the landscape or detract from the receptors experience in of the area. Never-the-less, for those receptors impacted by for increased nuisance factors and change in sense of place the scale of the impact will be medium.

The impact is considered irreversible. The frequency of the impact will be constant for the duration of the operation phase. Given the above factors, the magnitude of the impact is considered medium.

The vulnerability of receptors is considered medium as most sensitive receptors are located in quiet areas, with low ambient noise levels, low traffic volumes, and are people who are attracted to the area for outdoor and recreational activities (particularly in the case of those visiting parks and tourism facilities).

Therefore it is anticipated that the significance of the impact will be **Moderate (-ve).**

Mitigation

The ability to which visual impacts can be managed is limited by the size of the facility and the industry standards governing setbacks and fire control. However, the following measures should be implemented to minimise the impact of lighting at night:

- Lighting should be limited to areas where it is required.
- Lights should be directional and avoid light spillage.
- Low-level lights should be used over flood lights along walkways.

All of the mitigation measures outlined in *Section 10.9 of the EIR, the Traffic Assessment Report the Noise Impact Assessment Report and Air Quality Specialist Report (Annex D)* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will result in the remaining of **Moderate negative** significance.

Table 10.42 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place during Operation

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Increased nuisance factors and change in sense of place operation	Operation	Moderate (-ve)	Moderate (-ve)

Table 10.43 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place Operation

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Medium
- **Frequency:** Constant
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE.

10.13 WORKER HEALTH AND SAFETY AND RIGHTS

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working and living conditions.

These issues will be considered not only for workers who are directly employed by the Project but also contractors (including sub-contractors) and workers within the supply chain. The main risks in relation to worker's management and rights are associated with the use of contractors and subcontractors and the supply chain.

The Project is expected create 450 direct employment opportunities during the peak of the construction period, which will be approximately 48 months in duration. The majority of workers will be engaged by the EPC contractor and will consist of a semi-skilled to skilled workforce. The operation phase is

planned for a lifespan of 25 - 30 years and will involve around 95 permanent site employees including skilled and semi-skilled staff.

The expected impacts on worker rights and H&S as a result of construction, operation and decommissioning activities and Project operation are as follows:

- Risk to workers H&S due to hazardous construction and decommissioning activities;
- Risk to workers H&S due to hazardous operation activities; and
- Violation of workers' rights.

This impact assessment is based on the assumption that no specific Project H&S policies, procedures and training provisions are in place for construction workers (both of EPC Contractor and subcontractors) as limited information is available on this at the current Project stage.

10.13.1 Construction and Decommissioning Phase: Risk to Workers' H&S due to Hazardous Construction Activities

Impact Description

The construction activities will involve the following main activities (in order of occurrence):

- Site preparation including levelling;
- Piling of the foundations;
- Concrete works in scope of building construction;
- Construction of fuel supply arrangements;
- Construction of the powerline; and
- Underground pipeline laying.

Details of the activities associated with decommissioning are not yet detailed but will involve removal of all installed infrastructure.

These activities will involve the operation of heavy equipment and trucks, working at height, working in confined spaces, construction traffic, use of electric devices, handling of hazardous materials and other hazardous activities. Due to the nature of the activities being undertaken during construction and decommissioning, worker H&S is a key risk with the potential for accidents that may result in injuries and fatalities as well as lost man-hours.

Within South Africa, worker health and safety falls under the ambit of the Department of Labour, and is primarily governed through the Occupational Health and Safety Act (OSHA) (Act No. 83 of 1993). Employees working informally and those with limited or without awareness of their rights (for example, migrant workers, or those newly entering the labour market) are likely to be most at risk of working in unsafe conditions.

Impact Assessment

The impact on worker health and safety from the Project will be a direct, negative impact. The duration will be short-term, for the duration of the construction phase. The extent of the impact will be regional, as it will affect those directly employed by the Project, as well as people employed in the supply chain. The scale of the impact will be large for anyone adversely affected by a health and safety incident on the Project, as they may experience a temporary loss of work time, or in the worst-case scenario may be rendered permanently unable to work. In most instances, this impact is considered reversible, as incidences can be addressed through medical intervention where required and health and safety can be constantly improved to avoid future incidences. The frequency of the impact will not be uniform, but will likely occur often the duration of the construction phase. The magnitude of the impact is therefore considered Medium.

The vulnerability of the workers to this impact is considered low, as there are laws in place in South Africa to protect worker rights. However, migrant workers, or those newly entering the labour market may not be aware of their rights, and people may be willing to compromise their rights to secure employment in light of high unemployment rates.

The impact is therefore considered to be of Minor - Moderate negative significance.

Mitigation

- The Project will comply with all applicable South African legislation in terms of health and safety, and worker rights, which will include access to workmans compensation for loss of income resulting from an onsite incident.

- As part of the contractor and supplier selection process the Project will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in South African law, international standards and the Project's policies.

- The Project will provide support to contractors and subcontractors to ensure that labour and working conditions are in line with South African law through capacity building.

- Workers will be provided with primary health care and basic first aid at construction camps /worksites.

- Facilities and operations will be developed, planned and maintained such that robust barriers are in place to prevent accidents. All employees have the duty to stop any works if adequate systems to control risks are not in place.

- In line with the worker code of conduct employees should not be under the influence of intoxicants which could adversely affect the ability of that employee to perform the work or adversely affect the health and safety of other employees, other persons or the environment.

- The Project will provide of Personal Protective Equipment (PPE), training and monitoring as well as ongoing safety checks and safety audits.

Residual Impact

Following the implementation of mitigation measures the impact significance will be (post-mitigation) of Minor negative significance**.**

Table 10.44 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Construction Activities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Risk to Workers' H&S due to Hazardous	Construction	Minor to Moderate (-ve)	Minor (-ve)

Table 10.45 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Construction and Decommissioning Activities

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low to Medium

Impact Magnitude: Low

- **Extent:** Regional
- **Duration:** Short-term
- **Scale:** Large
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR to MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measures will ensure the impact remains **MINOR NEGATIVE.**

10.13.2 Operation Phase: Risk to Workers' H&S due to Hazardous Operation Activities

Please note: For the operation of the Project the mitigation and prevention measures outlined above for construction (Section 10.13.1) are considered as embedded controls.

Impact Description

Hazardous activities during the operation phase and regular maintenance activities will include, but not be limited to; the operation of heavy equipment and trucks, use of electrical devices including high voltage, working at height, maintenance of high pressure pipework and vessels and handling of hazardous materials. During these activities the workers will be at risk for accidents and injury.

Impact Assessment

The impact on worker health and safety as a result of the Project will be a direct, negative impact. The duration will be long-term, for the duration of the operation phase. The extent of the impact will be regional, as it will affect those directly employed by the Project, as well as people employed in the supply chain. The scale of the impact will be large for anyone adversely affected by a health and safety incident on the Project, as they may experience a temporary loss of work time, or in the worst-case scenario may be rendered permanently unable to work. In most instances, this impact is considered reversible, as incidences can be addressed through medical intervention where required and health and safety can be constantly improved to avoid future incidences. The frequency of the impact will not be uniform, but will likely occur occasionally the duration of the operation phase. The magnitude of the impact is therefore considered small.

The vulnerability of the workers to this impact is considered low, as there are laws in place in South Africa to protect worker rights and most employees will be highly skilled engineers and technicians, who have likely been educated around their rights and H&S practices.

The impact is therefore considered to be of minor significance.

Mitigation

The implementation of mitigation measures defined for the construction phase will continued throughout the operation phase with consideration in the health and safety management system of the specific risks associated with operation and maintenance activities and the new size and structure of the workforce. In this regard, mitigation measures outlined in *Section 10.13.1* above are applicable to the operation.

Residual Impacts

The implementation of mitigation measures will ensure that the significance remains of minor negative significance.

Table 10.46 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Operation Activities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Risk to Workers' H&S due to Hazardous Operation Activities	Operation	Minor (-ve)	Minor (-ve)

Table 10.47 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Operation Activities

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Large
- **Frequency:** Rare
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measures will ensure the impact remains **MINOR NEGATIVE.**

10.14 IMPACTS ON ARCHAEOLOGY AND PALAEONTOLOGY

This Section discusses the potential impacts on heritage resources resulting from the establishment of the gas-fired power plant including physical effects on sites and features of cultural heritage interest and broader landscape.
The expected impacts on cultural heritage resources as a result of construction, operation and decommissioning of the Project are:

- Impacts to Pre-colonial & Colonial Archaeology
- Impacts to Graves and Cairns
- Impacts to buried Palaeontology

10.14.1 Construction, Operation and Decommissioning: Impacts to Pre-colonial & Colonial Archaeology

Impact Description

The site clearance, excavation of foundations, road construction, laying of the pipeline and other construction activities have the potential to destroy or damage archaeological and palaeontological resources. The key threat to pre-colonial archaeological remains is the potential impacts to sub-surface remains

and these are difficult to predict and to mitigate. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the Project.

Archaeological sites are non-renewable, it is therefore, important that they are identified and their significance assessed prior to development. The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context as an archaeological site is highly dependent on its geological and spatial context.

Impact Assessment

The impacts to pre-colonial & colonial archaeology during construction, operation and decommissioning will be a direct, negative impact. The duration will be permanent as it relates to the loss of pre-colonial & colonial archaeology. The extent of the impact will be local, limited to the Project footprint. The scale of the impact will be medium. The impact is considered irreversible. The frequency of the impact will vary depending on construction activities, but it anticipated that it would be rare given nature of the baseline. Given the above factors, the magnitude of the impact is considered low.

The vulnerability of receptors is considered low as no pre-colonial or colonial period archaeological sites were found during a comprehensive field survey along the pipeline, and in the area identified for the power plant.

Therefore it is anticipated that the significance of the impact will be **Minor negative.**

Mitigation

Should any human burials, archaeological or palaeontological materials (fossils, bones, artefacts etc.) be uncovered or exposed during earthworks or excavations, they must immediately be reported to the Heritage Western Cape must be notified (Telephone: 021 483 9685).

After assessment and if appropriate a permit must be obtained from the SAHRA or HWC to remove such remains.

Residual Impact

The implementation of mitigation measures will result in the impact being of Negligible significance.

Table 10.48 Pre- and Post- Mitigation Significance for Impacts to Pre-colonial & Colonial Archaeology

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts to Pre-colonial & Colonial Archaeology	Construction	Minor (-ve)	Negligible

10.14.2 Construction, Operation and Decommissioning: Impacts to Graves and Cairns

Impact Description

The site clearance, excavation of foundations, road construction, laying of the pipeline and other construction activities have the potential to destroy or damage archaeological resources. Graves are typically considered to be of high heritage significance. They are best avoided by development. An extensive consultation process is required if exhumation is considered.

Human remains are protected by a number of legislations including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). In the event of human bones being found on site, Heritage Western Cape HWC must be informed immediately and the remains removed by an archaeologist under an emergency permit.

Impact Assessment

Impacts to graves and cairns during construction, operation and decommissioning will be a direct, negative impact. The duration will be permanent as it relates to the loss of graves and cairns. The extent of the impact will be local, limited to the Project footprint. The scale of the impact will be medium. The impact is considered irreversible. The frequency of the impact will vary depending on construction activities, but it anticipated that it would be rare given nature of the baseline. Given the above factors, the magnitude of the impact is considered low.

The vulnerability of receptors is considered low as no evidence of graves or stone cairns were found within the Project footprint.

Therefore it is anticipated that the significance of the impact will be **Minor negative.**

Mitigation

Should any human burials, archaeological or palaeontological materials (fossils, bones, artefacts etc.) be uncovered or exposed during earthworks or excavations, they must immediately be reported to the Heritage Western Cape must be notified (Telephone: 021 483 9685).

After assessment and if appropriate a permit must be obtained from the SAHRA or HWC to remove such remains.

Residual Impact

The implementation of mitigation measures will result in the impact being of Negligible significance.

Table 10.49 Pre- and Post- Mitigation Significance for Impacts to Pre-colonial & Colonial Archaeology

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts to Pre-colonial & Colonial Archaeology	Construction	Minor (-ve)	Negligible

10.14.3 Construction, Operation and Decommissioning: Impacts to buried Palaeontology

Impact Description

The site clearance, excavation of foundations, road construction, laying of the pipeline and other construction activities have the potential to destroy or damage palaeontological resources.

A fossil record along the entire project area does not exist. However, based on the distribution and nature of known sites, sufficient information is available to make at least general assumptions of what may be expected in many areas. It is noted, however, that sub-surface palaeontological potential cannot properly be assessed superficially without digging.

It is entirely possible that excavations into sediments not normally accessible to palaeontologists will be encountered in sub-surface deposits of the Langebaan and Velddrif Formations. However, rather than treating this as a negative, implementation of appropriate management may enable observations otherwise impossible to be made and provide opportunities to recover important fossil material.

Portions of the proposed project area have been heavily disturbed by agriculture and these surfaces have been adequately covered during the foot survey, without revealing Palaeontological or Pleistocene archaeological remains other than terrestrial molluscs and insect burrows; these latter are ubiquitous and will have no effect on the project.

Table 10.50 Impact Characteristics: Impacts to buried Palaeontology

Characteristic	Description
Activity	Construction, operation and decommissioning activities.
Aspect	The site clearance, excavation of foundations, road construction, laying of the pipeline
Impact	Construction activities particularly have the potential to destroy or damage palaeontological resources
Impact Type	Indirect negative impact
Resource or Receptor	Palaeontological resources

Impact Assessment

Impacts to buried Palaeontology during construction, operation and decommissioning will be a direct, negative impact. The duration will be permanent as it relates to the loss of palaeontological resources. The extent of the impact will be local, limited to the Project footprint. The scale of the impact will be large. The impact is considered irreversible. The frequency of the impact will vary depending on construction activities, but it anticipated that it would be rare given nature of the baseline. Given the above factors, the magnitude of the impact is considered large.

The vulnerability of receptors is considered high, despite the fact that no palaeontological or Pleistocene archaeological remains were observed on the surface, sub-surface findings may be revealed through Project activities.

Therefore it is anticipated that the significance of the impact will be **Major negative.**

Mitigation

- Sub-surface excavations should be monitored by a palaeontologist or archaeologist with appropriate palaeontological knowledge. The frequency of this to be worked out a priori with the contractor to minimise time spent on site.
- Any material recovered will be lodged in the Cenozoic collections of Iziko South African Museum.
- If any palaeontological material is uncovered, permit for the disturbance and removal of palaeontological material will be required from the Western Cape Provincial Heritage Agency.
- Training in the nature and value of palaeontological and archaeological remains should be provided to project staff and equipment operators.
- Should anything of a palaeontological nature be encountered on site by the Contractor (or any other party), e.g. bones or wetland deposits, work is to be stopped in that area immediately, and the OM / Principal Agent notified. Failure to do so will result in a penalty and this must be carefully explained to workers during the Environmental Education Programme undertaken by the OM.

- In the event of palaeontological material being encountered, the OM will demarcate the area and notify the appointed specialist (palaeontologist/ archaeologist with appropriate experience) who will view the material and ascertain whether further study of the area is required.
- Should the specialist confirm a genuine fossil or sub-fossil and recommend further study of the area, work in the applicable area is to cease until further notice while arrangements are put in place. Heritage Western Cape (HWC) is to be informed immediately by the OM (Telephone: 021 483 9685).

Residual Impact

The implementation of mitigation measures will result in the impact being of Negligible significance.

Table 10.51 Pre- and Post- Mitigation Significance for Impacts to buried Palaeontology

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts to buried Palaeontology	Construction	Major (-ve)	Negligible

10.15 RISK ASSESSMENT

10.15.1 Introduction

The major hazards considered in a risk assessment are generally one of three types: flammable, reactive or toxic. With reference to the Project, only flammable hazards which may result from the loss of containment of the flammable Natural Gas being transferred in the pipelines (during operation), or the Propane from storage at the power station (highest concentrations during the second year of construction, but continued risk during operation), have been identified. Flammable hazards may manifest as high thermal radiation from fires and overpressures following explosions that may cause direct damage, building collapse, etc. These hazards pose a risk to current and future land uses and individuals.

Impacts that have been assessed as part of this section of the report therefore are:

- Land use planning impact for the construction phase;
- Risk to individuals for the construction phase;
- Land use planning risk posed by the pipelines during the operational phase;
- Land use planning risk posed by the propane storage facility during the operational phase; and
- Risk to individuals for the operational phase.

This introduction sets out the relevant legislation and guidelines for the assessment of these impacts and provides the baseline context which informs the assessment of all of these.

Relevant legislation and guidelines

The Occupational Health and Safety Act in South Africa offers the Major Hazard Installation regulations which govern major accidents in South Africa. These regulations do not currently offer criteria with which to assess the acceptability of developments from a major accident risk perspective. Therefore the risk criteria used are based on those adopted by the Health and Safety Executive (HSE) in the United Kingdom. This methodology is internationally recognised and accepted as a basis for risk management.

The HSE has developed different sets of risk criteria for different applications. One role that the HSE fulfils in the UK is to advise on development of land in the vicinity of existing major hazard installations. For this purpose the HSE uses its so-called land use planning (LUP) criteria. Another set of criteria is used by the HSE to judge the acceptability of risk from existing major hazard installations. These are known as risk tolerability criteria.

The individual risk tolerability criteria will also be used to assess whether the risks posed by the Natural Gas pipelines or Propane generator are acceptable to individuals in the vicinity of the pipeline servitude.

Land Use Planning Around Hazardous Installations

A three zone system is applied in the HSE approach - Inner Zone, Middle Zone and Outer Zone, with the outermost extent of the Outer Zone referred to as the Consultation Distance (CD). In combination with this, land-uses are classified according to Sensitivity Level, with Sensitivity Level 1 (typically places of work) being the least sensitive and Sensitivity Level 4 (typically large schools or hospitals) being the most sensitive. A set of rules (in the form of a 'decision matrix') is applied to determine which land-uses are appropriate for which zones.

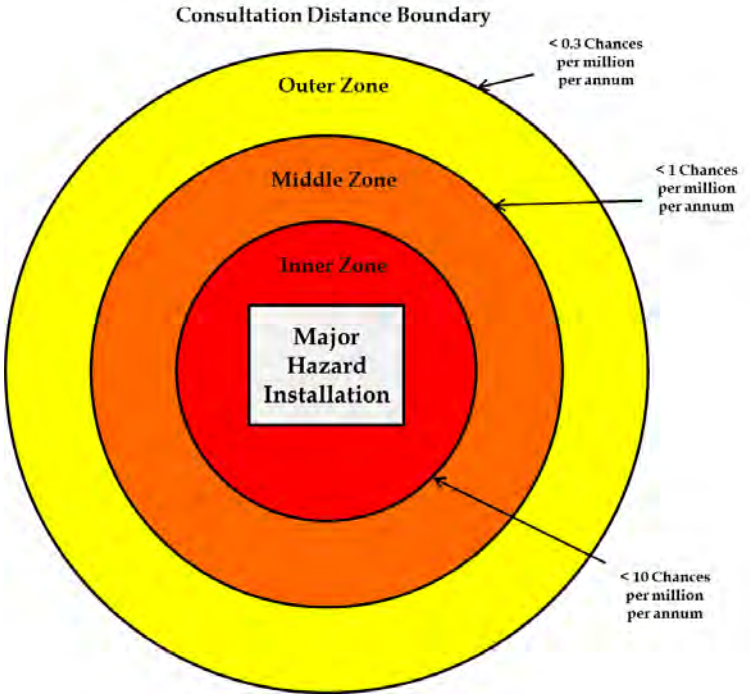
In practice, the zones are related to the risk of an individual being exposed to a dangerous dose or load which would "...cause severe distress to almost everyone, many [would] require medical treatment, some [would] be seriously injured and highly vulnerable people might be killed". This approach appreciates the general public's aversion not only to fatality but also to injury and other distress (i.e. the concept of harm), and is distinct from approaches solely related to fatality.

The zones for an individual being harmed from exposure to flame/heat, explosion overpressure, toxic gas or asphyxiant (i.e. a specified frequency of receiving a dangerous dose) have been set to correspond to the following risk levels:

- Inner Zone - 10 chances per million per year (1×10^{-5});
- Middle Zone - 1 chance per million per year (1×10^{-6}); and
- Outer Zone (Consultation Distance) - 0.3 chances per million per year (3×10^{-7}).

Examples of the various zones for major hazard sites are shown in *Figure 10.15*.

Figure 10.15 Land Use Planning Consultation Zones around Hazardous Sites



In November 2001 the UK HSE modified its zoning criteria. These are summarised in *Table 10.52* with proposed developments categorised as either 'advise against' (AA) or 'don't advise against' (DAA).

Table 10.52 Land-use Sensitivity to Risk

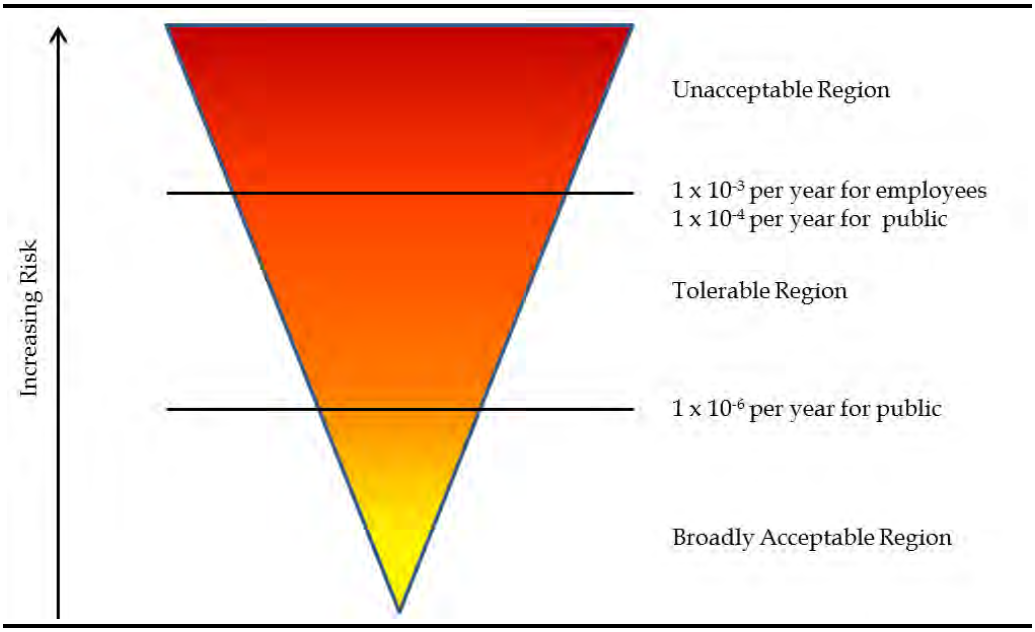
Level of Sensitivity	Inner Zone	Middle Zone	Outer Zone
1. The normal working public	DAA	DAA	DAA
2. The general public at home	AA	DAA	DAA
3. Vulnerable members of the public (schools, hospitals, etc.)	AA	AA	DAA
4. Large examples of No 3 & large outdoor examples of No 2 (i.e. recreational areas)	AA	AA	AA

Individual risk tolerability criteria

The HSE risk tolerability criteria are used to judge the acceptability of the risks from existing MHIs or pipeline servitudes. In the HSE tolerability of risk framework (1), risk levels are divided into three bands of increasing risk, as shown in *Figure 10.16.*

In the lowest band, within the 'broadly acceptable' region, the risk is considered to be insignificant and adequately controlled. Risks that are within the 'unacceptable' level fall into the uppermost band. In such cases, either action should be taken to reduce the risk levels, or the activity giving rise to the risk should be halted. Between the unacceptable and broadly acceptable regions, the risk is considered to be tolerable if it is As Low As Reasonably Practicable (ALARP). The risk is ALARP when the cost of any further risk reduction measures would be grossly disproportionate to (i.e. much greater than) the benefits gained.

Figure 10.16 HSE Risk Criteria Framework



The individual risk is the risk to which a hypothetical person (usually with defined characteristics and behaviour pattern) is exposed. The HSE criteria(1) are stated in terms of individual risk of fatality for two types of hypothetical person: a person who is engaged in the industrial activity under consideration (e.g., an employee); and a person who is not involved in the activity (e.g., a member of the public).

The HSE has provided individual risk values corresponding to the boundaries between the different regions indicated in *Figure 10.16*. These are summarised in *Table 10.53.*

(1) HSE (2001). Reducing Risks, Protecting People. HSE Books, C100.

Table 10.53 Individual Risk Criteria

Level	Individual Risk to Personnel Engaged in the Activity (/yr)	Individual Risk to People not Engaged in the Activity (/yr)
Unacceptable	Greater than 1 in 1,000 (10^{-3})	Greater than 1 in 10,000 (10^{-4})
Broadly Acceptable	No greater than 1 in 1,000,000 (10^{-6})	No greater than 1 in 1,000,000 (10^{-6})

Baseline conditions

Typically, quantitative risk assessments (QRAs) require information regarding the ambient temperatures, wind speed, wind direction and stability class.

Site-specific wind speed data were obtained for the Port of Saldanha. It is understood that to date no weather stations in South Africa measure both wind speed and atmospheric stability categories. Therefore, ERM selected the following stability classes and wind speed scenarios as being considered representative for modelling purposes:

- C4 – meaning a stability class of C (slightly unstable conditions) where the wind speed is greater than 4 m/s.

- C8 - meaning a stability class of C (slightly unstable conditions) where the wind speed is greater than 8 m/s.

The above weather scenarios reflect a conservative daytime weather condition.

- F2 – meaning a stability class of F (moderately stable) where the wind speed is less than or equal to 2 m/s. This class is often used by the US Environmental Protection Agency for determining worse case scenarios for vapour cloud dispersion consequence analysis. F2 gives a conservative night time weather condition.

Selecting the above categories gives an average and a 'worst case' condition for the risk assessment study.

The average ambient temperature and humidity for Saldanha Bay were obtained from www.weatherbase.com. A summary of the data is as follows:

- Average ambient temperature is 15.9 °C; and
- Average relative humidity is 78 %.

The area around the proposed Natural Gas pipelines' route and CCGT power plant site includes the following land uses:

- Sensitivity Level 1: The Saldanha Port area and the access road running adjacent to the CCGT power plant site as this is a single lane road; and

- Sensitivity Level 2: MR559 which is crossed by the pipelines as this is a dual carriageway.

The following built-in mitigation has been considered in this assessment:

- Multiple (at least two) safety systems will be implemented for Propane offloading. Such systems include wheel chocks, interlock brakes, interlock barriers, etc. In addition the site will implement an effective pull away mitigation system and inspection and pressure/leak tests to prevent transfer system leaks and bursts.

Based on the Risk Assessment undertaken (see *Annex D*), the following potential impacts have been assessed in this section:

- Land Use Planning Impact for the Construction Phase;
- Risk to Individuals for the Construction Phase;
- Land Use Planning Impact for the Operational Phase for the Natural Gas Pipelines;
- Land Use Planning Impact for the Operational Phase for the Propane Generator Installations; and
- Risk to Individuals for the Operational Phase.

Proposed Mitigation

The following mitigation is proposed for the Natural Gas pipelines and the Propane storage in order to minimise potential impacts. Impacts are assessed in the sections that follow.

Mitigation measure(s) for the proposed Natural Gas Pipelines

The following proposed engineering design features that reduce risks should be implemented:

- The pipelines should be designed to an international standard such as:
  - BS EN 14161: Petroleum and natural gas industries – Pipeline transportation systems;
  - ASME B31.8 Gas Transmission and Distribution Piping Systems; or
  - Other internationally recognised standards.

- The pipelines' wall thickness should be designed to accommodate the maximum operating pressure of 90 barg with a suitable safety factor;

- Isolation valves should be located at least at either end of the pipelines but ideally at intervals such that in the event of a leak only small amounts of Natural Gas would be released;

- Leak prevention systems such as cathodic protection and pipeline coatings suitable for the ground conditions should be implemented;

- The pipelines should include an emergency shutdown system that will shut emergency isolation valves and depressurise the pipelines safely;
- Areas of road crossing shall include specific protection measures to account for the weight from road traffic;
- A Leak detection system should be considered for the pipelines;
- The installation of non-return valves on the pipelines should be considered;
- Depth of burial of the pipelines along their length should be equal to, or greater than the minimum depth of burial specified;
- Potential other risk reduction measures include concrete sheathing, tiles above pipelines, marker tape above pipelines, route marker posts etc; and
- Emergency response plan for the pipeline must be compiled with the user of the pipelines and the Local Authority together.

The following protective measures should be put in place to reduce the risks:

- Third party interference protection measures should be included. These should differentiate between accidental interference (which can be protected against with safety marker tape, regular aboveground pipeline markers, etc) and deliberate interference (which can be protected against with regular pipeline surveys, ground disturbance early warning systems, etc);
- All Natural Gas processing areas should be equipped with gas detectors with appropriate logic that can initiate emergency shutdown of Natural Gas operations and even the pipelines if necessary;
- All of the automatic safety systems shall be designed so that they can also be manually activated.

Specific mitigation measures identified by the specialist include:

- Ensuring compliance with all statutory requirements (i.e. pipeline designs);
- Ensuring compliance with applicable South African National Standards (i.e. SANS 10087, etc.);
- Incorporating applicable guidelines or equivalent international recognised codes of good design and practice into the designs;
- Completing recognised processes of hazard analysis processes (HAZOP, FMEA, SIL, LOPA etc.) for the proposed CCGT power plant prior to

construction to ensure design and operational hazards have been identified and adequate mitigation has been considered;

- Ensure any amendments to the current design specifications are captured in amendments to the EIA and relevant specialist studies; and

- Ensuring a Major Hazard Installation (MHI) risk assessment is carried out for the facility after detailed designs have been completed for the pipelines and CCGT power plant in accordance with the Major Hazard Installation regulations;

Mitigation measure(s) for the proposed Propane generator installations on the CCGT power plant site

The following proposed engineering design features that reduce risks should be implemented:

- The installation must comply with all the requirements of SANS 10087-3:2015 *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 L*;

- The Propane storage vessel shall be fitted with pressure relief valves, which would only lift when the vessel has reached its maximum operating pressure or level;

- All piping shall be rated to accommodate the required operating pressure of the system and allow for pressure relief to a safe area;

- All pressure relief systems should vent away from the generator air intake system;

- The Propane vessel shall be filled with sparge pipes in the vapour space to limit reverse flow to the off-loading point as well as preventing vessel stresses due to uneven temperature;

- All instrumentation and electrical equipment shall be specified in accordance to the Hazardous Area classification as per SANS 10108;

- Off-loading of Propane shall be done on a fully-automated system to prevent overfilling;

- Off-loading safety systems such as earthing of the road tanker are required;

- Emergency shutdown (ESD) shall be provided that would automatically shut down systems such as feed or off-loading pumps and emergency shut off valves in the event of an emergency; and

- Emergency shutdown should be initiated by local operators, CCGT control room operators as well as by gas detectors where appropriate.

The following protective measures should be put in place to reduce the risks:

- Active or passive fire protection on the Propane storage bullet in line with SANS 10087-3:2015;

- Propane road tanker offloading deluge system to cool equipment in the event of a fire if required by SANS 10087-3:2015;

- Gas detectors with appropriate logic which can initiate emergency shutdown;

- All of the automatic safety systems shall be designed so that they can also be manually activated;

- Procedures should ensure at least one person be present during Propane offloading;

Specific mitigation measures identified by the specialist include:

- Ensuring compliance with applicable South African National Standards (i.e. SANS 10087-3:2015, etc.);

- Incorporating applicable guidelines or equivalent international recognised codes of good design and practice into the designs;

- Completing recognised processes of hazard analysis processes (HAZOP, FMEA, SIL and LOPA etc.) for the proposed CCGT power plant prior to construction to ensure design and operational hazards have been identified and adequate mitigation has been considered;

- Ensure any amendments to the current design specifications are captured in amendments to the EIA and relevant specialist studies; and

- Ensuring a Major Hazard Installation (MHI) risk assessment is carried out for the facility after detailed designs have been completed for the pipelines and CCGT power plant in accordance with the MHI regulations.

10.15.2 Risk Assessment: Land Use Planning Impact for the Construction Phase

Impact Description

This impact will pose the maximum risk in the second year of the construction phase of the project when there will be the highest usage of the propane storage facility. Natural gas will not yet be in use on the Project site at that

time and thus there will be no risk posed by the pipelines during this phase of the Project.

The main hazards associated with potential releases of Propane from the Propane storage facility are jet fires (immediate ignition), flash fires (delayed ignition) and explosions (delayed ignition of the gas or vapour in a confined space). The hazards may be realised due to leaks/failures in the Propane storage vessel, off-loading road tankers or associated equipment, all of which can release significant quantities of flammable materials on failure. This would result in human exposure via thermal radiation and overpressures.

As the planned construction period in the second year is expected to consume the most Propane, this scenario has been modelled for the assessment of this impact.

Impact Assessment

Risk model outcome

The Land Use Planning risk contours for the Propane generator operations during the second year of construction are shown in *Figure 10.17*.

The risk associated with the increased Propane consumption during the second year of construction results in an area outside the power plant site falling within the 1×10^{-5} contour and therefore falling within the Inner Zone. This area extends approximately 110 m to the west and 40 m to the north of the CCGT site boundary. Therefore no Level 2, Level 3 or Level 4 developments should be allowed within this area during the second year of construction.

From the figure it can be seen that an area outside the power plant site falls within the 1×10^{-6} contour and therefore is within the Middle Zone. This area extends approximately 120 m to the west and 50 m to the north of the CCGT site boundary. Therefore no Sensitivity Level 3 or Level 4 developments should be allowed within this area during the second year of construction. No Sensitivity Level 3 or 4 land uses exist in the surrounding area.

From the figure it can be seen that an area outside the power plant site falls within the 3×10^{-7} contour and therefore is within the Outer Zone. This area extends approximately 140 m to the west and 60 m to the north of the CCGT site boundary. Therefore no Sensitivity Level 4 developments should be allowed within this area during the second year of construction. No Sensitivity Level 4 land uses exist in the surrounding area.

The current land uses within these areas result in the risk level being classified as 'don't advise against' during the second year of construction according to the land use planning criteria. Future land uses around the CCGT power plant site within the second year of construction should adhere to those of *Table 10.52* for risk contours presented in *Figure 10.17*.

The hazards as described above, would result in a direct negative type of impact on the natural vegetation, structures, employees and people in the immediate area. The duration would be temporary as such hazards would be of short duration and only happen occasionally, if at all. The extent for the impact is local.

The scale of the hazard effects of a dangerous dose as defined earlier, from the Propane generator installations are as follows:

- Jet Fire: 173 m;
- Flash Fire: 239 m;
- Vapour Cloud Explosion: 13 m; and
- Boiling Liquid Evaporating Vapour Explosion / Fireball: 114 m.

If facilities and equipment are designed to the prescribed specifications and standards, the likelihood of such an event occurring is considered **unlikely**.

The area surrounding the proposed CCGT power plant site is similarly unused with the exception of a small access road. Therefore, this land use sensitivity is also categorised as low.

Box 10.16 Land Use Planning Impact for the Construction Phase

Nature and Type: Negative direct

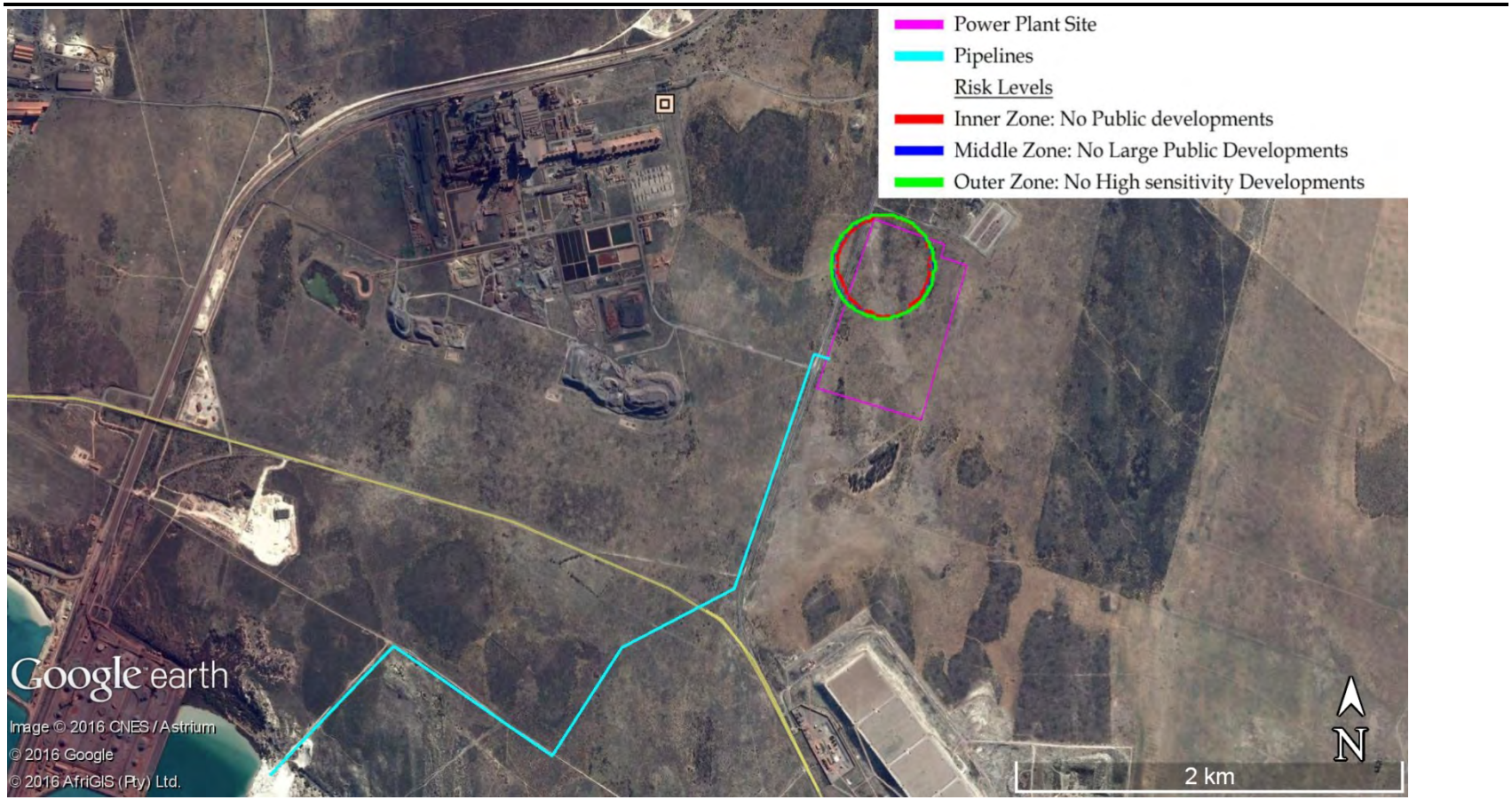
Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Temporary
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest land use restriction extends 140 m to the west and 60 m to the north of the CCGT site boundary, centred on the Propane generator.
- **Likelihood:** Unlikely

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation, as detailed in Section 10.15.1, this impact remains **NEGLIGIBLE**

Figure 10.17 Contours for Land Use Planning for Saldanha Steel Natural Gas Pipelines and Propane backup generator with High Propane Consumption during the Second Year of Construction



10.15.3 Risk Assessment: Risk to Individuals for the Construction Phase

Impact Description

The main hazards associated with potential releases of Propane from the Propane storage facility are jet fires (immediate ignition), flash fires (delayed ignition) and explosions (delayed ignition of the gas or vapour in a confined space). The hazards may be realised due to leaks/failures in the Propane storage vessel, off-loading road tankers or associated equipment, all of which can release significant quantities of flammable materials on failure. This would result in human exposure via thermal radiation and overpressures.

As the planned construction period in the second year is expected to consume the most Propane and therefore presents the highest risk for the construction phase of the Project, this scenario has been modelled for the assessment of this impact.

Impact Assessment

Risk model outcome

Individual risks are by definition specific to individuals and need to take into account the extent and circumstances under which exposure arises. For instance, the risk will depend on the amount of time the individual spends outdoors as well as the time they may spend indoors which will afford them some protection. Risks are calculated for hypothetical persons located outdoors and indoors.

The risk contours presented in this section represent Location Specific Individual Risk (LSIR).It should be noted that the LSIR relates to an individual who is permanently exposed 24 hours a day 365 days a year. This is therefore an overestimate of the individual risk to personnel or public who may be present at these locations.

Individual risks of fatality contours for persons located outdoors and indoors at 1×10^{-6}, 1×10^{-5}, 1×10^{-4} and 1×10^{-3} for the Propane installation were calculated.

The areas surrounding the proposed developments that fall between the 1×10^{-6} contour and the 1×10^{-4} contour are small areas to the north and west of the CCGT power plant site. As the risk exceeds 1×10^{-6} but does not exceed the 1×10^{-4} risk level, the LSIR for the pipelines and Propane backup generator for persons located outdoors in these areas is not considered intolerable. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1×10^{-4} contour exists for the area centred on the Propane backup generator. This contour does not extend offsite, therefore only workers involved in the construction and operation of the CCGT power plant are

exposed to this risk level and this is not considered intolerable according to the risk criteria. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1×10^{-3} LSIR contour do not exist for individuals located outdoors, therefore the risk is below these levels.

Areas located beyond the 1×10^{-6} contour would be considered 'broadly acceptable'. The risks posed to areas located between the 1×10^{-6} contour and the 1×10^{-4} contour would be considered tolerable if they can be proved to be ALARP by the Propane installation operator. The risks posed to non-Natural Gas operational personnel and establishments as well as sensitive areas within the 1×10^{-4} contour are considered intolerable. The LSIR contours for individuals located outdoors and indoors for the proposed Propane backup generator during the second year of construction are shown in *Figure 10.18* and *Figure 10.19* respectively.

Figure 10.19 represents the LSIR for hypothetical persons located indoors for the Propane generator during the second year of construction. Areas located off the power plant site have an individual risk higher than 1×10^{-6}. As the risk exceeds 1×10^{-6} but does not exceed 1×10^{-4}, the LSIR for the Propane backup generator for persons located outdoors in these areas is not considered intolerable according to the risk criteria. The risks can only be considered tolerable, however, if they can be demonstrated by the site operator to be ALARP.

The 1×10^{-3} LSIR contour does not exist for individuals located indoors, indicating that the risk is lower than this level.

The general public sensitivity is categorised as medium while worker sensitivity is categorised as low, given that workers are more aware of the risks and adequately prepared to handle them as a result of emergency planning, PPE etc.

The hazards, as described above, would result in a direct negative type of impact on the natural vegetation, structures, employees and people in the immediate area. The duration would be temporary as such hazards would be of short duration and only happen occasionally, if at all. The extent for the impact is local.

The scale of the hazard effects of a Dangerous Dose as defined earlier from the Propane generator installations are as follows:

- Jet Fire: 173 m;
- Flash Fire: 239 m;
- Vapour Cloud Explosion: 13 m; and
- Boiling Liquid Evaporating Vapour Explosion / Fireball: 114 m.

Figure 10.18 Contours for Individual Risk of Fatality for Saldanha Steel Propane Storage Facility during the Second Year of Construction – Persons Located Outdoors

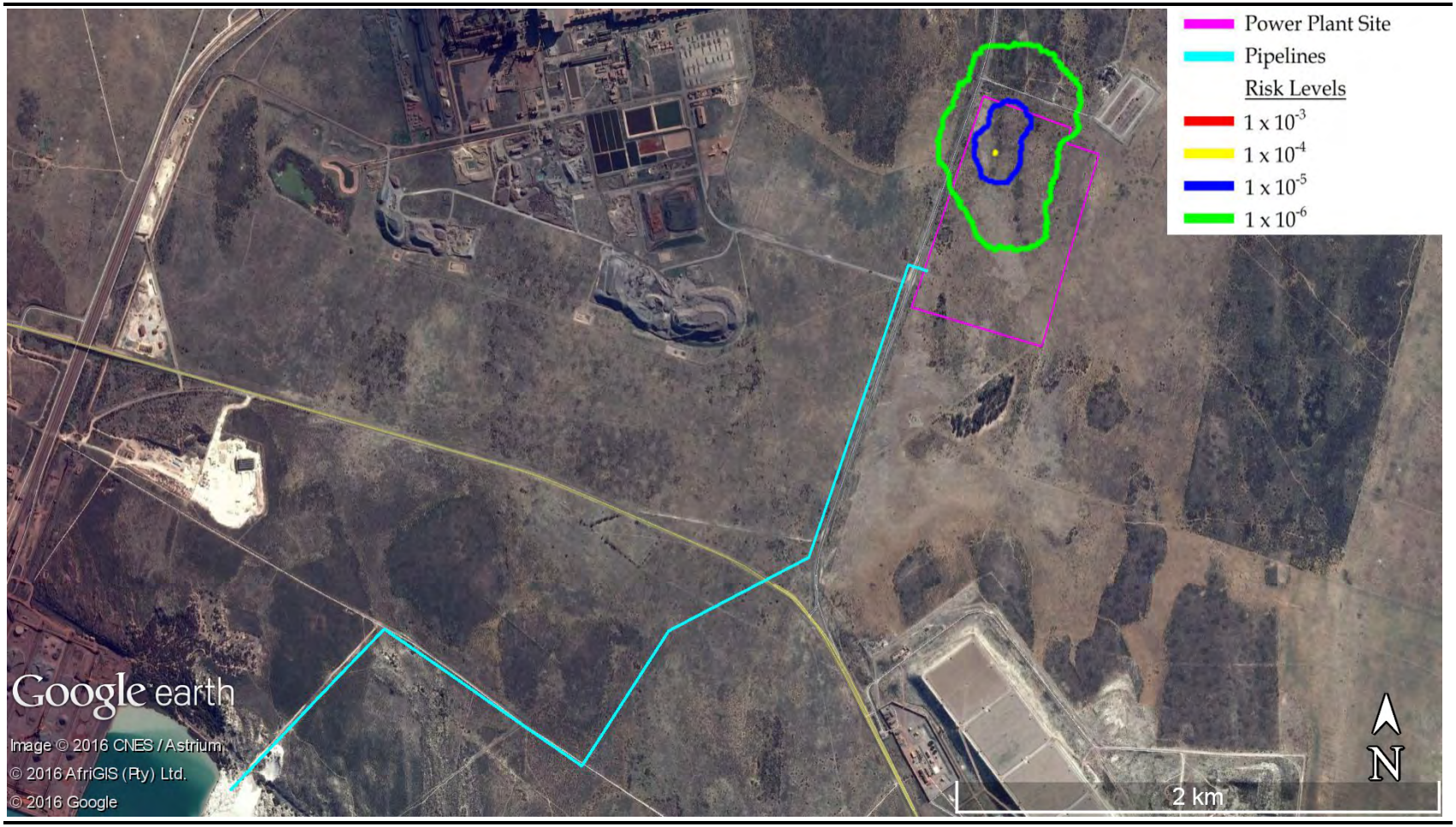
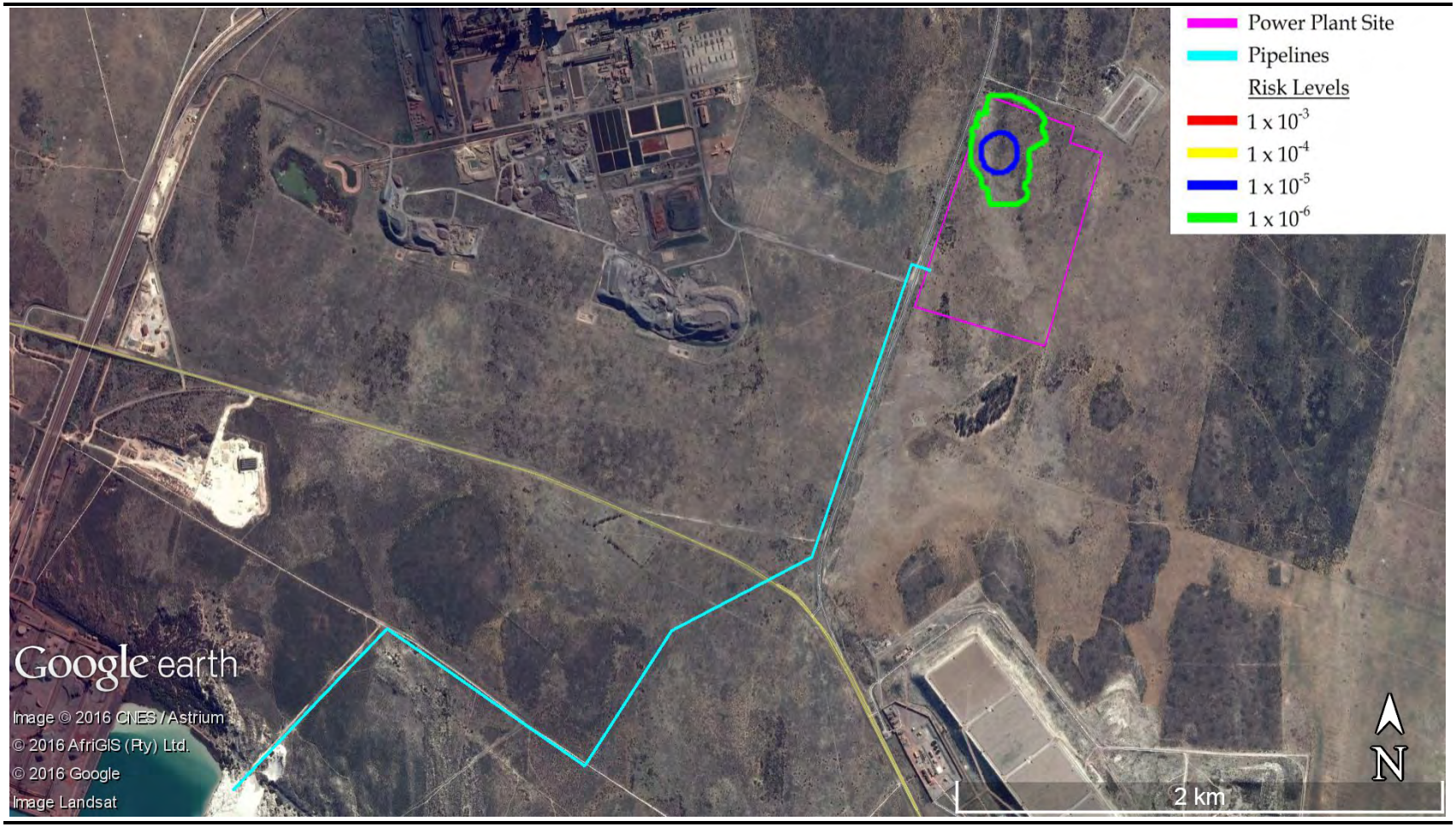


Figure 10.19 *Risk Contours for Individual Risk of Fatality for Saldanha Steel Propane Storage Facility during the Second Year of Construction – Persons Located Indoors*



If facilities and equipment are designed to the prescribed specifications and standards, the likelihood of such an events occurring is considered **unlikely**.

Box 10.17 Risk Assessment: Risk to Individuals for the Construction Phase

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium for Public Area; Low for Workers;

Impact Magnitude: High

- **Extent:** Local
- **Duration:** Temporary
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest LSIR contours extend 360 m to the west, 320 m to the north and 80 m to the east of the CCGT site boundary, centred on the Propane generator. The area considered intolerable for the general public extends 60 m to the north of the CCGT site boundary. An area centred on the Propane generator is considered intolerable for workers.
- **Likelihood:** Unlikely

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation, as detailed in Section 10.15.1, this impact remains **MODERATE**

10.15.4 Risk Assessment: Land Use Planning Impact for the Operational Phase for the Natural Gas Pipelines

Impact Description

The main hazards associated with potential releases of natural gas from the pipelines are jet fires (immediate ignition), flash fires (delayed ignition) and explosions (delayed ignition of the gas or vapour in a confined space). This would be caused by leaks/failures in the pipelines. This would result in human exposure via thermal radiation and overpressures.

Impact Assessment

Risk model outcome

The LUP risk transect for the pipelines in the general public area are shown in *Figure 10.20* and in the Transnet Port Authority (TPA) area are shown in *Figure 10.21*. Third party activity in the TPA area is likely to be lower than elsewhere along the pipeline route due to strict access controls. A modifier has therefore been added to reduce the likelihood of third party activity.

Figure 10.20 Risk Transect for the General Public for Land Use Planning for Saldanha Steel Natural Gas Pipelines

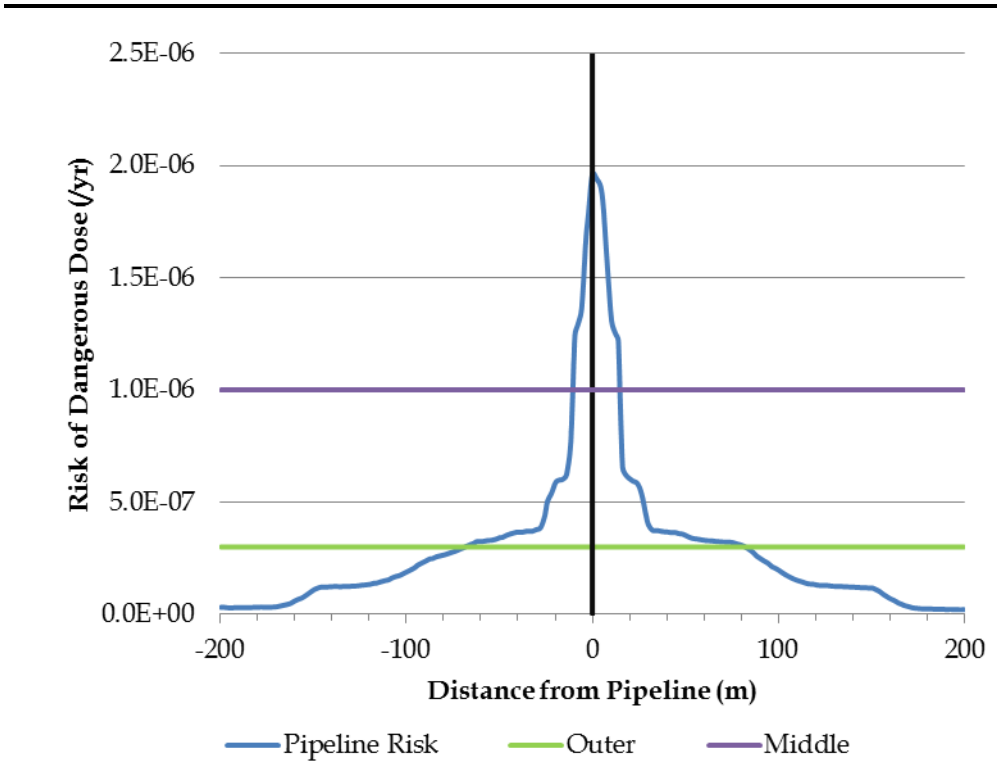
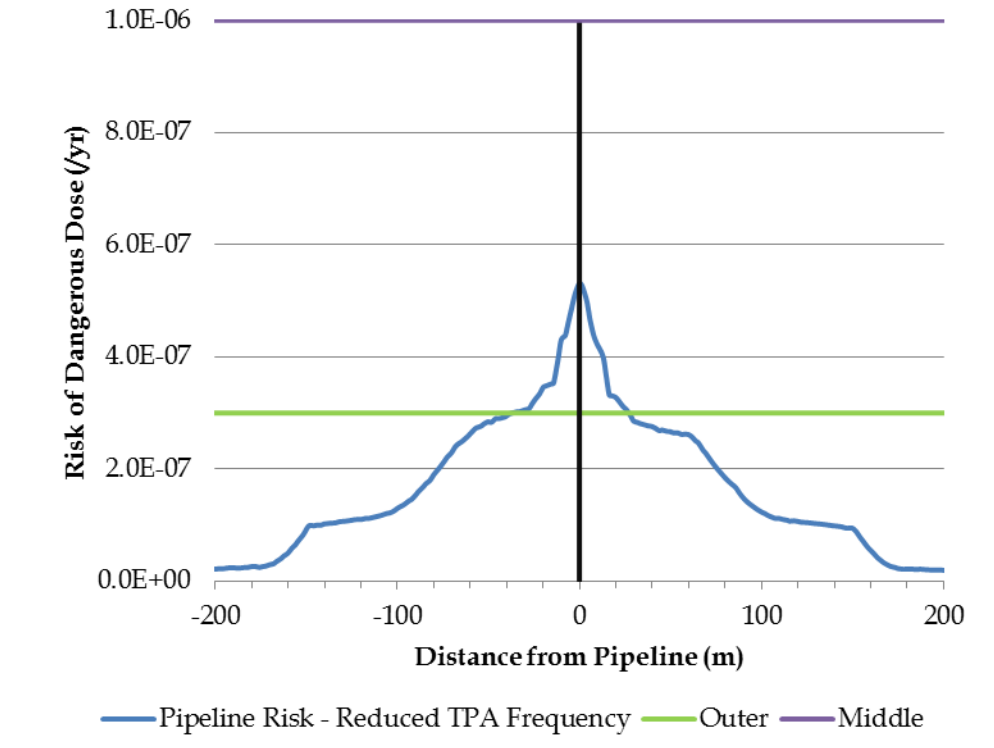


Figure 10.21 Risk Transect for Land Use Planning for Saldanha Steel Natural Gas Pipelines with Reduced TPA Frequency in the Port Area



The area of the Natural Gas pipelines that is accessible to the general public has a risk level within the Middle Zone which is approximately 10 m to either side of the pipelines. Therefore no Level 3 or Level 4 developments should be allowed within 10 m of the centre line of the pipeline servitude. No Sensitivity Level 3 or 4 land uses exist in the surrounding area.

The area of the pipeline that is accessible to the public has a risk level within the Outer Zone which is approximately 68 m to either side of the pipelines. Therefore no Level 4 developments should be allowed within 68 m of the centre line of the pipeline servitude. No Sensitivity Level 4 land uses exist in the surrounding area.

The area surrounding the pipelines' servitude within the port boundary is understood to be zoned for industrial use and therefore classified as Sensitivity Level 1.

Based upon the current land uses around the proposed Natural Gas pipelines' route, the risk level would be classified as 'don't advise against' according to the land use planning criteria. Therefore the current land uses can be considered tolerable. Future land uses around the Natural Gas pipelines should adhere to those of *Table 10.52* for the pipelines' risk transects presented in *Figure 7.1* and *Figure 10.21*.

The hazards, as described above, would result in a direct negative type of impact on the natural vegetation, structures, employees and people in the immediate area.

The duration would be temporary as such hazards would be of short duration and only happen occasionally, if at all. The extent for the impact is local.

The scale of the hazard effects of a Dangerous Dose as defined earlier from the Natural Gas pipelines are as follows:

- Jet Fire: 156 m;
- Flash Fire: 676 m; and
- Gas Cloud Explosion: 57 m.

If facilities and equipment are designed to the prescribed specifications and standards, the likelihood of such an event occurring is considered **unlikely**.

The area surrounding the Natural Gas pipelines' servitude is currently open land with the exception of MR559. A portion of this servitude also passes through an area owned by the Port. As these areas are not currently inhabited and future land use within the Port is understood to be categorised as Industrial, the land use sensitivity in these areas is categorised as low.

Box 10.18 Land Use Planning Impact: Operation Phase: Natural Gas Pipelines

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Temporary
- **Scale:** The largest hazard effects of Dangerous Dose are to 676 m. The largest land use restriction extends 140 m from the pipeline due to proposed bends which increase the risk in these areas. Risk transects indicate the normal pipeline area restrictions extend 68 m from the centre of the Natural Gas pipelines' servitude.
- **Likelihood:** Unlikely

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation, as detailed in Section 10.15.1, this impact remains **NEGLIGIBLE**

10.15.5 Risk Assessment: Land Use Planning Impact for the Operational Phase for the Propane Generator Installations

Impact Description

Risks associated with flammable hazards during the operation phase of the project as a result of the propane storage facility at the power station will exist. Risks are anticipated to be reduced from that experienced during the Construction Phase due to smaller quantities of propane been utilised in the plant.

Impact Assessment

Risk model outcome

The Land Use Planning risk contours for the Propane generator operations during normal operation are shown in *Figure 10.22*.

From the figure it can be seen that an area outside the power plant site falls within the 1×10^{-6} contour and therefore is within the Middle Zone. This area extends approximately 90 m to the west and 50 m to the north of the CCGT site boundary. Therefore no Sensitivity Level 3 or Level 4 developments such as those described in *Table 10.52* should be allowed within this area during normal operation. No Sensitivity Level 3 or 4 land uses exist in the surrounding area.

From the figure it can be seen that an area outside the power plant site falls within the 3×10^{-7} contour and therefore is within the Outer Zone. This area extends approximately 120 m to the west and 60 m to the north of the CCGT site boundary. Therefore no Sensitivity Level 4 developments such as those

described in *Table 10.52* should be allowed within this area during normal operation. No Sensitivity Level 4 land uses exist in the surrounding area.

The current land uses within these areas result in the risk level being classified as 'don't advise against' during normal operation according to the land use planning criteria. Future land uses around the CCGT power plant site during normal operation should adhere to those of *Table 10.52* for risk contours presented in *Figure 10.22*.

The hazards, as described above, would result in a direct negative type of impact on the natural vegetation, structures, employees and people in the immediate area. The duration would be temporary as such hazards would be of short duration and only happen occasionally, if at all. The extent for the impact is local.

The scale of the hazard effects of a Dangerous Dose as defined earlier from the Propane generator installations are as follows:

- Jet Fire: 173 m;
- Flash Fire: 239 m;
- Vapour Cloud Explosion: 13 m; and
- Boiling Liquid Evaporating Vapour Explosion / Fireball: 114 m.

If facilities and equipment are designed to the prescribed specifications and standards the likelihood of such an events occurring is considered unlikely.

The area surrounding the proposed CCGT power plant site is similarly unused with the exception of a small access road. Therefore this land use sensitivity is also categorised as low.

Figure 10.22 Contours for Land Use Planning for Saldanha Steel Natural Gas Pipelines and Propane backup generator with Normal Power Plant Operation Propane Consumption

Box 10.19 Land Use Planning Impact: Operation Phase: Propane Generator Installations

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Temporary
- **Scale:** The largest hazard effects of Dangerous Dose are to 239 m. The largest land use restriction extends 140 m to the west and 60 m to the north of the CCGT site boundary, centred on the Propane generator.
- **Likelihood:** Unlikely

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation, as detailed in Section 10.15.1, this impact remains **NEGLIGIBLE**

10.15.6 Risk Assessment: Risk to Individuals for the Operational Phase

Impact Description

The main hazards associated with potential releases of Propane from the Propane storage facility are jet fires (immediate ignition), flash fires (delayed ignition) and explosions (delayed ignition of the gas or vapour in a confined space). The hazards may be realised due to leaks/failures in the Propane storage vessel, off-loading road tankers or associated equipment, all of which can release significant quantities of flammable materials on failure. This would result in human exposure via thermal radiation and overpressures.

The main hazards associated with potential releases of natural gas from the pipelines are jet fires (immediate ignition), flash fires (delayed ignition) and explosions (delayed ignition of the gas or vapour in a confined space). This would be caused by leaks/failures in the pipelines. This would result in human exposure via thermal radiation and overpressures.

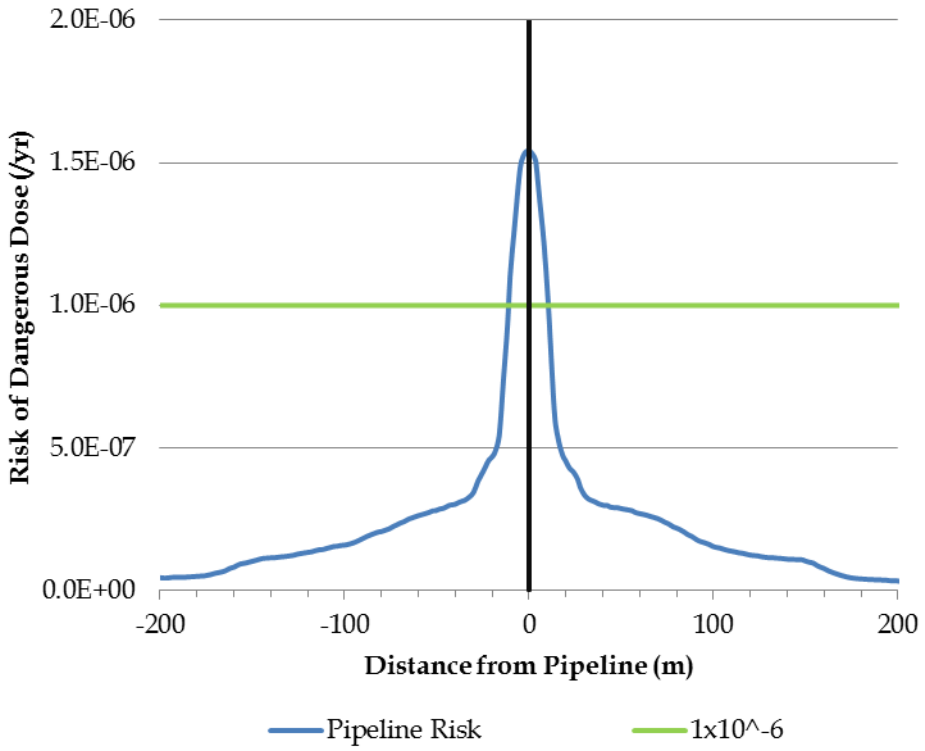
Impact Assessment

Risk model outcome

Risk transects representing the LSIR transect for hypothetical persons located outdoors and indoors for the pipelines were calculated for the areas accessible to the general public as well as those within the Port boundary. Only the transects for persons located outdoors for the area accessible to the general public were found to exceed 1×10^{-6} and therefore all other LSIR transects were excluded from further analysis.

Figure 10.23 represents the LSIR risk transect for hypothetical persons located outdoors for the Natural Gas pipelines. This transect is taken for the area accessible to the general public.

Figure 10.23 Risk Transect for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines – Persons Located Outdoors



From *Figure 10.23* it can be seen that the individual risk of fatality exceeds the 1 x 10^{-6} contour. This extends approximately 10 m on either side of the pipeline's route. As the risk in this area exceeds 1 x 10^{-6} but does not exceed 1 x 10^{-4}, the LSIR for the pipelines for persons located outdoors along the pipeline route is not considered intolerable according to the risk criteria. The risks within this area can only be considered tolerable if they can be demonstrated by the site operator to be ALARP.

The LSIR contours for individuals located outdoors and indoors for the proposed Natural Gas pipelines and Propane backup generator developments during normal operation are shown in *Figure 10.24* and *Figure 10.25* respectively.

Figure 10.24 represents the LSIR for hypothetical persons located outdoors for the proposed Natural Gas pipelines and Propane backup generator developments during normal Propane backup generator operation. Areas located off the power plant site have an individual risk higher than 1 x 10^{-6}. As the risk exceeds 1 x 10^{-6} but does not exceed the 1 x 10^{-4} risk level, the LSIR for the pipelines and Propane backup generator for persons located outdoors

in these areas is not considered intolerable according to the risk criteria. The risks can only be considered tolerable if they can be demonstrated by the site operator to be ALARP.

The 1×10^{-3} and 1×10^{-4} LSIR contours do not exist for individuals located outdoors, therefore the risk is below these levels.

Figure 10.25 represents the LSIR for hypothetical persons located indoors for the proposed pipelines and Propane backup generator developments during normal Propane backup generator operation. Areas located off the power plant site have an individual risk higher than 1×10^{-6}. As the risk exceeds 1×10^{-6} but does not exceed 1×10^{-4} the LSIR for the pipelines and Propane backup generator for persons located indoors in these areas is not considered intolerable according to the risk criteria. The risks can only be considered tolerable if they can be demonstrated by the site operator to be ALARP.

The 1×10^{-3} and 1×10^{-4} LSIR contours do not exist for individuals located indoors, therefore the risk is below these levels.

Figure 10.24 *Risk Contours for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines and Propane Developments during Normal Operation – Persons Located Outdoors*

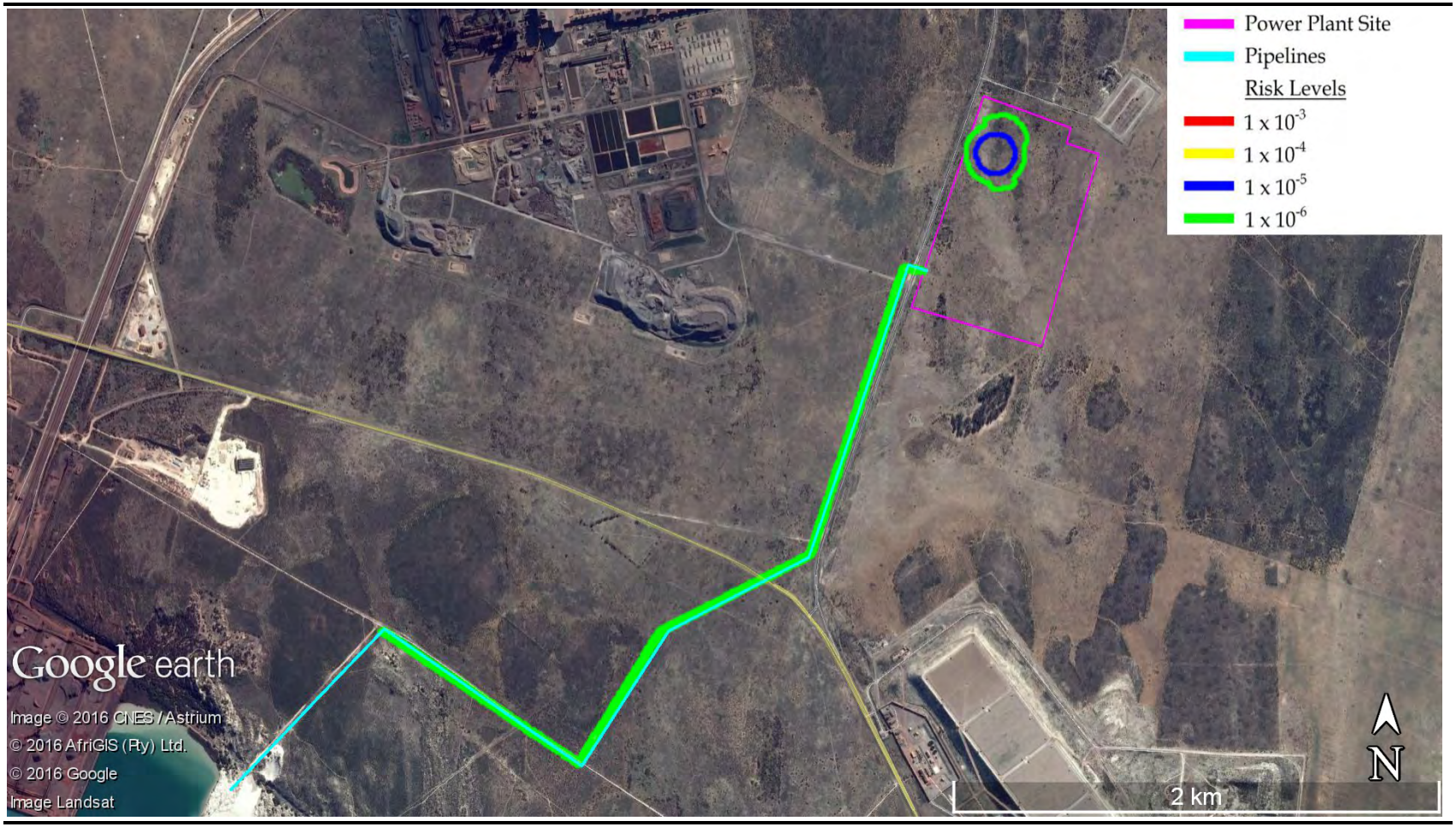
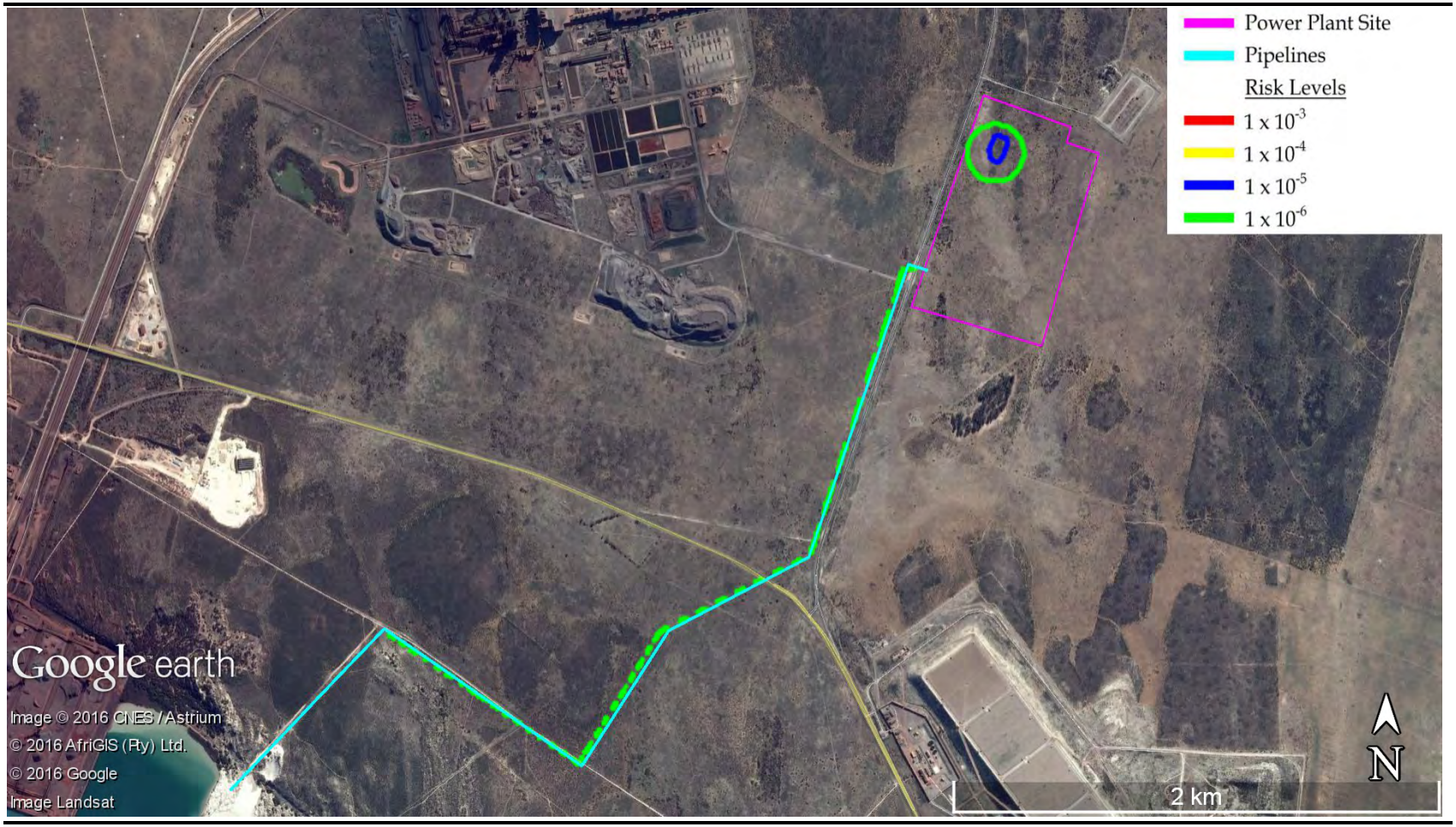


Figure 10.25 Risk Contours for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines and Propane Developments during Normal Operation – Persons Located Indoors



Considering individuals, it is understood that the area surrounding the Natural Gas pipelines' servitude is not permanently inhabited as no homes, work places or other gathering areas exist in the vicinity. The general public does however have access to the area surrounding the servitude (with the exception of the Port property). Therefore the sensitivity of the general public in the area surrounding the Natural Gas pipelines' servitude is categorised as medium. For workers involved in the construction phase or operational phase of the CCGT power plant project, the sensitivity is categorised as low. This is due to these individuals being aware of the risks and being more adequately prepared to handle them as a result of emergency planning , PPE, etc.

A similar situation exists for the proposed CCGT power plant site and surrounding area. The general public sensitivity is categorised as medium while worker sensitivity is categorised as low. The hazards, as described above, would result in a direct negative type of impact on the natural vegetation, structures, employees and people in the immediate area. The duration would be temporary as such hazards would be of short duration and only happen occasionally, if at all. The extent for the impact is local.

The scale of the hazard effects of a Dangerous Dose as defined earlier from the Propane generator installations are as follows:

- Jet Fire: 173 m;
- Flash Fire: 239 m;
- Vapour Cloud Explosion: 13 m; and
- Boiling Liquid Evaporating Vapour Explosion / Fireball: 114 m.

The scale for the pipeline would be:

- Jet Fire: 156 m;
- Flash Fire: 676 m; and
- Gas Cloud Explosion: 57 m.

If facilities and equipment are designed to the prescribed specifications and standards, the likelihood of such an event occurring is considered **unlikely**.

Box 10.20 ***Location Specific Individual Risk Impact: Operation Phase: Natural Gas Pipelines and Propane Generator Installations***

Nature and Type: Negative direct

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium for Public Area; Low for Workers;

Impact Magnitude: High

- **Extent:** Local
- **Duration:** Temporary
- **Scale:** The largest hazard effects of Dangerous Dose are to 676 m. The largest LSIR contours extend 110 m to the west and 240 m to the north of the CCGT site boundary, centred on the Propane generator.
- **Likelihood:** Unlikely

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE
IMPACT SIGNIFICANCE (POST-MITIGATION): With mitigation, as detailed in Section 10.15.1, this impact is reduced to **MODERATE**

10.15.7 *Residual*

If mitigation measures as described above are implemented, the residual impact significance will change to for the construction phase as described in *Table 10.54* as the only receptors will be workers involved in the construction and operation of the CCGT power plant and their sensitivity is classed as **low.** The residual risk from the operation phase will remain the same.

Table 10.54 ***Pre- and Post- Mitigation Significance: Quantitative Risk Assessment***

Impact	Phase	Pre- and Post- Mitigation Significance:	Residual Significance (Post-mitigation)
Natural Gas Pipelines, LUP Assessment	Construction	Negligible	Negligible
Propane Generator, LUP Assessment	Construction	Negligible	Negligible
Natural Gas Pipelines and Propane Generator, LSIR Assessment	Construction	Moderate	Moderate
Natural Gas Pipelines, LUP Assessment	Operation	Negligible	Negligible
Propane Generator, LSIR Assessment	Operation	Negligible	Negligible

Natural Gas Pipelines and Propane Generator, LSIR Assessment	Operation	Moderate	Moderate

10.16 CUMULATIVE IMPACTS

10.16.1 Background

The preceeding impact assessment assessed the impacts associated with the Project largely in isolation. It is important to assess cumulative impacts associated with a proposed development and there also is a legislated requirement in South Africa to do so. A cumulative impact is one that arises from an impact associated with a proposed Project, that when viewed in isolation may be acceptable, but when combined with multiple developments in the greater area affected by the proposal may not be acceptable.

The DEAT Integrated Environmental Management Information Series (2004) suggest the following principles be applied when undertaking a cumulative assessment:

- Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions;
- Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken;
- Since it is not practical to analyse the cumulative effects of an action on every environmental receptor, the list of environmental effects must focus on those that are truly meaningful;
- Boundaries must be set so analysts are not attempting to measure effects on everything;
- Cumulative effects analysis on natural systems must use natural ecological boundaries, and analysis of human communities must use actual socio-cultural boundaries to ensure all effects are included;
- Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects;
- Repeated actions may cause effects to build up through simple addition (more and more of the same type of effect), and the same or different actions may produce effects that interact to produce cumulative effects greater than the sum of the effects;
- Cumulative effects may last for years beyond the life of the action that caused the effects; and
- Each affected resource, ecosystem, and human community must be analysed in terms of its capacity to accommodate additional effects, based on its own time and space parameters.

The assessment of cumulative impacts of the Project are presented in this section.

10.16.2 Methodology

The assessment of cumulative impacts requires a holistic and integrated view of the Project and other known projects in the area.

The Project is located in an area ear-marked for further industrial development. The National Department of Energy, through its Gas to Power Programme, is investigating the feasibility of development of a gas-fired power station in the Saldanha Bay area. In addition, the Integrated Development Zone (IDZ) is being promoted as an oil and gas hub and industrial development is being encouraged in the area.

There are numerous proposed developments in the Saldanha – Vredenburg area. At this stage, not all developments can be confirmed and the timing of the developments is not known. A selection of developments (see *Figure 10.26*) that may contribute to the cumulative impacts on similar natural or social resources and those either confirmed or most likely to come to fruition have been considered in this cumulative impact assessment, including:

- The IDZ development itself, covering an area of up to 4000 ha which could attract several industrial type developments;
- Afrisam Cement Plant;
- LPG Storage Facilities – Sunrise and Avedia ;
- Vredenburg Industrial Development, including:
    - Frontier Separation Plant;
    - Chlor-Alkali Facility;
- One desalination plant;
- One additional approximately 1000 - 1500 MW gas-fired power plant (location not confirmed);
- LNG Import terminal; and
- Expansion of the Port of Saldanha.

Input from specialists was obtained regarding cumulative impacts on the following aspects:

- Air Quality;
- Climate Change;
- Noise;
- Flora;
- Fauna;
- Avifauna;
- Traffic;
- Socio-economic;
- Heritage; and
- Risk.

How the impacts and effects are assessed is strongly influenced by the status of the other activities (e.g. already in existence, approved or proposed) and how much data is available to characterise the magnitude of their impacts. Where possible specialists' recommendations and conclusions from similar developments were taken into consideration in the assessment of cumulative impacts, as reflected above and in more detail in each specialist study (Specialist Studies are included in *Annex D*).

It is important to keep in mind that there is uncertainty as to whether the above-mentioned developments will all come to fruition.

Figure 10.26 Known Developments in the Vicinity of the Proposed Saldanha Steel Development

10.16.3 Air Quality

Impact Description

The cumulative effect of the proposed Project and other possible future development projects has been considered, taking into account the uncertainty of such projects. Future projects may include but not be limited to i) 1000 - 1500 MW LNG power plant in the vicinity of the IDZ, ii) LNG import and storage facilities, iii) a chlorine, caustic soda and hydrochloric acid plant in the Vredenberg Industrial Development, and iv) a cement manufacturing plant to the east of the IDZ.

Of these plants, emissions of CO and NO_X, i.e. those pollutants assessed for the ArcelorMittal CCGT, will occur from the power plant as a result of LNG combustion and from the cement manufacturing plant as a result of fuel combustion and heat generated in the kiln. For the cement plant, the predicted incremental NO_2 concentrations were very low, while CO was not assessed (Aurecon, 2013). For the power plant using LNG and Best Available Technology for power generation, the NO_X and CO emissions are also expected to be very low.

Impact Assessment

Given the findings of this impact assessment (the ArcelorMittal CCGT), that of the cement plant (Aurecon, 2013), and the understanding of emissions from LNG power plants generically, it is deemed unlikely that the cumulative effect will exceed the NAAQS for CO and NO_2 in Saldanha Bay.

With a low magnitude expected for NO_2 and CO concentrations resulting from emissions of the proposed Project in combination with the potential projects considered, together with a low sensitivity, the significance is predicted to be **minor** or **negligible**.

Proposed mitigation/ enhancement

No additional mitigations are proposed, other than those indicated in Section 10.3.

Residual impacts

No additional mitigation measures are proposed. The impact will remain **Minor.**

Table 10.55 Pre- and Post- Mitigation Significance for the Air Quality Cumulative Impact

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Air Quality	Cumulative Impact	Minor (-ve)	Minor (-ve)

A summary for the impact is presented in the following table.

Table 10.56 Pre- and Post- Mitigation Significance for the Air Quality Cumulative Impact

Nature and Type: Direct negative. The cumulative impacts are a direct consequence of emissions of pollutants into the atmosphere resulting from fuel combustion at the respective facilities. The impacts manifest as ambient concentrations of the respective pollutants with risks of exposure through inhalation.

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Low. The scale of the cumulative impact is related to whether the ambient concentrations of the pollutants are likely to exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. For NO_2 and CO, the cumulative ambient concentrations are likely to be well below the respective NAAQS and the scale of the impact is scored low.
- **Reversibility:** Low/Medium.
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR NEGATIVE

10.16.4 Climate Change

Impact Description

In the context of the Project's climate change impacts (i.e. GHG emissions), cumulative impacts can be considered as the combined impacts that result from the emission of GHGs from this development together with other existing and planned developments. Cumulatively, GHG emissions from developments and human activities across the globe are contributing to global climate change, which impacts ecosystems and communities across the globe in complex and varied ways. Whilst it is beyond the scope of this study to address global climate change impacts, cumulative impacts can be considered in the context of the combined effect of developments at a national level, and implications on South Africa's climate change mitigation commitments.

The cumulative impact with respect to GHG emissions from this Project and other developments in South Africa, and implications with respect to South Africa's GHG mitigation commitments, are addressed in Section 2.4.2 of the Specialist Report (included in *Annex D*). The analysis is based on assessing the alignment between the power sector generation plans in the IRP 2010-2030 (2011) and the Peak, Plateau, Decline (PPD) trajectory that forms the basis of South Africa's climate change mitigation commitments, assuming that this development forms part of the 3 126 MW of additional gas-based energy generation capacity provided for in the IRP 2010-2030 (2011) and that

electricity generation and proposed power projects will be aligned to the IRP and not exceed it.

DEA's Mitigation Potential Analysis study conducted in 2014 illustrated that, based on the IRP's projections for the energy sector and considering national mitigation potential, the PPD trajectory can only be tracked up to 2040 but after this point national GHG emissions exceed the boundaries depicted in the PPD. However, the study used the IRP 2010-2030 (2011) generation mix to estimate GHG emissions from the energy sector, and assumed that the generation mix would hold constant after 2030 until 2050. It is likely, however, that future updates of the IRP extending to later time periods will incorporate measures to help reduce emissions from the power sector, including the retirement of some of the existing coal-fired fleet and increased low carbon electricity generation. It should also be noted that an updated IRP is due to be promulgated, and will likely depict a different energy outlook on the basis of more up-to-date economic growth forecasts.

Detailed analysis will need to be undertaken on future iterations of the IRP that extend to later time periods in order to make a statement with respect to cumulative GHG impacts from this and other power sector developments, and alignment with South Africa's climate change policies and GHG mitigation commitments.

Impact Assessment

While the cumulative impact arising from additional GHG emissions from industries in the Vredenburg-Saldanha area is likely to get worse over the years, an overall National Climate Change Response Policy (NCCRP) has been developed to ensure the reduction of GHG emission to meet South Africa's GHG mitigation commitments. No additional mitigation measures are proposed other than those included in *Section 10.4*.

10.16.5 Noise

Impact Description

Ambient sound level is the cumulative effect of sound from sources both near and far, natural and man-made, with each sound being a complex mix of air pressure in different phases (with various interactions) with different spectral or transient character. As such the sounds we hear are generally the cumulative effect of numerous other sounds, with certain sounds dominating.

However, audibility does not necessary mean that there is a noise impact. In reality, sound sources only contribute significant levels to the soundscape if the levels are at least 3 dBA higher than the typical ambient sound levels. For an industrial activity or road traffic it requires the activity to be relative close to a receptor (depending on the character and magnitude of the noise source). If noise-generating activities are further than 2,000 – 4,000 m from a potential noise-sensitive receptor, the magnitude of noises levels are generally low,

decreasing the further the activities are located from the receptor(s) up to a point where they become inaudible at all times (when further than 10,000 m they should be inaudible for most industries). Therefore, to significantly contribute to the soundscape, or the cumulative sound level, activities should be located closer than 2,000 m.

At the closest receptor (NSD02 see *Figure 10.6*), the dominating sounds were due to noises from the house as well as natural sounds. Sounds of passing traffic (on the R27) and from the Saldanha Steel operation were audible at times but not dominant (definitely less than 3 dBA from the typical ambient sound levels).

These activities however are all further then 2,000 m from receptor NSD02, with the proposed Project being almost 4,000 m from NSD09. At NSD09 the dominant sound will be from the SALKOR and Namakwa Sands operations, less from the R27 with the proposed power plant being too far from NSD09 to cumulatively add any significant sound levels to the ambient levels at NSD09.

Considering the ambient sound levels (between 40 and 45 dBA) measured at NSD02 as well as the projected noise levels from the proposed power plant (around 37 dBA at peak), the potential cumulative noises levels from other industries in the area will even be less.

Impact Assessment

Based on the above, the significance of the cumulative increase in noise levels for the closest noise-sensitive receptors will be **Minor.**

Proposed mitigation/ enhancement

Mitigation as per *Section 10.5* should be adhered to.

Residual impacts

No additional mitigation measures are proposed. The impact will remain **Minor.**

Table 10.57 Pre- and Post- Mitigation Significance for the Noise Cumulative Impact

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Noise	Cumulative Impact	Minor (-ve)	Minor (-ve)

A summary for the impact is presented in the following table.

Table 10.58 Pre- and Post- Mitigation Significance for the Noise Cumulative Impact

Nature and Type: Direct negative.

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium - High

Impact Magnitude: Negligible. The cumulative addition will be low at NSD02 and NSD09 and insignificant to people located further from the activity.

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Low
- **Reversibility:** Low/Medium.
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR NEGATIVE

10.16.6 Flora

Impact Description

There are numerous proposed developments in the Saldanha – Vredenburg region, several of which will contribute to the overall cumulative impact on flora.

The primary construction phase impacts of these Projects are permanent loss of Saldanha Flats Strandveld, Langebaan Dune Strandveld, Saldanha Limestone Strandveld and Saldanha Granite Strandveld some of which are considered threatened/endangered, in addition much of the area is listed as a Critical Biodiversity Area in terms of the Saldanha Fine Scale Conservation Plan (Pence 2008). Future uncontrolled industrial development within the CBAs is likely to have an ongoing cumulative impact on flora.

Impact Assessment

The development would contribute to habitat loss through transformation and disturbance of vegetation. However this contribution would be minor when the extent of the development is considered together with the sensitivity of the vegetation on site i.e. previous farmed agricultural land. Sensitive areas along the pipeline route were also avoided. As such, the cumulative impact of this development is considered to have a minor significance without mitigation and a negligible significance if all proposed developments abide by the various mitigation measures prescribed by the respective specialists.

However, for other developments in the area, Biodiversity Off-sets have been required indicating a significant direct impact on the flora. While the direct impact of this development does not result in a cumulative impact that is unacceptable or significant, future industrial development as planned by the Saldanha Bay Municipality – see *Figure 2.1* showing future planned industrial corridor) may result in a significant cumulative impacts in the future.

Proposed mitigation/ enhancement

Mitigation as included in the Impact Assessment in *Section 10.6* should be adhered to. It is also strongly recommended that the appropriate regional and local authorities undertake a more strategic assessment to understand the cumulative impact of future industrial and other development on the sensitive biodiversity in the Vredenburg-Saldanha area. In this way the potential cumulative impacts can be identified and proactively managed at the appropriate planning level.

Residual impacts

The implementation of the above-mentioned mitigation measures will reduce the impact on Flora to **Minor.**

Table 10.59 Pre- and Post- Mitigation Significance for Cumulative Impact on Flora

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Flora	Cumulative Impact	Moderate (-ve)	Minor (-ve)

A summary for the impact is presented in the following table.

Table 10.60 Pre- and Post- Mitigation Significance for Cumulative Impact on Flora

Nature and Type: Direct negative. Loss of current levels of ecological connectivity and critical biodiversity areas; alien plant invasion in surrounding disturbed areas in combination with other proposed projects in the area.

Sensitivity/Vulnerability/Importance of Resource/Receptor: High

Impact Magnitude: Small

- **Extent:** Regional
- **Duration:** Permanent
- **Scale:** Medium to Large
- **Reversibility:** Low
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR NEGATIVE

10.16.7 Fauna

Impact Description

The main impacts on fauna from the Project are likely to result from noise and physical disturbance during the construction phase, but will be predominantly be local in nature and would thus not be of broader significance. The major impact from a cumulative perspective is the ongoing loss of landscape

corridors, which provide connectivity to fragmented faunal habitat and also allow for movement of wildlife when dispersing or under times of stress, such as droughts. Disturbance and vegetation clearing should therefore be kept to a minimum at all developments and, in order to prevent future loss of habitat, the invasion of alien plant species should be controlled on a regular basis.

The proposed development would, however, contribute to a relatively small disruption of habitat loss of fauna across the greater landscape, as the footprint is relatively low.

Impact Assessment

The cumulative impact of all development in the Vredenberg-Saldanha area and surrounds is likely to impact on fauna through increased habitat loss and fragmentation. Habitat fragmentation can result in the disruption of ecological corridors which aid in faunal dispersal, ensure ecosystem resilience, maintain population connectivity and provide refuge areas.

Provided the mitigation measures in the report are implemented, there would not be high impacts on a cumulative scale. As such, the cumulative impact of this development is considered to have a moderate significance without mitigation, and a minor significance if all proposed developments abide by the various mitigation measures prescribed by the respective specialists.

Proposed mitigation/ enhancement

Mitigation as included in the Impact Assessment in *Section 10.7* should be adhered to. It is also strongly recommended that the appropriate regional and local authorities undertake a more strategic assessment (e.g. integrated biodiversity and development management plan) to understand the cumulative impact of future industrial and other development on the sensitive biodiversity in the Vredenburg-Saldanha area. In this way the potential cumulative impacts can be identified and proactively managed at the appropriate planning level. Strategically, the Saldanha Bay authorities should maintain corridors of remnant natural vegetation in the landscape which new developments must avoid and which would provide for increased ecosystem resilience.

Residual impacts

The implementation of the above mentioned mitigation measures will reduce the impact on Fauna to **Minor.**

Table 10.61 Pre- and Post- Mitigation Significance for Cumulative Impact on Fauna

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Fauna	Cumulative Impact	Moderate (-ve)	Minor (-ve)

A summary for the impact is presented in the following table.

Table 10.62 Pre- and Post- Mitigation Significance for Cumulative Impact on Fauna

Nature and Type: Direct negative

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low - Medium

Impact Magnitude: Medium - High

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Medium to Large
- **Reversibility:** Low
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR NEGATIVE

10.16.8 Avifauna

Impact Description

The cumulative impact of planned development in the study area and surrounds is likely to impact on avifauna through increased habitat loss and disturbance as well a greater likelihood of injury or mortality by electrocutions or collisions on power infrastructure due to increased exposure.

Impact Assessment

The development would contribute to habitat loss through transformation and disturbance of avifauna and their habitats. However this contribution would be minor when the extent of the development is considered. As such, the cumulative impact of this development is considered to have a minor significance without mitigation and a negligible significance if all proposed developments abide by the various mitigation measures prescribed by the respective specialists.

The significance of the impact is rated as **Minor (-ve)**.

Proposed mitigation/ enhancement

Mitigation measures as per *Section 10.8* should be adhered to; in addition each development will impact on avifauna in a different way and as such, would require its own unique suite of mitigation measures. In order to ensure the cumulative impacts of the various developments do not exponentially impact on avifauna, it is imperative that each development in isolation abides by the prescribed mitigation measures set by the specialist working on the impact assessment.

Residual impacts

The implementation of the above mentioned mitigation measures will reduce the impact on Avifauna to negligible**.**

Table 10.63 Pre- and Post- Mitigation Significance for Cumulative Impact on Avifauna

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Avifauna	Cumulative Impact	Minor (-ve)	Negligible (-ve)

A summary for the impact presented below.

Table 10.64 Pre- and Post- Mitigation Significance for Cumulative Impact on Avifauna

Nature and Type: Direct negative

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Low/Medium

- **Extent:** Local
- **Duration:** Long Term
- **Scale:** Medium to Large
- **Reversibility:** Medium
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGIBLE NEGATIVE

Impact Description

The construction phase will require large amounts of material and equipment to be transported to the Project site. It is expected that the other projects in the area will use similar transport routes which will place pressure on the local road network especially during the construction phases of the projects.

As such there is increased potential for accidents and disruption to the road traffic network for local users associated with the increase in traffic movements from overlapping construction traffic.

As depicted in *Figure 10.27* the road infrastructure is planned to be expanded with dualling of links.The plan, developed by AECOM, shows the future dualling of the OP7644 and the planned interchange of the TR85/1 and the realigned OP7644. This project will provide additional network capacity in the study area.

The additional capacity provided by the new infrastructure is adequate to accommodate the future travel demands of the site and the surrounding development consisting of the immediate Vredenburg Industrial

Development (located between Namaqua Sands and Fossil Park). The other planned projects (as identified in *Section 10.16.2*) are more remote from the site and are unlikely to have any significant impact on the traffic in the immediate study area. The modal split of travel associated with the project is likely to produce a significant number of public transport trips and predominantly MBT and Bus patronage. This in itself is a travel demand measure that will enhance the sustainability index of the Project.

Impact Assessment

The cumulative impacts related to increased traffic in the Project area will be indirect and negative. The impact will be experienced at a local level, primarily within the Saldanha Bay area. The duration of the impact will be long term, as projects may occur in a phased manner, over an extended period of time. The scale of the impact will be small as the cumulative effects of the Project with the implementation of further projects in the Saldanha Bay IDZ were considered and were predicted to have no significant impact on the key intersections in the study area. The impact would be reversible. Given the above, the magnitude of the impact is considered small.

The vulnerability of receptors is considered **low** as the current traffic is fairly light and the planned infrastructure will be sufficiently robust to accommodate the additional traffic from the Project in combination with the background projects.

The significance of the impact is rated as **Negligible.**

Proposed mitigation/ enhancement

Mitigation as per *Section 10.9* should be adhered to.

Residual impacts

No additional mitigation measures are proposed. The impact will remain **Negligible.**

Table 10.65 Pre- and Post- Mitigation Significance for the Traffic Cumulative Impact

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Traffic	Cumulative Impact	Negligible	Negligible

A summary for the impact is presented in the following table.

Table 10.66 Pre- and Post- Mitigation Significance for the Traffic Cumulative Impact

Nature and Type: Indirect negative.

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Small

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Small
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGIBLE

Figure 10.27 Saldanha Municipal Area Proposed Road Network Improvements

10.16.9 Socio-economic

The cumulative impact of the proposed Project in combination with the projects identified in *Section 10.16.1* above may impact on the following:

- Economy, Employment and Skills Development
- Community Health, Safety and Security
- Pressure on Social Infrastructure and Services

Economy, Employment and Skills Development

Impact Description

The development of large scale industrial projects will result in increased direct and indirect employment during the construction and operation of each of the projects. The nature and extent of the benefits will depend on the employment strategy of the various developers and the extent to which they are committed to maximise local employment.

There may be overlap between the construction phases of the Project with the other developments, or they may run consecutively. Either way, this will result in a significant uplift in local employment directly and indirectly through the procurement of goods and services. Furthermore, those that have been employed by one of the developers may be in a better position to find employment with the other developers as they will have increased their skills level and experience. As such, the potential during construction for cumulative positive benefits associated with economy, employment and skills development is considered to be higher than for the Project alone.

The operation of the developments outlined will occur over the same period of time and will be located in close proximity. As such the economic, employment and skills development opportunities outlined will be greater for all the projects combined than just for the Project development.

It should be noted that expectations regarding economic development, employment and skills development will be high amongst stakeholders in the local community and as such, in the event that one developer does not meet expectations, there is the potential for all developers to be the target of this negative feedback.

Impact Assessment

The cumulative creation of local employment opportunities, skills enhancement and local business opportunities will result in direct, indirect and induced impacts. The duration will be medium to long-term, as the projects will not all happen concurrently. Employment will be created for South Africans at a local and regional level depending on skills requirements of each project, and consequently the extent will be regional. For those who are able to secure employment on the projects, the scale will be medium to

high, depending on the duration of the contract. The magnitude of the impact will be positive.

Given the capacity of the local workforce to fill unskilled and semi-skilled employment positions, together with the opportunity to increase skills and work experience, the vulnerability is medium.

The significance of the impact is rated as **Moderate (+ve)**.

Proposed mitigation/ enhancement

It is recommended the Project investigates opportunities to work with other developers to formulate a collaborative approach to training, employment and skills development for the local population, starting in the run up to Project construction. This may include developing a coordinated standard set of requirements for service providers (e.g. required labour numbers of carpenters, welders, heavy goods vehicle drivers, etc. and the minimum qualifications required for these) and making the communities aware of these requirements. The developers should also plan and implement a coordinated approach to community skills development based on these requirements.

Residual impacts

The implementation of the above-mentioned mitigation measures will ensure that the positive impact on the Economy, Employment and Skills Development remains **moderate positive.**

Table 10.67 ***Pre- and Post- Mitigation Significance for Economy, Employment and Skills Development Cumulative Impact***

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Economy, Employment and Skills Development	Cumulative Impact	Moderate (+ve)	Moderate (+ve)

A summary for the impact is presented in the following table.

Table 10.68 Pre- and Post- Mitigation Significance for Economy, Employment and Skills Development Cumulative Impact

Nature and Type: Indirect positive impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Positive

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Medium to Large
- **Reversibility:** N/A
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE POSITIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE POSITIVE.

Community Health, Safety and Security

Impact Description

The presence of an external workforce for the combined projects housed within the communities and construction camps could increase the spread of communicable diseases and STIs such as HIV/AIDS. The profile of these diseases will be influenced by the existing health profile of communities within the area of influence of the project and that of the workers, which is difficult to predict for the various projects.

Increased air emissions as a result of the Project and another power plants, as well as additional risks of industrial accidents and explosions could result in cumulative impacts on community health and safety. However, according to the Air Quality Report (*Annex D* of the EIR), the cumulative impact on air quality is expected to be minor and the cumulative risks associated with the Project are acceptable.

While the Project alone is not expected to attract vast numbers of jobseekers to the area, the development of multiple projects is likely to attract people seeking employment opportunities, particularly in light of a declining agricultural sector in the West Coast District Municipality, and given that Saldanha Bay is already seen as an economic hub. An influx of jobseekers will result in increased competition for employment which may contribute locally to social tension and conflict within the local communities.

Impact Assessment

The impacts related to community health and safety in the Project area will be indirect and negative. The impact will be experienced at a local level, within the Saldanha Bay area. The duration of the impact will be long term, as projects may occur in a phased manner, over an extended period of time. The

scale of the impact will be large for those affected as it will lead to a fundamental change in their life, and/ or health status, particularly for those affected by violence, unwanted pregnancies or HIV/ AIDS. For those affected, the impact will be largely irreversible. Given the above, the magnitude of the impact is considered medium.

In light of this, the vulnerability of receptors is considered medium. However, teenage girls are considered to be highly sensitive to this impact.

The significance of the impact is rated as **Moderate negative** overall, but the significance will be of **high** negative rating to those affected by unwanted pregnancies and HIV/ AIDS.

Proposed mitigation/ enhancement

- The Project should engage with other developers to ensure that community education and awareness campaigns in relation to health, safety and security are developed and implemented collaboratively to avoid duplication of effort.

- The Saldanha Bay Local Municipality should develop combined emergency response plans which take into account all the proposed developments and the community. This should consider combined risks from unplanned events.

Residual impacts

The implementation of the above mitigation measures would ensure that the impact significance remains that of **Moderate,** since the Project cannot influence the behaviours on the workforce associated with other projects, or that of jobseekers.

A summary for the cumulative impact is presented in the following table.

Table 10.69 ***Pre- and Post- Mitigation Significance for Community Health and Safety Cumulative Impact***

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts Associated with the Presence of a Workforce	Cumulative Impact	Moderate (-ve)	Moderate (-ve)

Table 10.70 Pre- and Post- Mitigation Significance for Community Health and Safety Cumulative Impact

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Large
- **Reversibility:** Irreversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE

Pressure on Social Infrastructure and Services

Impact Description

Related to the above, the influx of jobseekers together with presence of the workforce associated with each project could place additional pressure on the delivery of social infrastructure and services, in particular housing. This is largely related to the unskilled workforce, as it is expected that the skilled and semi-skilled workforce would be able to enter the housing market.

Projects that bring a large external unskilled workforce into the area and do not provide accommodation will be increasing the burden on the provision of low cost housing. The Saldanha Bay Local Municipality is faced with a housing backlog, and healthcare facilities are under pressure.

Impact Assessment

The impacts related to increased pressure on existing social infrastructure and services will be indirect. The impacts will be negative as they will place pressure on infrastructure and services and the local government, who will have to provide the services as demand grows.

The impact will be experienced at a local level, within the Saldanha Bay area. The impacts will be long-term as the provision of social infrastructure and services may take time to catch-up with the increased demand. The scale of the impact will be medium, as it will notable but will not dominate over existing conditions. The impact is revisable as social infrastructure and services can be improved to address the impact. Given the information presented above, the impact will be medium in magnitude.

The population within the SBLM has been increasing at a rate greater than expected which has been attributed to the in-migration of people seeking

economic opportunities, resulting in the existing housing backlog and pressured health services. Therefore, the vulnerability of receptors is considered medium.

The factors described above result in the significance of the impact being rated as **Moderate negative.**

Proposed mitigation/ enhancement

Mitigation measures implemented by the Project, particularly a commitment to employing local labour, will help to minimise this impact. However, the potential impact on social infrastructure and services remains that of moderate, as the Project cannot influence how other developments employ or house their workforce.

Residual Impact

The impact significance remains of **Moderate** significance. A summary for the impact is presented in the tables below.

Table 10.71 ***Pre- and Post- Mitigation Significance for Cumulative Impacts Associated with Pressure on Social Infrastructure and Services***

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Pressure on Social Infrastructure and Services	Cumulative	Moderate (-ve)	Moderate (-ve)

Table 10.72 ***Pre- and Post- Mitigation Significance for Cumulative Impacts Associated Pressure on Social Infrastructure and Services***

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Medium
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE

10.16.10 Cultural Heritage

Impact on Archaeological Resources

Impact Description

Each development within the greater Saldanha Bay area, irrespective of the nature of the project, will to some extent involve site clearance and the excavation of foundations. Such construction activities have the potential to destroy or damage archaeological resources, particularly sub-surface artefacts and remains.

The greater Saldanha Bay area is one of the best studied yet least significant tracts of landscape in the Western Cape in archaeological terms.

Previous archaeological impact assessments undertaken in the surrounding area were consulted and the following conclusions were made:

- Hart & Pether (2008) rate impacts of the Salkor Yard Expansion, the railway line and powerlines as of low scale, high confidence, and that the significance (with or without mitigation) is "Not Significant";
- Halkett (2011) with respect to the AFRISAM cement project does not provide any impact ratings but did not expect any significant impacts;
- Orton (2011) with respect the proposed Isivunguvungu Wind Farm described the probability of finding archaeological sites as "improbable", the significance as "very low" and commented that "No assessments in the immediate vicinity has yielded significant archaeology and none is present on this site. Cumulative Impacts are thus insignificant";
- Orton (2011) with respect to the proposed pipe yard in the Iron Ore terminal noted that no significant archaeological resources were expected on the development site (improbable), and the significance was expected to be very low.
- Kruger (2013) with respect to the Saldanha Separation Plant rated the archaeological remains as having low significance, and that impacts would be negligible.

Further, archaeologists who have conducted research in this specific area of the Saldanha IDZ, have expressed a high degree of confidence that the likelihood of finding significant remains was extremely low, and the cumulative impacts have therefore been assessed as "insignificant".

Impact Assessment

The cumulative impacts on archaeological resources will be direct and negative. The duration will be permanent as it relates to the loss of heritage resources. The extent of the impact will be local, limited to the greater Saldanha Bay area. The scale of the impact will be medium. The impact is considered irreversible. The frequency of the impact will vary depending on construction activities, but it is anticipated that it would be rare given the

nature of the baseline. Based on the above factors, the magnitude of the impact is considered low.

The vulnerability of receptors is considered low as the area is considered one of the least significant tracts of landscape in the Western Cape in archaeological terms.

Therefore it is anticipated that the significance of cumulative impacts will be **Negligible.**

Proposed mitigation/ enhancement

From a cumulative impact perspective, no mitigation is required, with the exception of the standard chance find protocol to consider the possibility of buried archaeology and/or human remains.

Residual Impacts

The impact significance remains Negligible. A summary for the impact is presented in the tables below.

Table 10.73 Pre- and Post- Mitigation Significance for Cumulative Impacts on Archaeological Resources

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on Archaeological Resources	Cumulative	Negligible (-ve)	Negligible (-ve)

Table 10.74 Pre- and Post- Mitigation Significance for Cumulative Impact on Archaeological Resources

Nature and Type: Direct negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Small

- **Extent:** Local
- **Duration:** Permanent
- **Scale:** Medium
- **Frequency:** Rare
- **Reversibility:** Irreversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGIBLE NEGATIVE

Impact on Paleontological Resources

Palaeontological materials are likely to be destroyed by bulk earthworks. However palaeontological resources tend to be extensive (depending on the resource) and are rather more resistant to impact than archaeological material for the simple reason that there is more of it. Because palaeontological material is often very deeply buried, scientists often rely on human intervention in the land surface to collect data. Aside from natural exposures, open cast mines, quarries and deep road cuttings often present the only opportunities for palaeontologists to examine deep sediments which under normal circumstances they may not have access to.

Hart & Pether (2008) note that the palaeontological sequence of the Saldanha – Langebaan area is therefore well described. Numerous palaeontological impact assessment reports have been produced over the last two decades (see included in Paleontological Impact Assessment, *Annex D*). The reports are unanimous in noting the significance of the palaeontological resources. However, the distribution of resources is patchy and unpredictable and the resources have never been found to be a fatal flaw in development.

Impact Assessment

Cumulative impacts on buried palaeontological material will be direct and negative. The duration will be permanent as it relates to the loss of palaeontological resources. The extent of the impact will be local to the greater Saldanha Bay area. The scale of the impact will be large. The impact is considered irreversible. The frequency of the impact will vary depending on construction activities, but it anticipated that it would be rare given the nature of the baseline. Based on the above factors, the magnitude of the impact is considered small.

The vulnerability of receptors is considered low, provided that palaeontologists can use the opportunity arising from major construction works to adequately sample and record profiles and exposed material as part of the environmental management process. In this way, a potential negative impact can be transformed into a positive opportunity to increase the levels of knowledge about a locality and its past environments.

Therefore it is anticipated that the significance of the impact will be **Negligible.**

Proposed mitigation/ enhancement

From a cumulative impact perspective, no mitigation is required, with the exception of the standard chance find protocol to consider the possibility of buried palaeontological resources.

Residual Impacts

The impact significance remains of Negligible. A summary for the impact is presented in the tables below.

Table 10.75 Pre- and Post- Mitigation Significance for Cumulative Impacts on Palaeontological Resources Cumulative Impact

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on Palaeontological Resources	Cumulative	Negligible (-ve)	Negligible (-ve)

Table 10.76 Pre- and Post- Mitigation Significance for Cumulative Impact on Palaeontological Resources

Nature and Type: Direct negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Small

- **Extent:** Local
- **Duration:** Permanent
- **Scale:** Medium
- **Frequency:** Rare
- **Reversibility:** Irreversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGIBLE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGIBLE

10.16.11 Risk

Impact Description

In consideration of the cumulative risk affects associated with the Project in combination with the proposed/future projects identified in *Section 10.16.2* ERM has reviewed the risk assessments undertaken for the Sunrise and Avedia LPG facilities, as well as the Chlor-Alkali Facility, located within the Vredenberg Industrial Development (see *Figure 10.26*). These are discussed in more detail below.

Sunrise LPG Facility
A QRA for Sunrise was carried out by Riscom in October 2012. The assessment indicates the following hazardous substance stored on site:

- 15 x 2 495 m^3 Liquefied Petroleum Gas (LPG) Vessels (stored at Phase 2 of project).

From a review of the Sunrise LPG QRA, it was found that individual risk of fatality contours from incidents at the Sunrise site would overlap those of the proposed Project's Natural Gas pipelines and the two LPG/propane developments. From observation, the maximum overlap for individual risk of fatality is approximately 1×10^{-6}. This risk level does not however reach the power plant site and therefore does not accumulate with the risk of the Propane facilities. The risk from the Saldanha Steel Natural Gas pipelines is in the order of magnitude of 1×10^{-6} to 1×10^{-5}. Therefore the addition of 1×10^{-6} from the Sunrise LPG facility will not escalate the risk a further order of magnitude to 1×10^{-4}, making the resulting risk level below that which would be considered intolerable according to the criteria shown in *Section 10.15*.

It must be noted that this analysis is purely based on observation of the Riscom report supplied. Technical methodologies and assumptions made as part of the QRAs may differ between Riscom and ERM. This has the potential to make the actual cumulative risk results generated by the two companies' QRAs differ slightly.

Avedia LPG Facility
A QRA for Avedia was carried out by MHR Consultants in July2013. The assessment indicates the following hazardous substance stored on site:

- 32 x 500 m^3 Liquefied Petroleum Gas (LPG) Vessels.

From a review of the Avedia LPG QRA, it was found that individual risk of fatality contours from incidents at the Avedia site would not overlap any contours from the proposed Project's Natural Gas pipelines and the two LPG/propane developments. Therefore no cumulative risk affects are relevant from the Avedia LPG facility. Once again it must be noted that this analysis is purely based on interrogation of the MHR Consultants report supplied.

Chlor-Alkali Facility
A QRA for the Chlor-Alkali Facility was carried out by ISHECON in September 2014. The assessment indicates the following hazardous substances stored on site:

- 3 x 500 ton Chlorine Vessels;
- 60 x 1 ton Chlorine Vessels;
- 400 x 0.07 ton Cylinders;
- 150 tons Sodium Hypo-chlorite;
- 4 000 tons Hydrochloric acid (31%);
- 25 tons Sulphuric acid (98%);
- 30 tons Sulphuric acid (70%); and
- 170 tons Liquefied Petroleum Gas (LPG).

From a review of the Chlor-Alki QRA, it was found that individual risk of fatality contours from incidents at the Chlor-Alki site would overlap those of the proposed Project's Natural Gas pipelines and the two LPG/propane developments. From observation, the maximum overlap for individual risk of

fatality is approximately 1 x 10^{-9}. This risk level is significantly lower than the risk levels from the proposed Project's Natural Gas pipelines and the two LPG/propane developments. The cumulative risk will therefore not materially increase above those from the proposed Project's Natural Gas pipelines and the two LPG/propane developments.

It must again be noted that this analysis is purely based on observation of the ISHECON report supplied. Technical methodologies and assumptions made as part of the QRAs may differ between ISHECON and ERM. This has the potential to make the actual cumulative risk results generated by the two companies' QRAs differ slightly.

Impact Assessment

The largest contributor to cumulative risk with the proposed Project's Natural Gas pipelines and the two LPG/propane developments is that of the Sunrise LPG facility. The cumulative risk of all the sites discussed above in the vicinity of the proposed Project's Natural Gas pipelines and the two LPG/propane developments is not expected to exceed 1 x 10^{-4}, making the resulting risk level below that which would be considered intolerable according to the criteria shown in *Section 10.15*.

10.16.12 Conclusion

The cumulative impacts on environmental and social receptors have been assessed by each specialist based on publicly available information relating to existing and planned developments in the Vredenburg-Saldanha Area. The significance of the cumulative impacts has been considered in the need and desirability of the Project (refer to *Chapter 2*).

The findings of the specialist show that the cumulative impacts for the Project will be acceptable, with most of the impacts being of **minor** significance, with some being of **moderate** significance.

Based on the outcome of the above cumulative assessment, and taking into consideration the mitigation measures proposed by the specialists, ERM is of the opinion that the proposed Project and associated pipeline should be authorised, contingent on the mitigations and monitoring for potential environmental and socio-economic impacts as outlined in the EIA Report and EMPr being implemented.

11 ENVIRONMENTAL MANAGEMENT PROGRAMME

This Environmental Management Programme (EMPr) is included in the Final EIR, dated 19 October 2016.

11.1 OVERVIEW

ArcelorMittal, the Project Applicant, has appointed Environmental Resources Management (Pty) Ltd (hereafter ERM) to prepare the Environmental Management Programme (EMPr) for the development of a proposed 1507 MW gas fired power plant. The Project is to be developed on a green field site owned by ArcelorMittal within the IDZ of Saldanha Port. The site is located less than 1 km to the east of the existing ArcelorMittal Saldanha Steel, immediately adjacent to the Blouwater substation.

The aim of the EMPr is to provide a set of guidelines and actions aimed at addressing potential environmental risks and impacts associated with the construction, operation and decommissioning phases of the project, and will be included in contract documentation between the Project Company and its contractors. The EMPr also provides assurance to regulators and stakeholders that their requirements with respect to environmental and socio-economic performance will be met, and provides a framework for compliance auditing and inspection programs. It becomes a legally binding document on the environmental authorisation of the Project.

11.2 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

ERM was appointed by the Project Company as the Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment and application for environmental authorisation for the proposed CCGT gas fired power plant. ERM and the specialists appointed by ERM have no financial ties to nor are they a subsidiary, legally or financially, of the Project Company. Remuneration for the services by the Project Company in relation to the EIA and EMPr is not linked to approval by any decision-making authority and ERM has no secondary or downstream interest in the development.

ERM is a leading global provider of environmental, health, safety, risk, social consulting, and sustainability services. ERM has over 150 offices in more than 40 countries and territories with a staff complement in excess of 5,000 people. ERM is committed to providing a consistent, professional, quality service that creates value for our clients in the mining, oil and gas, power, manufacturing, chemical and pharmaceutical, ports and infrastructure sectors. Over the past three years we have worked for more than 50 percent of the Global Fortune 500 companies delivering innovative solutions for business and selected

government clients, helping them understand and manage the sustainability challenges they face.

ERM has been involved in projects across every country in Africa for over 36 years, and in 2003 established a permanent presence in Sub-Saharan Africa to meet the growing needs of our clients. ERM is one of the largest sustainability consulting firms in the region with offices in Kenya (Nairobi), Mozambique (Maputo) and South Africa (Cape Town, Durban and Johannesburg). With over 180 dedicated staff involved in environmental and social projects throughout the continent, ERM offers clients effective, cost-conscious solutions using experienced local and global expertise.

Details of the EAPs are provided in *Table 11.1* below.

Table 11.1 Details of Environmental Assessment Practitioners

Name	Stuart Heather-Clark
Responsibility	Partner in Charge
Qualification	MPhil Environmental Science and BSc Civil Engineering
Professional registration	Certified EAPSA
Experience in years	18
Experience	Experience in EIA in South Africa and various African countries.

Name	Stephan Van Den Berg
Responsibility	Project Manager
Qualification	BSc (Hons)
Experience in years	9 years
Experience	Experience in EIA in South Africa and various African countries.

11.3 PROJECT DESCRIPTION

A detailed project description can be found in Chapter 3 of the EIR.

11.3.1 Project Background

The International Power Consortium South Africa (IPCSA), have developed a solution to ArcelorMittal Saldanha Steel's requirement for stable, economical electricity over the long term. The solution will supply baseload power and cater for a peaking demand up to 250MW and consists of a 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site (1). This will ensure the medium to long term sustainability of ArcelorMittal's Saldanha Steel as well as the surrounding economy it operates in.

(1)In order for the solution to achieve the economy of scale required to allow for cost effective gas importation, it is designed as a 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the Bankable Feasibility Study (BFS) completion.

The Project is primarily a power supply project to the Saldanha Steel Plant. Additionally, the proposed power plant will tie into the Department of Energy's (DoE) Gas to Power (G2P) programme [(1)]. The project will support Liquefied Natural Gas (LNG) as its main fuel. LNG will be supplied by ship to the Port of Saldanha, where it will be regasified and then offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha. Initial discussions have been held with Transnet National Ports Authority (TNPA) in Saldanha in this regard.

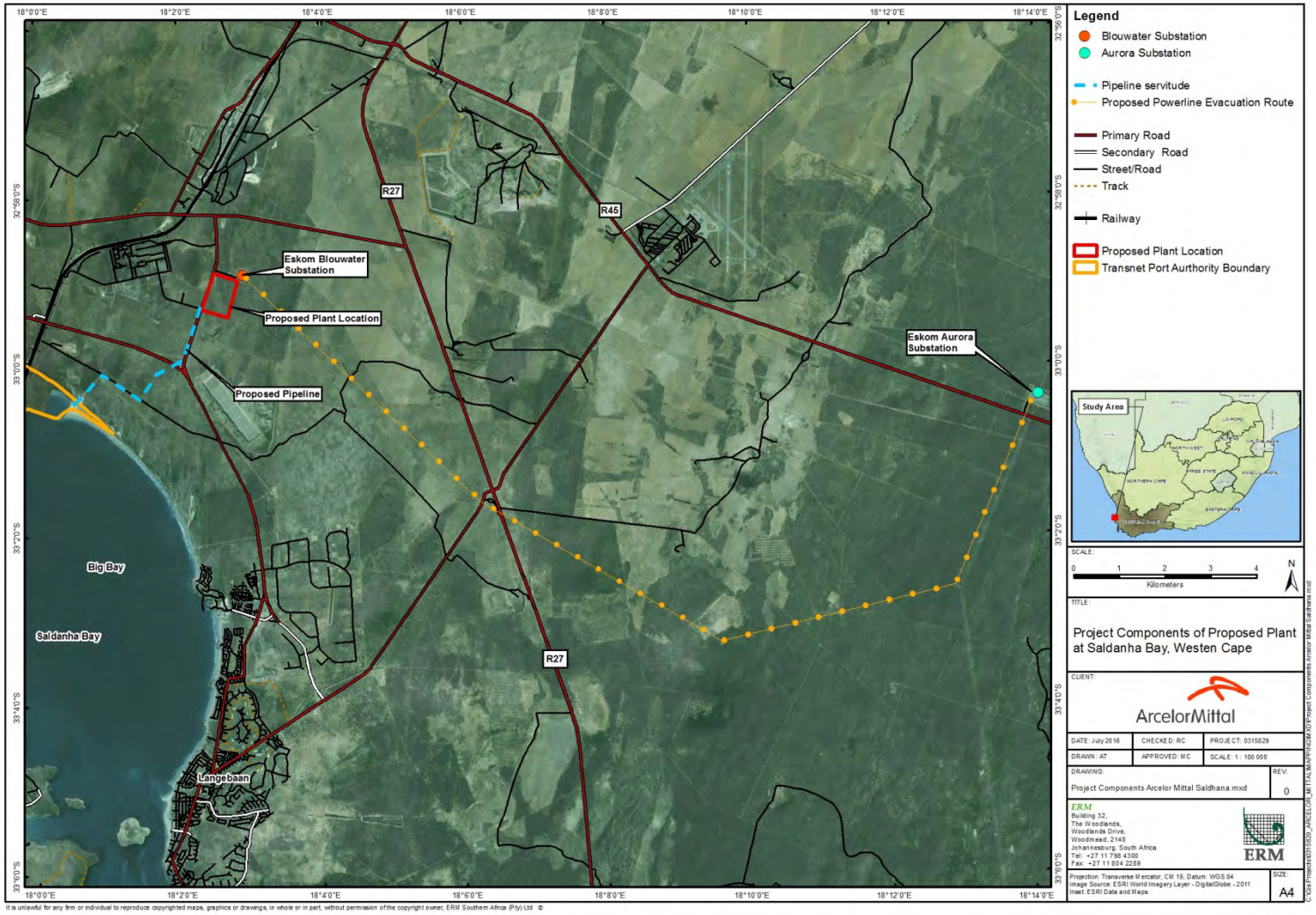
The Project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160 MW of base load energy, peaking up to 250 MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

11.3.2 Project Location

The Project is to be developed on a green field site owned by ArcelorMittal, approximately 5 km northeast of the Port of Saldanha (*Figure 11.1*). The site is located less than 1 km to the east of the existing ArcelorMittal Steelworks, immediately adjacent to the Blouwater substation. The site is located within an area identified for industrial development according the Saldanha Bay Municipal Spatial Development Framework (2011).

(1) In 2012, the Minister directed in her Determinations that new generation capacity should be procured from hydro, coal and gas sources to support the South Africa's base load energy mix and generation from gas and cogeneration as part of the medium-term risk mitigation project programme. The Determinations require that 3126MW of baseload and/or mid-merit energy generation capacity is needed from gas-fired power generation to contribute towards energy security. The gas required for such power generation will be from both imported and domestic gas resources. (https://www.ipp-gas.co.za/)

*Figure 11.1 Project location and key components**



*Note: 400kV transmission line is shown only for illustration purposes and is not included in the scope of this EIA.

11.3.3 Land Ownership and Acquisition

The two properties on which the proposed power plant site is located are detailed in *Table 11.2.*

Table 11.2 Properties which are intersected by the power plant footprint

Farm Name	Portion Number	Parcel Number	SG Code
Yzervarkensrug	129	Remaining Extent	W014C04600000000012900000
Jackels kloof	195	2	W014C04600000000019500002

The proposed pipeline corridor intersects with the properties as listed in *Table* 11.3.

Table 11.3 Properties which are intersected by the pipeline corridor

Farm Name	Portion Number	Parcel Number	SG Code
None	0	1185	W014C04600000000001185000000
STATE LAND 196	0	196	W014C04600000000000196000000
HOPEFIELD 195	195	0	W014C04600000000000195000001
HOPEFIELD 195	7	195	W014C04600000000000195000070
HOPEFIELD 195	1	195	W014C04600000000000195000010
HOPEFIELD 195	2	195	W014C04600000000000195000020
None	0	1132	W014C04600000000001132000000
YZERVARKENSRUG 129	0	129	W014C04600000000000129000001

11.3.4 Project Components

The key project components considered in this EIA are as follows:

- Pipeline;
- Power plant; and
- Power evacuation and connection to the grid (1).

These are discussed in detail in the sections below. The general surface areas for the project components are listed in *Table 11.4* below.

Table 11.4 Project components general surface areas and lengths

Project Component	Area / Length
Power Plant total surface area	45.83 ha
Length of pipeline	4.6km
Pipeline construction (temporary) RoW (36m width)	30.49 ha
Pipeline permanent easement (6m width)	2.76 ha

(1) Note: The transmission connection for Phase 1, i.e. the 132 kV connection to Saldanha Steel, is included in this EIA. The transmission connection for Phase 2, i.e. the 400 KV connection to Eskom's Aurora substation, will be considered in a separate EIA application. See Section 3.4 for details about the phases referred to here.

Project Component	Area / Length
132kV feeder transmission line to ArcelorMittal length	2.4km
132kV feeder transmission line to ArcelorMittal RoW (30m width)	7.22 ha
Proximity to grid connection	150m

It is envisaged that LNG will be supplied by ship to the Port of Saldanha where it will likely be offloaded to a Floating Storage Regasification Unit (FSRU). The FSRU will regasify the LNG and pump it via a pipeline to the power plant. The supply of fuel and import facilities have not been considered in this EIA. The Department of Energy initiated a project in 2015 to permit the construction of an LNG import terminal at the Port of Saldanha, it was understood that individual developers were not required to undertake the EIA for this component. Should this information change, a separate EIA for the import of gas will be undertaken.

Power Plant

Figure 11.2 shows the proposed plant layout. Current plans include:

- six Trent 60 DLE (low NOx) 50 MW turbines in open cycle; and
- three identical but independent 435 MW SCC5 4000F single shaft generating trains in combined cycle.

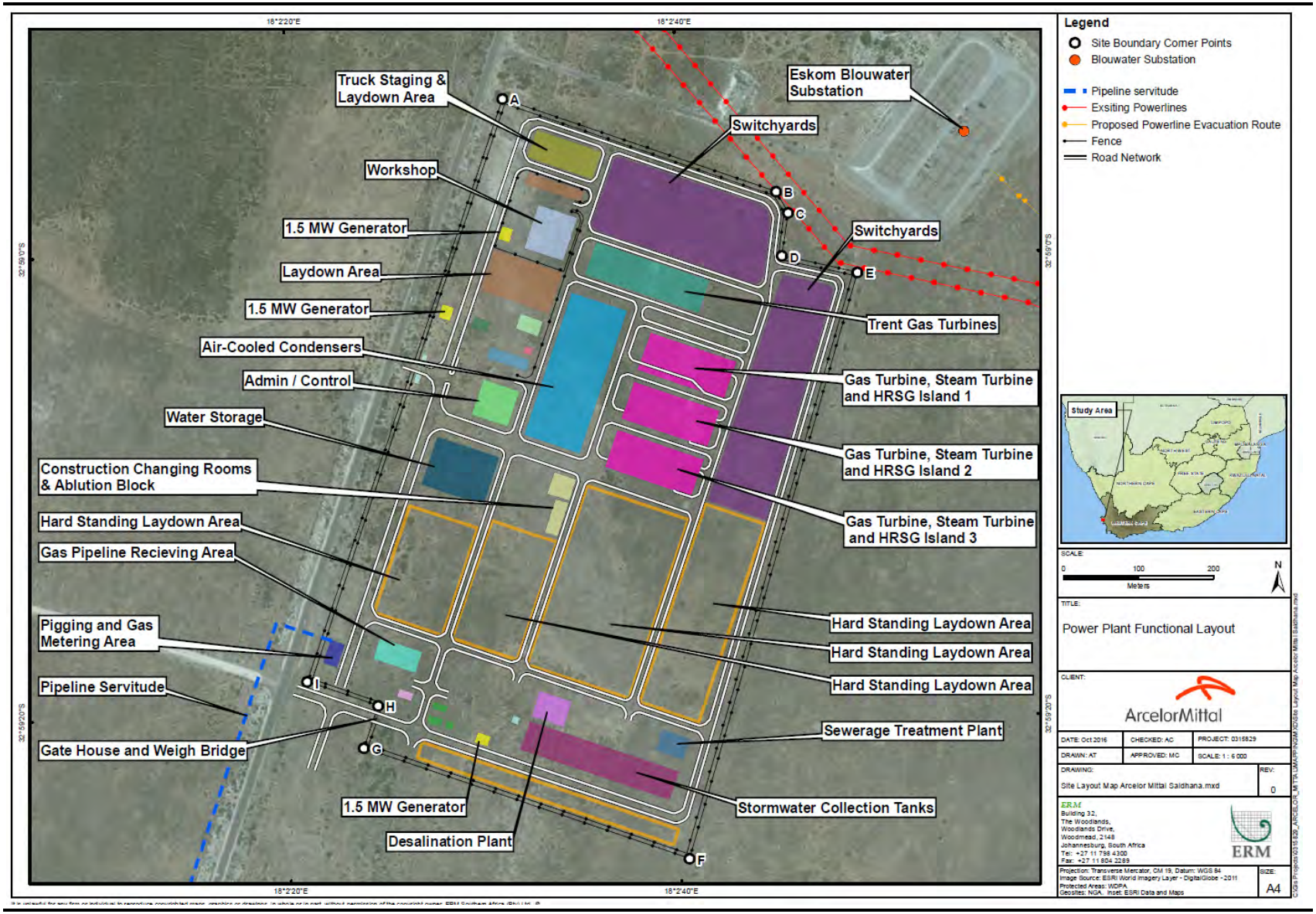
Other infrastructure on site is reflected in *Table 11.5.*

Table 11.5 Power Plant components and their respective footprint areas / lengths

Project Component	Area
1.5 MW Generator	0.09 ha
132KV Switchyard	2.4 ha
440KV Switchyard	2.48 ha
Admin, Control, Laboratory	0.25 ha
Air-Cooled Condensers	1.56 ha
Canteen, Changing Rooms, Ablutions	0.09 ha
Clinic	0.01 ha
Construction Changing Rooms & Ablution Block	0.18 ha
Emergency Assembly Point	0.04 ha
Gas Pipeline Receiving Area	0.18 ha
Gas Turbine, Steam Turbine and HRSG Island 1	1.89 ha

Project Component	Area
Hard Standing Laydown Area	9.64 ha
Laydown Area	0.69 ha
Other miscellaneous infrastructure	0.03 ha
Pigging and Gas Metering Area	0.07 ha
Reverse Osmosis, MSFD, Salt Residue	0.05 ha
Sewerage Treatment Plant	0.12 ha
Stormwater Collection Tanks	1.2 ha
Trent Gas Turbines	0.73 ha
Truck Staging & Laydown Area	0.36 ha
Visitors and Training Centre	0.07 ha
Water Filtration	0.02 ha
Water Treatment, Raw Water Storage, Fire Fighting Water	0.59 ha
Workshop Warehouse and Spares	0.33 ha
Road surface area (total)	6.9ha
Propane storage vessels	3
Propane storage volume on site (total)	30 m^2
Height of stacks	60m (max)
Capacity of on-site substation	132 KV substation for phase 1 400 KV substation for Phase 2
Type of perimeter fencing	ClearVu Reinforced
Perimeter fence length	2.8km
Perimeter fence height	3 m

Figure 11.2 Power plant functional layout



Access routes and roads

The Project has accounted for certain road works, described below, deemed necessary for safety and compliance with regional legislative requirements. Permissions have not yet been sought for the proposed road works, the costs of which will be borne by the project and executed according to local Council and/or Department of Roads and Traffic and/or Committee of Transport Officials (COTO) regulations, requirements and guidelines; in particular Road Infrastructure Strategic Framework for South Africa (RISFSA) of the South African Department of Transport (DOT, 2006)

All of the approximately 6,900 m of road access on the 45.83 ha site will be concrete- paved. The total area of roads is 5.59 ha which represents approximately 12.4 percent of the fenced-in site area. Most roads are 8m width and others 12m. The 12 m concrete-paved roads will be constructed early after commencement of construction works and will serve to carry heavy load traffic (mobile cranes, multi axle heavy equipment trailers, cement delivery trucks, etc.) during the early stages of construction.

All concreted roads will play an important role for rainwater harvesting, in addition to the concreted lay-down areas. The site's natural slope is towards the south where the raw water storage tanks will be situated. The east-west thoroughfares ('streets') will channel rainwater into the rain-water drains of the north-south thoroughfares ('avenues'). Rainwater will run southwards to the bulk water storage tanks.

Approach to the Power Plant

For road safety considerations and in light of the increased traffic (particularly during construction phase) the provincial road leading past the two power plant entrances will be widened from 11 m to a 20 m wide over-taking 4- lane section.

For the office and administration gate a wide entrance (12 m) and a 12 m radius bend into the power plant site and offices from the access road to the gate house is planned.

Pipeline

General

The pipeline transport system from the point of arrival on-shore to the power plant site will consist of the following:

- A gas and sea-water forwarding station at the start of the land-based pipeline system;
- A dual, parallel gas pipeline for security of gas supply;

- A sea water pipeline to provide the power plant with sea water for desalination;
- A power cable to provide motive power for a projected air compressor and actuated isolation valves and instrumentation along the pipeline route; and
- A gas and sea-water receiving station at the power plant.

The LNG pipeline (regasified gas) and sea-water supply servitude will run from the pipeline entry point connecting to the power plant boundary. The gas pipeline will be buried to a depth of 3 to 4 m, cover a servitude width of approximately 15 – 20 m and be approximately 4600 m in length.

The gas and sea-water supply pipelines commence from the routing point #1, where the regasified LNG arrives on shore and enters the land-based servitude section of the supply line to the 1507 MW power plant.

The pipeline will run along the indicated servitude approximately 4600 m to the gas receiving station within the power plant boundary. Over the 4600 m the pipeline will not intersect with any water courses.

The proposed pipeline system will be buried underground with the pipeline servitude extending 6m on either side of the pipeline trench.

Where the pipeline passes through sensitive areas the temporary RoW will be kept to between 20-25m in order to minimise impacts.

The pipeline arrangement will consist of the following elements:

- Two steel gas pipelines with a clearance of 0.3m (as per EN 1594:2000);
- One steel water pipeline; and
- One electrical conduit (plastic compound).

Power Evacuation and Connection to the Grid

132 kV Feeder line to ArcelorMittal Steel Works

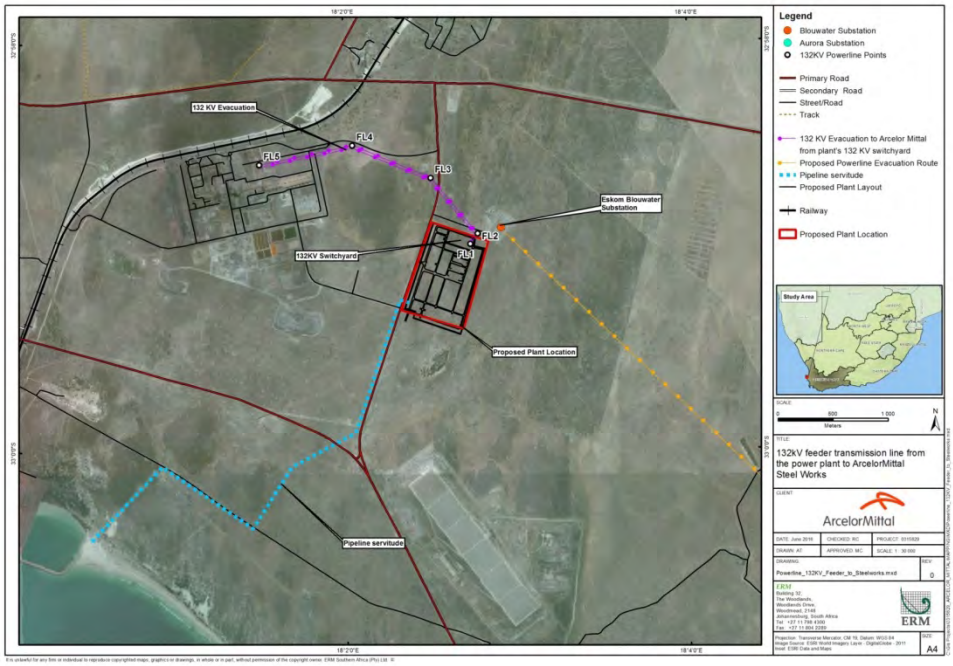
The feeder power line for the initial 160 MW base load (peaking to 250 MW) from the power plant to the ArcelorMittal Steel Works will be the first priority. This 132 kV feeder line will be sized for a capacity of 400 MW. The proposed routing of the transmission line is illustrated in *Figure 11.3*.

The Project plans on utilising the existing 132 KV lines; towers and conductors. The 132 KV plant substation would join directly on to these existing lines. It is noted that there are currently no observed bird deterrent measures on the existing lines. This may need to be introduced, however this would need to be determined between IPCSA and Eskom.

400 kV Transmission line to Aurora Substation

The additional 1103 MW (1400 MVA) of power generated at the plant will be evacuated through the construction of a new 22 km High Voltage (HV) 400 kilo Volt (kV) line from the power plants own switch yard to the existing Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude. This transmission line in not considered as part of this EIA process and will be considered in a separate EIA process in coordination with Eskom.

Figure 11.3 ***132kV feeder transmission line from the power plant to ArcelorMittal Steel Works***



11.3.5 *Project Phasing and Schedule*

Construction Phase

The proposed project will be implemented in two phases. Phase 1 and 2 combined will produce approximately 1500 MW net out-put.

Phase 1 and 2 will consist of six Siemens Trent60 50 MW nominal (Installed Gross capacity) gas turbines in open cycle (labelled T1 through to T6) and three Siemens SCC5-4000F 435 MW (Installed Gross capacity) nominal combined cycle plants, labelled UNIT 1, UNIT 2 and UNIT 3 respectively and will be erected on three self-contained power 'islands' each approximately 150 m long x 60m wide.

Phase 1 of the project will constitute the following components:

- Site entrance with truck staging areas, hard standing areas;
- Offices and control room;

- Warehouse areas and workshops;
- Installation of six open cycle Siemens Industrial Trent 60 gas turbines (T1, T2, T3, T4, T5 and T6), one of which will be a redundant unit to ensure uninterrupted supply;
- Associated step-up transformers for every generating unit;
- 132KV and 400 kV switchyard;
- Site drainage;
- Gas receiving, conditioning and forwarding;
- Waste-Water treatment and water reclamation plant; and
- Storm water collection reservoir (25,000 m^3) and water treatment plant.

Construction period: 15 -18 months
Completion Phase 1: September 2019 commercial operation

Construction of Phase 2 of the project will include the following components:

- Installation of complete UNIT 1, UNIT 2 and UNIT 3 open cycle Siemens SCC5-4000F gas turbine (total approx. 1305 MW nominal (Installed Gross capacity) combined cycle plants);

- Associated step-up transformers, and station switchyard.

Construction period: 18 - 20 months
Completion Phase 2: Mid- 2020 - Early 2021

Employment during the Construction Phase

During peak construction activity, it is expected that up to approximately 450 workers will be directly employed (*Figure 11.4*). Most of this workforce will be employed by the engineering, procurement and construction (EPC) contractor and will consist in semi-skilled to skilled workforce. The breakdown of skills required during the construction phase will be as follows:

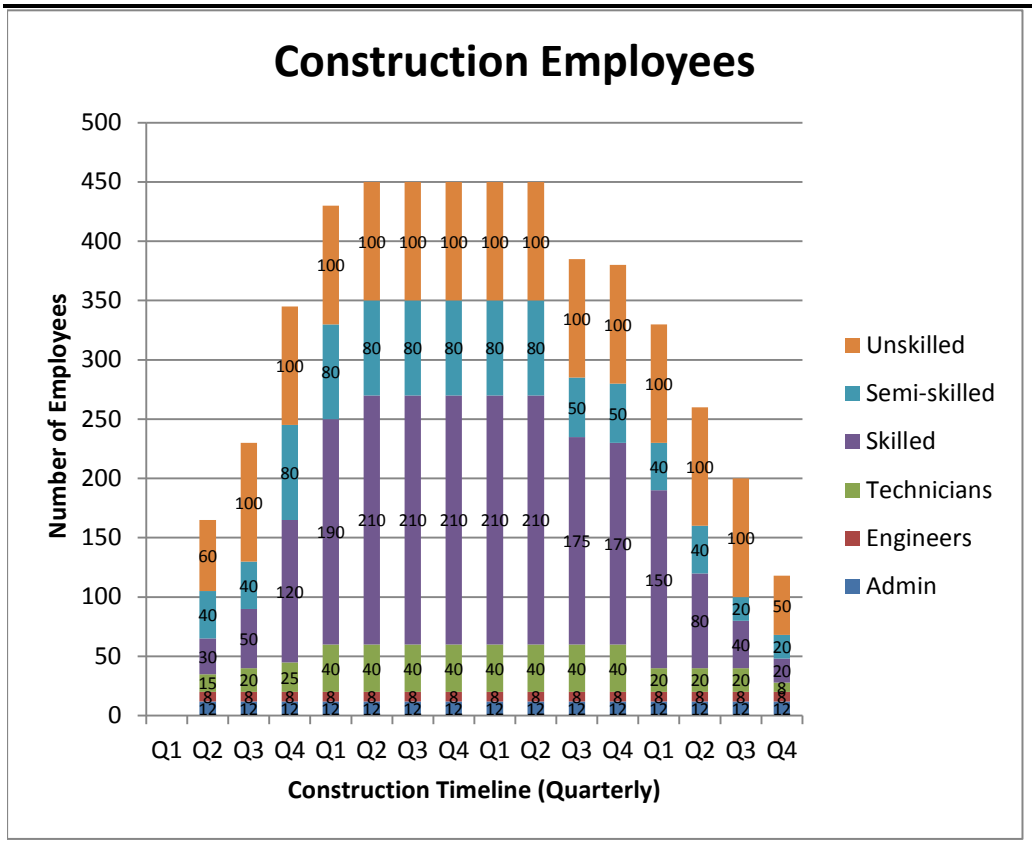
- Skilled labour: 58 percent;
- Semi-skilled labour: 20 percent; and
- Unskilled labour: 22 percent.

A further breakdown of the employment opportunities is provided in *Table* 11.6.

Table 11.6 Estimated Employment Positions Available During Construction

Employment Position	**Number of Positions**
Admin	12
Engineers	8
Technicians	40
Skilled	210
Semi skilled	80
Unskilled	100
Total	**450**

Figure 11.4 Employment requirements during the construction phase



It is understood that there will be no worker accommodation on site during construction. The unskilled workforce will, as far as possible be employed from the local community, reducing the need to the provision of accommodation. The skilled and semi-skilled workforce from outside the area will be housed within Saldanha Bay Local Municipality.

Traffic Requirements During the Construction Phase

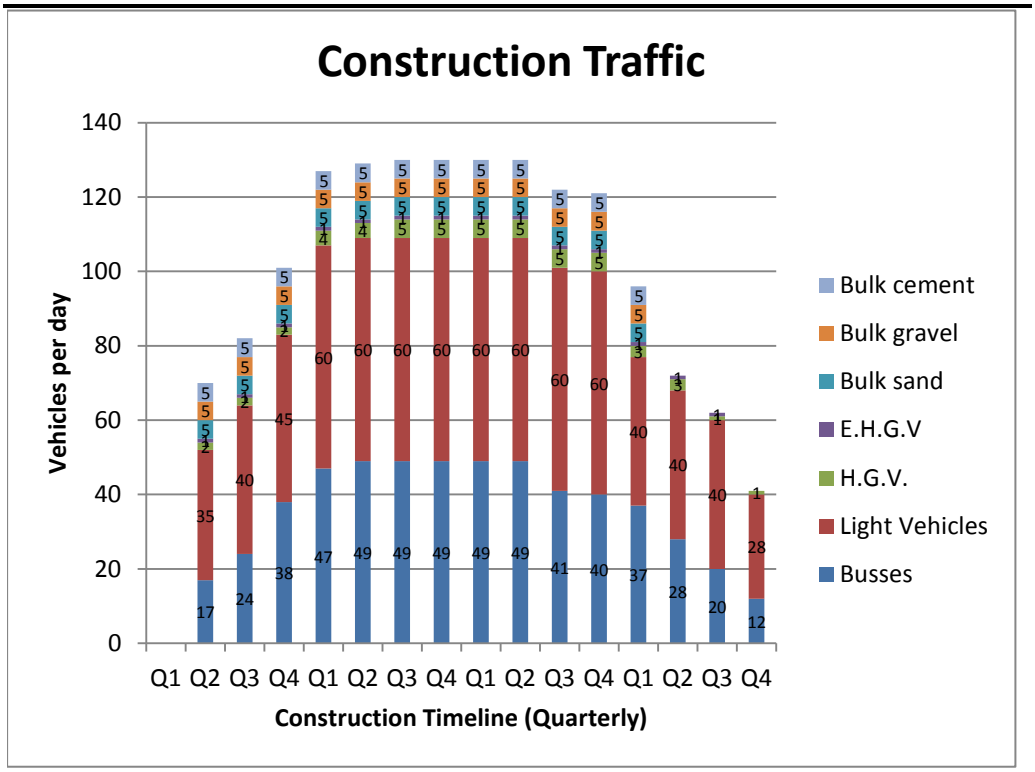
Approximately 35,000 tons of bulk cement and concrete aggregate, 800 tons re-bar steel, and 6,500 tons equipment and structural steel will need to be transported to the construction site.

It is envisaged that construction staff, up to a maximum of 350 persons, would be bussed to site in 8-seater or 10- seater mini busses and pass through this gate; about 40 - 50 busses per day, twice a day. Light vehicle traffic due to construction will start at around 35 vehicles per day and increase rapidly to 60 per day where it will remain for the bulk of the construction period.

There will be an expected 5 vehicles per day of HGV's, bulk gravel, bulk sand, and bulk cement respectively for the duration of the construction phase right up to Q1 of year 4, after which it tails off rapidly.

The gas turbines and other heavy equipment will be delivered via truck. This will involve some abnormal loads being moved on the roads during this time.

Figure 11.5 Predicted traffic loads during the construction phase



Water Requirements During the Construction Phase

During the construction phase the main water requirement will be for the concrete batching plant. It is estimated that 30 000m³ of water will be required for the concrete batching. Additional water will be required for:

- Off-site dust control: Post treatment recycled water will be used for dust control on unsurfaced roads where required during high traffic periods and during construction. Estimated temporary provision of 5,000 m³ per annum in 2017 and 2018.

- Domestic purposes by on site workers: Maximum water usage during peak construction period (600 site personnel) is estimated to be 60 m³/day. This peak requirement is estimated to be needed for approximately 2 years – 2017 and/ 2019.

- Construction and on-site dust control: Water is required for the manufacture of concrete during construction. The power plant will require approximately 80,000 – 90,000 m³ of concrete for foundations, road works, hard standing and other site works. Estimated temporary provision of 5,800 m³ per annum - 2017 and/ 2019.

During the commissioning phase the following water will be required:

- 2,000 – 5,000 m^3 for blow-out of the steam piping (Testing/commissioning);
- 2,000 – 5,000 $m^3$for blow out and chemical clean of the Benson boilers; and
- 23 000m3 (approximately) for pipeline cleaning and hydraulic pressure testing.

Initially water will be trucked in 30 m^3 loads from local farms (ground and surface water sources) (1). It will be transferred to a temporary stainless-steel tank for immediate use in preparing concrete for a small lay-down area and foundations for the first permanent raw-water storage tanks.

Operation Phase

The power plant will be operated on a 24 hour, 7 days a week basis. The position and location of the buried gas pipeline will be indicated above-ground by special marker beacons laid above the pipeline in line-of-sight of each other along the pipeline servitude route (*Figure 11.6*). The markers will be able to collect and transmit essential pipeline information.

Figure 11.6 Example of a marker indicating pipeline below ground

The pipeline is expected to operate continuously, for 8760 hours per year, only the flow rate will vary.

(1) Agreements with land owners are currently in the process of being developed.

Employment during the Operation Phase

The number of workers on site during operations will be about 107 operational employees and up to 70 part-time employees. These will include plant management and maintenance staff, skilled mechanical and electrical technicians, drivers, medical, quality control, and cleaning staff and a number of experienced plant operators who will operate and maintain the plant, and who are expected to be a mix of expatriate and local staff.
As the plant will operate 24 hours a day, three full-time shifts will be created per day, and the breakdown of the skills required will be as follows:

- Skilled labour: 65 - 70 percent;
- Semi-skilled labour: 15 - 20 percent; and
- Unskilled labour: 10 - 15 percent.

A further breakdown of the employment opportunities is provided in *Table* 11.7.

Table 11.7 Estimated Employment Positions Available During Operation

Position	**Number of Positions Available**
Admin	4
Security	15
Warehouse and Stores	6
Medical	6
Plant Control	15
Engineers	9
Technicians	9
Skilled	9
Unskilled	9
Tuition and Training	4
Quality Control, Water	3
Canteen	6
Total	**95**

It is understood that there will be no worker accommodation on site during operation. The unskilled workforce will, as far as possible be employed from the local community, reducing the need to the provision of accommodation. The skilled and semi-skilled workforce from outside the area will be housed within Saldanha Bay Local Municipality.

Traffic Requirements during the Operation Phase

During commercial operations there will be some traffic bringing supplies and spares to the power plant. This will increase during shutdowns and periods of major maintenance.

Maintenance activities will be undertaken by an Operations and Maintenance (O&M) contractor.

Water Requirements during the Operation Phase

Water during operation will be required for the following activities:

- Motive steam for the combined cycle [(1)]: Estimated annual provision 1500 m^3.

- Annual Cooling water for condensation of steam from steam turbine seals and vacuum plant seals: Estimated annual provision of 500 m^3 (Phase 1 and Phase 2).

- Cooling of lubrication oil for gas turbine, alternators and steam turbine generator, gas compressor air: Estimated annual provision of 500 m^3per year.

- As water/glycol for combustion air inlet cooling: A cooled water closed-loop is used to cool down the inlet combustion air to as close to 15 °C as possible. Estimated annual provision of 1500 m^3 per year.

- Make-up water for treated water replacement in event of any boiler blow-down requirement: Estimated annual provision of 1000 m^3 per year.

- Fire abatement: Estimated storage provision of 3000 m^3.

Water requirements during the operational phase are estimated as follows:

- Combined Cycle circuit, replacement feed water: 1 500 m^3/y
- Potable water: 200 m^3/y
- Water for ablutions during construction 25 m^3/day: 1 250 m^3/y
- Vacuum system and steam seal evaporative water loss: 500 m^3/y
- Sundry cooling system evaporative losses: 250 m^3/y
- Water/glycol cooling circuit losses: 1 500 m^3/y
- Other evaporative losses PV system washing):1,500 m^3/y Water will be produced by at least two methods:
    - Harvesting of rain water climate change dependent: 5 000 m^3/y
    - Desalination of sea water, 20 - 45 m^3/day, potable, up to 14 000 m^3/y. Sea-water to be pumped up to plant along gas servitude. This intended to be a ZLD (zero liquid discharge) process.
    - A third patented process currently being assessed: Recovery by vapour condensation in gas turbine exhaust.

It has been estimated that a provision of 25 000 m^3/year of water would be sufficient for operation of Phase 1 and Phase 2 of the power plant, this water would be sourced as follows:

(1) The Benson boiler does not consume water, in that there is no water discharge to out of battery limits, the quantity indicated here is a provision over and above what may be used for startup

- Trucking from local farms during the construction phase;
- Collection of annual precipitation in 5 x 2000m^3 storage tanks;
- A Reverse Osmosis plant on site using sea water that will be pumped up from the coast along the gas pipeline servitude. The RO process will be a zero discharge process; and
- Water recovery by condensation from the gas turbine exhaust.

Services

The following services will be provided by the project itself, managed by a services department on site or contracted to a third party:

- Electricity;
- Gas;
- Raw water treatment, including filtration RO and demineralisation;
- Water recovery from waste water;
- Sewage treatment;
- Boiler feed water;
- Boiler blow-down recovery;
- Condensate;
- Fire water;
- Cooling water;
- Hydrogen generator cooling system;
- CO^2 fire abatement system; and
- Compressed air.

11.4 STRUCTURE OF THE EMPR

The structure of the EMPr is indicated *Table 11.8*.

Table 11.8 Structure of the EMPr

Section	Heading	Content
Section 11.1-11.5	Introduction	Background information regarding the Site, Project Development and the EMPr.
Section 11.6	Implementation of the EMPr	Provides details of the communication and organisational structures within which the EMPr will be implemented, responsibilities of key role players, and provides the terms of reference for the construction team and Environmental Control Officer who will be utilised for all phases of the Project (ECO).
Section 11.7—11.16	Mitigation and Monitoring Measures	Mitigation and Monitoring measures for the Planning and Design, Construction, and Operational phases of the plant.

11.5 IMPLEMENTATION OF THE EMPR

11.5.1 Introduction

The EMPr details the mitigation measures which must be implemented during the development of the proposed Project and assigns responsibilities for specific tasks. The EMPr is applicable to all work activities during the pre-construction, construction, operation and decommissioning of the proposed gas fired power plant. It is an open-ended document implying that information gained during pre-construction, construction, operational and decommissioning activities and/or monitoring of procedures on the Site could lead to changes in the EMPr.

11.5.2 Environmental and Social Management System

An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by client/proponent, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders (see *Figure 11.7*). Drawing on the elements of the established business management process of "plan, do, check, and act," the ESMS entails a methodological approach to managing environmental and social risks and impacts in a structured way on an ongoing basis. A good ESMS appropriate to the nature and scale of the project promotes sound and sustainable environmental and social performance, and can lead to improved financial, social, and environmental outcomes.

The main elements of this approach comprise the following:

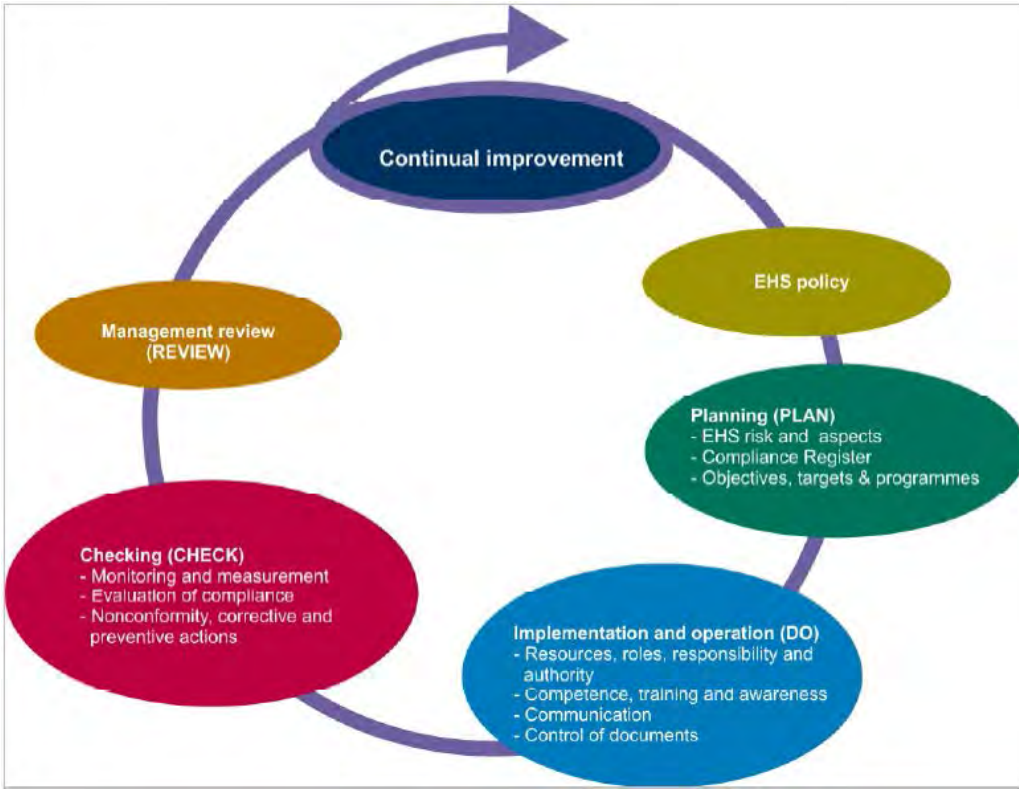
- **Planning**: Establishing actionable steps and key performance indicators, necessary to deliver results in compliance with regulations and obligations.

- **Doing**: Implementation of actionable steps, and assigning responsibilities for undertaking or implementing these requirements.

- **Checking**: Monitoring and measuring performance against key performance indicators, and other requirements, and reporting of the results.

- **Acting**: Taking actions to continually improve performance of the ESMP through the training of personnel and auditing of results.

Figure 11.7 Elements of an Environmental and Social Management System



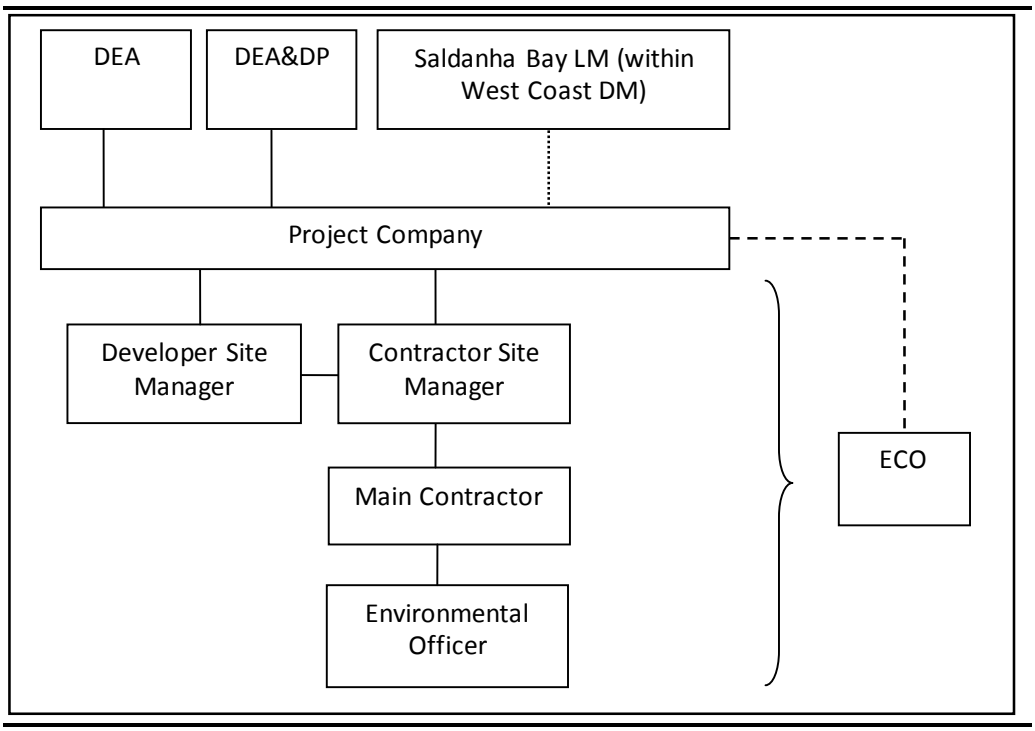
11.5.3 Roles and Responsibilities

The key role-players during the construction, operation and decommissioning phases of the plant, for the purposes of environmental management, include but are not limited to:

- the Project Company;
- Site Manager;
- Main Contractor;
- Environmental Control Officer (ECO); and
- Representatives of the relevant authority/ies.

Lines of communication and reporting between the various parties are illustrated in *Figure 11.8* below.

Figure 11.8 Roles and Responsibilities: Lines of Communication and Reporting



11.5.4 Communication Channels

Site Meetings during the Construction Phase

The ECO is required to attend regular meetings with the Project management team to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole. The ECO will minute the discussions, and specifically any decisions arising relating to environmental management actions and responsibility.

The ECO will compile a summary report outlining the main construction activities relating to the environment, aspects of non-compliance, and document agreed environmental actions and dates of achieving compliance by the Main Contractor (MC). The summary report will form part of the construction phase EMPr records.

The following people should attend these meetings:

Project Company's (1) Representative;
- Site Managers (SM);
- ECO; and
- MC's representative.

(1) The Project Company refers to the company undertaking the project implementation.

Environmental Education and Awareness

The MC, in consultation with the ECO, shall arrange for a presentation to site staff to familiarise them with the environmental requirements of the construction phase of the EMPr within seven days from the commencement date of construction. This presentation should take cognisance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness presentation or talk highlighting general environmental and social "do's and don'ts" (i.e. environmental induction), including good housekeeping practices. This information would be provided throughout construction in the form of regular toolbox (refresher) talks.

Management level staff on the Site, e.g. Site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the construction phase requirements of the EMPr, will benefit from a separate and more detailed presentation of these issues. If required, the ECO may call upon the services of a professional trainer or environmental consultant to present the technical contents of the EMPr.

Environmental education of staff can be assisted by compilation of posters placed in staff venues e.g. canteens and site offices.

Method Statements

The MC must compile and provide Method Statements to the ECO and SM for approval prior to the commencement of construction activities. Method statements will be required for specific activities that are deemed or identified to pose a risk to the environment and/or which require site specific detail beyond that contained in the EMPr or when requested by the SM or ECO.

A Method Statement is a dynamic document in that modifications are negotiated between the MC and the ECO/project management team, as circumstances unfold. Changes to, and adaptations of, Method Statements can be implemented with the prior consent of all parties. All Method Statements will form part of the construction phase of the EMPr documentation and are subject to the terms and conditions contained within the construction phase of the EMPr.

Note that a Method Statement is a starting point for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

A Method Statement describes the scope of the intended work in a step-by-step description, in order for the ECO and the SM to understand the MC's intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks.

For each instance where it is requested that the MC submit a Method Statement to the satisfaction of the SM and ECO, the format must clearly indicate the following:

- What - a brief description of the work to be undertaken;
- How - a detailed description of the process of work, methods and materials;
- Where - a description/sketch map of the locality of work (if applicable);
- When - the sequencing of actions with due commencement dates and completion date estimates;
- Who – The person/s responsible for undertaking the works described in the Method Statement; and
- Why – a description of why the activity is required.

ECO Diary/Logbook Entries

The ECO will maintain a Site diary or logbook that relates to environmental issues as they occur on the Site for record keeping purposes. Recorded issues will form part of feedback presented at Project meetings by the ECO.

Site Memo Entries

Site memos, stipulating recommended actions required to improve compliance with the EMPr by the MC will be issued by the ECO to the PM, who in turn will ensure that the MC is informed of the recommended instruction.

Comments made by the ECO in the Site Memo book are advisory and all consequential Site Instructions required may only be issued by the PM. Site Memos will also be used for the issuing of stop work orders to the MC for activities deemed to pose immediate and serious risk of unnecessary damage to the environment.

Dispute Resolution

Any environmentally related disputes or disagreements during the construction phase will firstly be referred to the SM or alternatively to the Department of Environmental Affairs (DEA) if no resolution on the matter is reached. Similarly, disputes or disagreements during the operations phase can be referred to the operational SM or the DEA if required.

Community Relations

The Project Company must continue to engage with stakeholders throughout the construction and operation phases. Communication with local communities and other local stakeholders will be a key part of this engagement process and will require the Project Company and MC to work closely together during the construction period. This should be facilitated

through a Stakeholder Engagement Plan (SEP) which would be developed prior to construction.

The objectives of communication and liaison with local communities are the following.

- To provide residents in the vicinity of the Site and other interested stakeholders with regular information on the progress of work and its implications.

- To monitor the implementation of mitigation measures and the impact of construction on communities via feedback from affected stakeholders in order to ensure that the mitigation objectives achieved.

- To manage any disputes between the Project Company, the contractors and local communities.

Grievance Procedure

The Project Company must develop a grievance procedure as part of the SEP to ensure fair and prompt resolution of problems arising from the project. The grievance procedure should be underpinned by the following principles and commitments:

- Implement a transparent grievance procedure, and disseminate key information to directly impacted stakeholders.

- Seek to resolve all grievances timeously.

- Maintain full written records of each grievance case and the associated process of resolution and outcome for transparent, external reporting.

The responsibility for the resolution of grievances will lie with the Project Company and its contractors.

Social Responsibilities

The Project Company and MC must encourage and implement wherever possible the procurement of locally based labour, skills and materials.

- The Project will establish a recruitment policy which prioritises the employment of South African and local residents (originating from the Local Municipality). Criteria will be set for prioritising local residents and then other South Africans as part of the recruitment process.

A local procurement policy will be implemented to ensure that local procurement is maximised, the policy will include:

- Reasonable targets for using local suppliers.

- a clause of none discrimination on any grounds of gender, ethnicity, religion.

- Criteria for monitoring local procurement and reporting on supplier performance management.

- Clearly communicate the criteria and tendering process prior to the commencement of construction activities; and

- The procurement policy and tendering requirements must be easily accessible to potential suppliers.

The following will be implemented to enhance skills development and on-the-job training:

- Training plans will be developed according to each permanent employee' work agreement and relevant to their job description.

- Develop internal training 'certification' or reference letter provisions to those who receive internal training.

11.5.5 Review

Review of effectiveness of mitigation measures such as grievance measures; waste management; alien and open space management; re-vegetation and rehabilitation; plant rescue and protection; and traffic and transportation, will be undertaken periodically and recommendations included in the audit reports.

11.5.6 Auditing

The Project will be audited against the requirements of this EMPr by an independent third party. Auditing should be undertaken post construction and periodically thereafter. The audit reports will be provided to the competent authority and to other authorities on request.

11.6 MITIGATION AND MONITORING MEASURES

Mitigation and monitoring measures are presented in this section (*Table 11.9*) and reflect the relevant phase of applicability which may include:

- Planning and Design Phase (Pre-construction);
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Mitigation and monitoring measures presented in the tables below have been prescribed by the EIA and specialist studies. The EMPr will require updating with conditions of the Environmental Authorisation and on the basis of the results of any monitoring programmes.

Table 11.9 Environmental Mitigation Measures

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
General									
General	Ensure legal compliance	Finalise layout of all components and submit to DEA for approval.	X				Approval of Final Layout	Project Company	Prior to commencement of construction
		Obtain any additional environmental permits required (e.g. AEL; permit to remove protected plant species etc.)	X				Permits as issued	Project Company	Prior to commencement of construction
		An upfront training session must be held to ensure all relevant personnel are aware of the provisions contained in the EMPr, any Environmental Authorisation, License or Permit issued and all agreed Method Statements	X				Training Records	Project Company and ECO	Once off at the start then as new personnel are hired
		Notify all registered I&APs and key stakeholders of the Environmental Authorisation and appeal procedure.	X				Proof of Notification	Project Company and appointed environmental consultant	Within 14 days of receipt of EA (EIA Regulations, 2014)
		Notify DEA prior to commencement of the activity.		X			Proof of Notification	Project Company and appointed environmental consultant	Timeframe stipulated in the EA
		Ensure that the EA and approved EMPr are available at the site.		X	X	X	Visual Inspection	Project Company and Contractors	Documents to be on site throughout Project life-cycle.
		EA and EMPr to form part of the contract with the Contractors appointed to construct the plant.	X	X			Signed commitment from all contractors	Project Company and Contractors	Contract signed prior to commencement of construction
	Audit Requirements	Appoint an independent ECO, who has expertise in the field, for the construction phase. The ECO will have the responsibility to ensure that the		X			Appointment of ECO	Project Company	Prior to commencement of construction

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		mitigation/rehabilitation measures and recommendations referred to in the EA are implemented and to ensure compliance with the provisions of the EMPr.							
		The ECO must maintain the following on site: • A daily site diary; • Copies of all reports submitted to the DEA; and • A schedule of current site activities including the monitoring of such activities.		X	X		Site Diary; copies of all reports and a project schedule	ECO	Throughout construction phase
		The Project Company must submit an environmental audit report to the relevant competent authority upon completion of the construction and rehabilitation activities.		X			Environmental Audit Report	Project Company and ECO	Upon completion of construction and rehabilitation activities.
Surface Water & Groundwater									
Impact on Surface and Groundwater	Implementation of Stormwater management principles to address runoff from disturbed portions of the site through appropriate design measures	Update and refine the Stormwater Management Plan (refer to *Section 11.15*) with engineering specifications.	X				Update of the Stormwater Management Plan	Project Company and civil engineers	Prior to construction during detailed design phase
		Implement energy dissipation structures where concentrated flows ensue.	X				Final SWMP	Project Company and civil engineers	Measure to be included in Final Design and implemented during construction
		Implement appropriate measures to trap sediment at sources where areas are going to be disturbed (e.g. construction materials laydown area). Mitigation measures could include sediment fences and erosion control blankets.	X				Final SWMP	Project Company and civil engineers	Measure to be included in Final Design and implemented during construction

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Design road networks to prevent the accumulation of high energy surface flows by specifying surface cross drains at regular intervals, by constructing roads to natural ground level or by including sufficient drainage in the form of culverts					Final SWMP and plant design	Project Company and civil engineers	Measure to be included in Final Design and implemented during construction
		Workshop areas will be lined to prevent subsurface ingress of contaminants and drainage from these areas will not be allowed to drain into water courses.	X				Final Design	Project Company	Throughout period that workshops are present
		Maintain, where possible, the natural vegetation cover and facilitate re-vegetation of disturbed areas to stabilise the soil.		X			Visual Inspection	Project Company and Contractors	During construction phase
		Stabilise all earthen berm structures by specifying adequate compaction and revegetating.		X			Visual Inspection	Project Company and Contractors	During construction phase
		Exercise good excavation practises during the construction phase. Backfill and compact all material to acceptable standards as soon as possible after construction and facilitate re-vegetation of all disturbed areas as soon as possible after backfilling.		X		X	Visual Inspection	Project Company and Contractors	During construction phase
		Implement free draining platforms (if required) for the substations and transformers to prevent the risk of flooding of infrastructure.	X				Visual Inspection	Project Company and civil engineers	Measure to be included in Final Design and implemented during construction
		Establish earthen berms to protect infrastructure against flooding.		X			Visual Inspection	Project Company and Contractors	During construction phase
		Implement attenuation facilities of areas that are drained.	X	X			Visual Inspection	Project Company and civil engineers	Measure to be included in Final Design and

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
									implemented during construction
	General conditions to minimise water use during construction and operation of the plant	Where feasible, use of closed circuit dry cooling system should be planned for to prevent unacceptable adverse impacts.	X				Final Design	Project Company	Measure to be included in Final Design and implemented during construction
		Project design to include measures for adequate water collection, spill control, leakage control systems and water-saving equipment e.g. low-flow toilets.	X				Final Design	Project Company	Measure to be included in Final Design and implemented during construction
	Minimise impacts on surface and groundwater due to run-off, erosion, spills of hazardous substances etc.	Fuel, oil, used oil and chemicals must not be stored where there can be accidental leakage in to surface or ground water. Methods for preventing leakage include appropriate bunding and other standard storage methods.		X	X	X	Method Statement for Storage of Hazardous Goods Visual Inspection	Project Company, Contractors	Throughout life cycle of the Project
		Construction vehicles and equipment will be serviced regularly and provided with drip trays, if required.		X		X	Maintenance records	Contractors	Throughout construction and decommissioning
		All surface water management infrastructure will be inspected and repairs made as soon as practically possible.			X		Visual Inspection	Project Company	Throughout construction and operation
Soils									
Impact on Soils	Minimise erosion, loss of topsoil and soil compaction during Project activities and try to conserve soil as a resource where	Implement the Erosion Management Plan as per *Section 11.16*. This includes the following:	X	X	X	X		Project Company, Contractors and ECO	Throughout life cycle of Project
		Restrict removal of vegetation and soil cover to the development footprint.		X		X	Visual Inspection	Project Company, Contractors	Throughout construction and decommissioning
		Soil stockpiles must be protected from		X		X	Visual Inspection	Contractors	Throughout

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
	practical and possible; or maximise the potential to re-use soils	wind or water erosion through placement, vegetation or appropriate covering.							construction and decommissioning
		Excavations/trenches should be backfilled slightly higher than the natural ground level to accommodate some degree of settlement of the backfill material.		X		X	Visual Inspection	Contractors	Throughout construction and decommissioning
		Exercise good excavation practises - backfill and compact all material to acceptable standards as soon as possible after construction and facilitate re-vegetation of all disturbed areas as soon as possible after backfilling.		X			Excavation Method Statement	Contractors	Throughout construction
		Construction vehicles will remain on designated and prepared roads. Special care should be taken to avoid driving on any sand dunes in the vicinity of the site.		X		X	Visual Inspection	Project Company, Contractors	Throughout construction and decommissioning
		Maintain, where possible, the natural vegetation cover and facilitate re-vegetation of disturbed areas to stabilise the soil against erosion.		X			Visual Inspection	Contractors	Throughout construction
		Foundations and trenches must be backfilled with originally excavated materials as far as possible. Excess excavation materials must be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.		X			Visual Inspection	Contractors	Throughout construction
		Borrow materials must only be obtained from authorised and permitted sites.		X			Visual Inspection	Contractors	Throughout construction
		Although soil erosion is not considered significant, it might be necessary to implement control measures such as		X			Engineering Design	Contractors	Throughout construction

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		suitable location on flatter areas with low erosion potential and the rapid establishment of vegetation through seeding of the stockpiles, to promote and reserve indigenous seeds and (soil fertility) organic matter							
		Where space constraints are not limiting, topsoil stockpiles will be constructed as low and long facilities not higher than 2m, or where space constraints limit this, stockpiles will be constructed as terraced stockpiles.		X			Visual Inspection	Contractors	Throughout construction
		Compacted areas must have adequate drainage systems to avoid pooling and surface flow.		X	X	X	Final Design	Project Company, Contractors	Throughout construction and operational phases, and if applicable, decommissioning
		Rehabilitation activities must commence at work faces as soon as construction activities have concluded. Phased construction and progressive rehabilitation should be implemented where practicably possible.		X		X	Visual Inspection	Project Company, Contractors	Throughout construction and decommissioning phases
Flora									
Disturbance / destruction of flora due to clearing of vegetation during construction and operation	Limit the loss of flora species and ensure legal compliance	The pipeline construction corridor in the area between the High and Medium – High sensitivity areas, through the dune area in particular, will be minimised and kept as narrow as possible, and should ideally be less than 25m wide in this area, or 30m at most.	X	X			Final Design	Project Company, Contractors	Final design prior to construction and corridor restrictions to be implemented during construction.
		Clearing of vegetation should be undertaken as the work front progresses – mass clearing should not occur unless the cleared areas are to be		X			Visual Inspection	Contractors and ECO	Weekly

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		surfaced or prepared immediately afterwards.							
	v	The ECO will ensure that no disturbance occurs outside the approved development footprints of the power plant site or the pipeline route during construction.		X			Visual Inspection	ECO	Throughout construction phase
	Reduce the impact of the development of the Project on listed and protected plant species and their habitats during construction	Implement the Plant Rescue and Protection Plan as per *Section 11.11*. This includes:	X	X			Plant Rescue and Protection Plan	Project Company, Contractors	Prior to disturbance of any natural areas.
		Plant Search and Rescue will be undertaken in the entire pipeline development corridor south of the MR559, prior to any development. Search and Rescue will also be undertaken for selected species within the power plant footprint prior to development.		X				Appointed specialist	Prior to any vegetation clearing activities occurring, once permits have been obtained for removing plants (if necessary)
		All translocatable plant species will be bagged up and stored in a nursery for later use, once construction has been completed and rehabilitation is required.	X	X			Visual Inspection	Project Company, Contractors, Appointed specialist	Prior to any vegetation clearing activities occurring
		Replanting of these rescued specimens will be undertaken in the first autumn – winter (May – June) after construction has been completed, giving the plants maximum time to establish before the next summer dry period.					Replanting schedule	Project Company, Contractors, Appointed specialist	Post-construction, during rehabilitation
		Immediately after being transplanted, species should be adequately watered.		X				Project Company, Contractors, Appointed specialist	Following transplant
		The approved development footprint will be surveyed and clearly	X	X			Visual Inspection	Project Company,	Prior to any vegetation clearing

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		demarcated with wire or coloured rope, and strung with warning signs, prior to any construction.						Contractors, Appointed specialist	activities occurring and implemented throughout construction phases
		A Training and Awareness Programme will be developed for employees and contractors to allow for training with regard to the areas of High and Medium – High sensitivity. This will be undertaken in conjunction with an experienced botanist.	X	X			Training and Awareness Programme, Training Records	Project Company and Specialist	Prior to any activities of disturbance
	Maximise rehabilitation efforts to allow for the re-introduction of plant species: *General Management Principles*	Implement the Revegetation and Rehabilitation Plan as per *Section 11.12*, which includes:		X			Revegetation and Rehabilitation Plan	Project Company, Contractors	Revegetation and habitat rehabilitation plan to be finalised during planning and design phase and implemented through lifecycle of project.
		Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.		X				Project Company, Contractors	Rehabilitation post-construction
		Once revegetated, areas should be protected to prevent trampling and erosion.		X				Project Company, Contractors	Rehabilitation post-construction
		No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.		X			Visual Inspection	Project Company, Contractors	Rehabilitation post-construction
		Fencing should be removed once a sound vegetative cover has been achieved.		X			Visual Inspection	Project Company, Contractors	Rehabilitation post-construction
		Any runnels, erosion channels or wash-		X			Visual Inspection	Project	Rehabilitation

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.						Company, Contractors	post-construction
		The movement of people and vehicles within rehabilitated areas must be restricted and controlled.		X	X		Visual Inspection	Project Company. Contractors	Access to be restricted throughout rehabilitation.
	Maximise rehabilitation efforts to allow for the re-introduction of plant species: *Topsoil Management Principles*	Topsoil should be retained on site in order to be used for site rehabilitation. Topsoil must be excavated to the correct depth. It is recommended that no more than the top 10cm of topsoil are stored and used for rehabilitation.		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		Topsoil removed from the pipeline trench must be kept separate from other fill during the construction process, and must be replaced last, on the soil surface.					Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This avoids stockpiling and double handling of the soil.		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		If direct transfer is not possible, the topsoil should be stored separately from other soil heaps until construction in an area is complete. The soil should not be stored for a long time and should be used as soon as possible.		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		Ideally stored topsoil should be used within a month and should not be stored for longer than three months. In addition, topsoil stores should not be too deep, a maximum depth of 1m is recommended to avoid compaction		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		and the development of anaerobic conditions within the soil.							
		If topsoil is stored on a slope then sediment fencing should be used downslope of the stockpile in order to intercept any sediment, and runoff should be directed away from the stockpiles upslope.		X			Visual Inspection		Rehabilitation post-construction
	Maximise rehabilitation efforts to allow for the re-introduction of plant species: *Transplant Principles*	Plants for transplant should preferably be removed from areas that are going to be cleared.		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		Transplants should be placed within a similar environment from where they came in terms of aspect, slope and soil depth.		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		Transplants must remain within the site and may not be transported off the site.		X			Visual Inspection	Project Company. Contractors	Rehabilitation post-construction
		Additional rehabilitation of the pipeline servitude south of the MR559 will be undertaken using relevant locally indigenous species that are additional to those used in the Search and Rescue process.		X			Visual Inspection	Appointed specialist (i.e. experienced horticultural contractor)	Rehabilitation post-construction
		Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level			X		Visual Inspection	Project Company. Contractors	As necessary
Introduction of alien invasive species	Manage alien plant infestation during all phases through implementation of the Alien Invasive Management Plan	Implementation of the Alien Invasive Management Plan (refer to *Section 11.10*); which includes:		X	X	X	Implementation of the Alien Invasive Management Plan	Project Company, Contractors and ECO	Throughout life cycle of the Project
		Lighter infested areas should be cleared first to prevent the build-up of		X	X	X		Project Company,	Throughout life cycle of the Project

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		seed banks.						Contractors and ECO	
		No spraying of herbicide will be undertaken in rehabilitated areas as this kills numerous non-target species. The focus will be on removing (using CapeNature approved methodology) all alien invasive shrubs and large herbs, although in some cases it may be possible and necessary to also remove invasive alien grasses.		X	X	X		Project Company, Contractors and ECO	Throughout life cycle of the Project
		Clearing of vegetation should be undertaken as the work front progresses – mass clearing should not occur unless the cleared areas are to be surfaced or prepared immediately afterwards.		X	X	X		Project Company, Contractors and ECO	During construction phase
		Clearing of vegetation is not allowed within 32m of any wetland, 80m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless permission is granted by the ECO for specifically allowed construction activities in these areas.		X	X	X	Visual Inspection Written permission from ECO	Project Company, Contractors and ECO	During construction phase
		Alien invasive species (such as ryegrass or oats) or straw containing any such species will not be used for temporary soil stabilisation of the pipeline corridor.		X		X		Project Company and ECO	During construction phase
		Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.		X		X	Visual Inspection	Contractors and ECO	Weekly inspections of stockpiles
		Per the Alien Invasive Management Plan, document and record alien invasive plant management including:		X	X	X	• Alien plant distribution map	Project Company, Contractors and	Throughout life cycle of the Project on a biannual basis

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		• alien plant distribution; • alien plant control measures implemented; and • evaluation of control success rate					• Record of clearing activities • Decline in documented alien abundance over time	ECO	
		Ongoing alien invasive plant management will be undertaken on a biannual basis within any undeveloped portions of the power plant site and within the full pipeline servitude.			X			Project Company	Biannual basis during operational phase
Fauna									
Loss of faunal habitat	Minimise impact to fauna during project activities as a result of habitat loss	Demarcate all areas to be cleared with construction tape or similar material.	X	X		X	Visual inspection	ECO and Contractors	Prior to clearance activities
		The ECO will provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially in the vicinity of sensitive features.		X		X		ECO	During construction and decommissioning vegetation clearing activities.
		All vehicles are to remain on demarcated roads and no driving in the veld will be allowed. The exception to this will be along the pipeline route during construction when all vehicles should follow the same track.		X		X		ECO and Contractors	
		There will be no fuelwood collection permitted on the site.		X		X	Visual inspection and ongoing monitoring	ECO and Contractors	Throughout construction and decommissioning activities
		No fires will be allowed on-site.		X		X	Visual inspection and ongoing	ECO and Contractors	Throughout construction and

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
							monitoring		decommissioning activities
		Sensitive habitat features will be avoided.	X	X			Visual inspection and ongoing monitoring	Project company and ECO	Prior to and during construction and operation activities
Direct Faunal Impact	Minimise direct impact to fauna during construction and decommissioning as a result of disturbance	All vehicles at the site will adhere to a low speed limit to avoid collisions with fauna such as tortoises.		X		X		ECO and Contractors	During construction and decommissioning
		Personnel will not be allowed to roam into the veld.		X		X	Visual inspection and ongoing monitoring	ECO and Contractors	During construction and decommissioning
		All personnel will undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.		X		X	Training materials and records	ECO and Contractors	During construction and decommissioning
		No activity will be allowed in the veld between sunset and sunrise.		X		X	Visual inspection and ongoing monitoring	ECO and Contractors	During construction and decommissioning
		Any dangerous fauna (snakes, scorpions etc) that are encountered during construction will not be handled or molested by the construction staff and the ECO or other suitably qualified persons will be contacted to remove the animals to safety.		X		X		ECO and Contractors	During construction and decommissioning
		No litter, food or other foreign material will be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.		X		X	Visual inspection and ongoing monitoring	ECO and Contractors	During construction and decommissioning

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Holes and trenches will not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days, will have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.		X		X	Visual inspection and ongoing monitoring	ECO and Contractors	During construction and decommissioning
		If there is any part of the site that needs to be lit at night for security reasons, then this will be with low-UV emitting types which do not attract insects.		X		X	Visual inspection	ECO and Contractors	During construction and decommissioning
Habitat degradation during construction and operation	Minimise degradation of faunal habitats during project activities	Personnel will not be allowed to roam into areas not demarcated for construction, operation and decommissioning activities.		X	X	X	Visual inspection and ongoing monitoring	ECO, Contractors and Project Company	All phases of the project
		No activity will be allowed in the veld between sunset and sunrise.		X	X	X	Visual inspection and ongoing monitoring	ECO, Contractors and Project Company	All phases of the project
		No litter, food or other foreign material should be thrown or left around the site and will be placed in demarcated and fenced rubbish and litter areas.		X	X	X	Visual inspection and ongoing monitoring	ECO, Contractors and Project Company	All phases of the project
		All hazardous materials will be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site will be cleaned up in the appropriate manner as related to the nature of the spill.		X	X	X	Method Statement for Storage of Hazardous Goods Visual Inspection	ECO, Contractors and Project Company	All phases of the project
Avifauna									
Loss of avifaunal habitat due to	Minimise impacts on birds during	The temporal and spatial footprint of the development will be kept to a		X	X		Visual Inspection	Project Company,	Boundaries to be established prior

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
clearing of vegetation during the construction phase	construction and operational activities as a result of habitat loss	minimum. The boundaries of the development area are to be clearly demarcated.						Contractors and ECO	to construction and maintained throughout construction phase
		Existing roads must be used as much as possible for access during construction.		X		X	Visual Inspection	Project Company, Contractors and ECO	Throughout construction and decommissioning phases
		Site personnel are to receive adequate training with regard to minimising areas of disturbance and avifaunal impacts and proposed management.		X	X	X	Training Records	Project Company, Contractors and ECO	Once off at the start then as new personnel are hired
		Any bird nests that are found during the construction phase must be reported to the ECO.		X		X	Records of birds' nests	Project Company, Contractors and ECO	Throughout construction and decommissioning phases
Disturbance of avifauna from construction activities and operational maintenance activities	Minimise impacts on birds during construction and operational activities as a result of destruction and displacement.	Ensure that all new lines are marked with bird flight diverters. Bird-diverters must be securely fitted and be readily and cost effectivity installed. Diverters should be fitted in consultation with an avifaunal specialist.		X	X	X	Visual Inspection; Final Design	Project Company, Contractors and ECO	Throughout construction
		All new power infrastructure must be adequately insulated and bird friendly in configuration (i.e. to allow for perching or roosting without electrocution).	X				Final Design	Project Company	Prior to construction
		If any priority species identified in this report are observed to be roosting and/or nesting and breeding in the vicinity, the ECO will be notified.		X	X	X	Records of birds' nests	Project Company, Contractors and ECO	Throughout construction and decommissioning phases
		The laydown areas and site offices etc. will be as close to the site as possible.	X	X		X	Final Design	Project Company	Prior to construction
		Driving must take place on existing		X	X	X	Visual Inspection	Project	Throughout

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		roads and a speed limit of 50 km/h must be implemented on all internal roads.						Company, Contractors	construction and decommissioning phases
		If birds are nesting on power infrastructure and cannot be tolerated due to operational risks of fire, electrical short or other problems, birds will be prevented from accessing nesting sites by using mesh or other means of excluding them. Birds will not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds already with eggs and chicks will be allowed to fledge their chicks before nests are removed. If there are any persistent problems with avifauna, then an avifaunal specialist will be consulted for advice on further mitigation.			X		Visual Inspection	Project Company, appointed specialist	During operations phase
Marine Ecology									
Impact to Marine Ecology due to seawater abstraction	Avoid impingement and entrainment of marine organisms.	Water to be drawn into the intake heads at a velocity of 14 l/s, screened through appropriate coarse and fine screens before being pumped to site.	X		X		Monitoring and visual inspection	Project Company	During operation phase
Marine Water Quality									
Impact on marine water quality incidences	Limit construction footprint	Any soil removed to bury the pipeline at the beach-crossing must be deposited in the Reclamation Dam. The sand must be spread over the Reclamation Dam to prevent sand from protruding above the water.	X				Monitoring and visual inspection	Project Company	During construction
Noise									
Increased noise levels associated	Reduce the impact of increased noise levels	Proper stack and ducting design, verified by finite element analysis of the various exhaust path sections.	X				Final Design	Project Company	During planning and design phase

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
with construction and operation activities on site.	on the community and the workforce	Incorporate sound attenuation lining within the flue stacks to nullify the potential amplification of pulsating exhaust disturbances.	X				Final Design	Project Company	During planning and design phase
		Buildings that will house noise generating equipment should be designed to incorporate sound attenuation.	X				Final Design	Project Company	During planning and design phase
		Increased stack diameter and reduced exhaust stack temperature through better, more efficient heat recovery and design of the heat recovery steam generators.	X				Final Design	Project Company	During planning and design phase
		Regular, scheduled maintenance of equipment, including exhaust and intake mufflers will be undertaken.		X	X	X	Maintenance Schedule and Log Book	Project Company; Contractors	As per maintenance schedule
		Internally "steel-brush" the larger steam pipelines before being assembled to reduce total 'blow-out' time.		X			Final Design	Project Company; Contractors	During assembly of the steam pipelines
		Advise people close to the facility, of the times during which high noise levels would be generated during safety valve testing, and recommend ear safety procedures for workers if warranted.		X	X		Proof of notification	Project Company	A day in advance of safety valve testing
		Mechanical equipment with lower sound power levels must be selected to ensure that permissible occupation noise-rating limit of 85 dBA is not exceeded.		X		X	Equipment inventory	Project Company, Contractors and ECO	Equipment used during construction and decommissioning
		Site personnel (including construction workforce and operational personnel) must wear hearing protection where the 8-hour ambient noise levels exceed 75dBA.		X	X	X	Visual Inspection	Project Company, Contractors and ECO	Throughout life cycle of Project where ambient noise levels are exceeded

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Ensure that workers accessing the site conduct themselves in an acceptable manner as far as noise generation is concerned.		X	X	X	Records of environmental inductions	Project Company; Contractors	Throughout life cycle of Project
		On site construction activities are to be limited to daylight hours as far as possible. Should construction activities need to be undertaken outside of these times, landowners need to be consulted.		X		X	Construction Schedule; Working Hours	Contractors	During construction and decommissioning phases
		A grievance procedure will be established whereby complaints are recorded and responded to.		X	X	X	Grievance Register	Project Company, Contractors and ECO	Throughout life cycle of Project
Air Quality									
Decreased ambient air quality resulting from: • Land clearing activities • Road construction activities • Wind erosion from exposed areas • Activities associated with operation of the power plant	Appropriate design measures to minimise impacts on the ambient air quality Reduce PM_{10} concentrations and dustfall	Stack heights must be designed according to Good International Industry Practice (GIIP) to avoid excessive ground level concentrations and minimise impacts.	X				Final Design	Project Company	Detailed design phase
		Dust suppression techniques must be used before and during surface clearing, excavation and piling activities on all exposed surfaces. Such measures may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.		X		X	Visual Inspection	Project Company, Contractors and ECO	Throughout construction and decommissioning phases
		Where necessary, stock piles of soil must be covered by suitable shade cloth or netting to prevent erosion, fugitive dust and to prevent the escape of dust during loading and transfer from site.		X			Visual Inspection	Project Company, Contractors and ECO	Throughout construction and decommissioning phases

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Loads of vehicles carrying dusty construction materials will be covered.		X		X	Visual Inspection	Project Company, Contractors	Throughout construction and decommissioning phases
		Loading and unloading bulk construction materials will be done in areas protected from the wind in calm conditions.		X		X	Visual Inspection	Contractors	Throughout construction and decommissioning phases
		Access to the construction site will be limited to construction vehicles only.		X		X	Visual Inspection	Contractors	Throughout construction and decommissioning phases
		Vehicle speed restrictions on the construction site will be imposed.		X		X	Visual Inspection	Contractors	Throughout construction and decommissioning phases
		A maintenance programme for construction vehicles will be implemented to ensure optimum performance and reduced emissions		X		X	Maintenance Schedule	Contractors	Throughout construction and decommissioning phases
		Vehicles carrying dusty materials will be cleaned before leaving the site		X		X	Visual Inspection	Contractors	Throughout construction and decommissioning phases
		Servicing programs for all operational components of the facility must be developed and implemented according to design specifications and requirements.			X		Servicing programmes	Project Company	Servicing according to design specifications and requirements
		Critical components must be in stock to ensure the availability of spares in the event of mechanical faults.			X		Stock inventory	Project Company	Throughout operation
		Commitment to use only LNG or CNG as the primary fuel.			X			Project Company	Throughout operation
		Any complaints received from neighbours or site users regarding air		X	X	X	Grievance	Project	Throughout life

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		quality must be reported to the Site Manager.					Register	Company, MC and ESO	cycle of Project
		Annual stack emission testing for SO_2, NO_x and PM to monitor efficiency of mitigation measures must be undertaken. The licence conditions of the atmospheric emissions license (AEL) shall describe the monitoring which needs to be done; therefore no specific monitoring requirements is prescribed until the AEL is obtained.			X		Stack emission testing results	Project Company	Annually during operations
		An atmospheric emissions license (AEL) will be obtained as required in terms of the legislation and conditions of approval adhered to.	X	X	X	X	Air Emissions Licence	Project Company	AEL must be obtained before construction. Conditions therein must be adhered to throughout project lifecycle.
Climate Change									
		The plant's thermal efficiency will be maximised throughout the life of the plant in order to reduce the gas consumption and therefore GHG emissions per unit of electricity (i.e. kWh or MWh) generated.			X		A combined thermal efficiency and GHG management plan	Project Company	During operation
		A plant specific assessment informed by the operations and maintenance (O&M) requirements for the equipment in question, and assessments will be carried out upon final selection of the equipment and, subsequent to the commencement of operations, periodically.	X				Plant specific assessment report	Project Company	Prior to the commencement of construction
		The Project documents note the potential for converting at least two of the 42 MW Trent60 OCGTs in Phase 1			X			Project Company	During operation following the commencement of

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		to combined cycle at a later stage for improved efficiency. The option to make such a change will be reviewed periodically and implemented when possible, and on as many of the six Trent60 turbines as is feasible.							Phase 2
		A combined thermal efficiency and GHG management plan will be developed to manage GHG emissions. Recommendations for aspects to be included in this plan are detailed in the Climate Change Specialist Study (see attached in *Annex D*).			X		A combined thermal efficiency and GHG management plan	Project Company	Prior to operation
		A detailed energy management plan including a baseline in accordance with SANS 50001will be prepared as required by the Department of Energy. The energy management plan will need to include a list of technically and financially viable measures that can be put in place to meet the savings potential.			X		Energy management plan	Project Company	Prior to operation
		The Project plans to make use of solar PV energy to meet some of the plant's auxiliary load requirements. Renewable energy can play a key role in the site's GHG emissions management plan and further opportunities to install more renewable capacity on-site will be investigated going forwards.			X			Project Company	During operation
Traffic									
Impact on traffic levels	Minimise traffic associated with the construction and operation of the	Implement the Traffic Management Plan (refer to *Section 11.14*); which includes the implementation of:		X	X	X	Traffic Management Plan	Project Company Contractors	Throughout the lifecycle of the Project

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
	Project								
		Conduct a road condition survey in order to gauge the damage to the road as a result of the intensive heavy traffic.	X				Road Condition Survey	Project Company; appointed specialist	Prior to construction
		The risk assessment of the proposed improvements to OP7644 should be the subject of a Road Safety Audit (RSA).	X				Road Safety Audit	Project Company; appointed specialist	Detailed design stage
		All employees must attend an environmental training programme which will include details of approved access roads and speed limits.		X		X	Training Records	Contractors; ECO	Prior to construction and during duration of contract
		Adjacent landowners must be notified of the construction and operation schedule.		X	X	X	Proof of Notification	Project Company	Prior to construction and operation phases
		Flagging must be provided at access points to the site and must be maintained until construction is completed.		X		X	Visual Inspection	Contractors	During construction and decommissioning phases
		All vehicles must be maintained in good condition to ensure that they are road worthy.		X	X	X	Maintenance Records Vehicle inspections	Project Company; Contractors	Throughout the lifecycle of the Project
		Speed restrictions must be established and enforced over all traffic.		X	X	X	Method Statements; Speeding Register	Project Company; Contractors	Throughout the lifecycle of the Project
		The movement of all vehicles within the site must be on designated roadways.		X	X	X	Visual Inspection	Project Company; Contractors	Throughout the lifecycle of the Project
		All necessary transportation permits to be applied for and obtained from the relevant authorities prior to	X				Transportation Permits	Project Company; Contractors	Prior to construction

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		construction, including access to the site from OP7644 which will include the addition of proposed turning lanes.							
		If abnormal loads are required, the appropriate arrangements will be made to obtain the necessary transportation permits and the route agreed with the relevant authorities to minimise the impact of other road users.	X	X	X	X	Abnormal load permits	Project Company; Contractors	As and when required.
		A designated access point to the site must be created and clearly marked to ensure safe entry and exit.		X		X	Visual Inspection	Contractors	During construction and decommissioning phases
		Signs must be placed along construction roads and at the entrance to the site to identify speed limits, travel restrictions and other standard traffic control information and road markings.		X		X	Visual Inspection	Contractors	During construction and decommissioning phases
		Where possible, construction vehicles to avoid travelling on the public roadway during the morning and late afternoon commute time, to reduce the impact on other road users.		X		X	Method Statement	Contractors	During construction and decommissioning phases
		All trucks transporting materials and water to and from the site must be appropriated covered during the construction phase.		X		X	Visual Inspection	Contractors	During construction and decommissioning phases
Impact on road safety	Manage vehicles and machinery to reduce the impact of traffic incidents.	A public transport embayment will be provided downstream of the entrance to the power plant and on both sides of the OP7644.			X		Final Design	Project Company	To be constructed during construction phase and implemented during operation
		All internal and access roads that will			X		Visual Inspection Maintenance Plan	Project Company	Throughout operational phase

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		be used during the operational phase of the Project must be maintained.							
Socio-Economic									
Employment, Skills Enhancement and Local Business Opportunities	Optimise opportunities for employment of local people, wherever possible, or alternatively that employment of South Africans, is prioritised over foreigners	Establish and implement a recruitment policy which prioritises the employment of South African and local residents (originating from the Local Municipality) over foreigners. Criteria will be set for prioritising local residents and then other South Africans as part of the recruitment process.	X	X	X	X	Recruitment Policy	Project Company	Throughout all phases of the Project
		All contractors will be required to recruit in terms of the Project's recruitment policy, where practical.	X	X	X	X	Recruitment Policy	Contractors	Throughout all phases of the Project
		The Project will meet with the Local Municipality and the IDZ to access any available skills/employment-seekers database for the area. This database is to be updated and made available to the appointed contractors.	X	X	X	X		Project Company	Throughout all phases of the Project
		Advertise job opportunities and criteria for skills and experience as needed through local media. This information should also be provided to all relevant authorities, community representatives and organisations on the interested and affected party database.	X	X	X	X		Project Company	Advertise at least three months ahead of recruitment
		Monitor on-the-job performance and training through performance reviews. Training needs will be identified and provided by the Project.	X	X	X	X	Performance Reviews Training Records	Project company, Contractors	Throughout all phases of the Project
Impacts on	Ensure effective	Compile and implement a grievance		X	X	X	Grievance	Project	To be

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
affected and surrounding landowners and land uses	communication mechanisms	procedure that is easily accessible to the local community, through which complaints related to contractor or employee behaviour can be lodged and responded to.					mechanism procedure	Company, Contractors	implemented during construction, operational, and if applicable, decommissioning phases
Community Health and Safety: Impacts associated with: • presence of the Project workforce; • influx of jobseekers; • air emissions	To protect members of the public / landowners / residents.	Develop an induction programme, including a Code of Conduct, for all workers directly related to the project and address the following aspects: • respect for local residents and customs; • zero tolerance of bribery or corruption; • zero tolerance of illegal activities; • no alcohol and drugs policy during working time or at times that will affect ability to work; • description of disciplinary measures.	X	X	X	X	Code of Conduct to be signed by each person.	Project Company	To be developed during planning and design phase and implemented during construction, operation, and if applicable, decommissioning phases
		Develop and implement an HIV/AIDS policy and information document for all workers directly related to the Project.		X	X	X	HIV/AIDS policy and information document	Project Company	To be implemented during construction, operational, and if applicable, decommissioning phases
		Secure the site, working areas and excavations in an appropriate manner.		X	X	X	Visual Inspection	Project Company, Contractors	During site establishment and maintenance for duration of contract.
		Implement access control procedures		X	X	X	Visual Inspection	Project	During site

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			Planning and Design	Construction	Operation	Decommissioning			
		which allows for the identification of all people on-site.						Company, Contractors	establishment and maintenance for duration of contract. Operational phase
Risk to Workers' Health and Safety due to Hazardous Construction and Operational Activities	To protect the construction workforce and operational personnel	The Project will comply with all applicable South African legislation in terms of health and safety, and worker rights, which will include access to workman's compensation for loss of income resulting from an onsite incident.		X	X	X	Workman's compensation policy as part of contract	Project Company, Contractors	Compliance throughout construction, operation, and if applicable, decommissioning phases
		As part of the contractor and supplier selection process the Project will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in South African law, international standards and the Project's policies.		X	X	X		Project Company, Contractors	Throughout all phases of the Project
		The Project will provide support to contractors and subcontractors to ensure that labour and working conditions are in line with South African law through capacity building.		X	X	X	Training records	Project Company, Contractors	Throughout all phases of the Project
		Workers will be provided with primary health care and basic first aid at construction camps /worksites.		X		X	Visual inspection	Contractors	Throughout construction and decommissioning phases
		In line with the worker code of conduct employees should not be under the influence of intoxicants which could adversely affect the ability of that employee to perform the work or adversely affect the health and safety of		X	X	X	Conduct breathalyser tests at random	Project Company, Contractors	Throughout all phases of the Project

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		other employees, other persons or the environment.							
		Provide Personal Protective Equipment (PPE), training and monitoring as well as ongoing safety checks and safety audits		X	X	X	Visual Inspection	Project Company, Contractors	Throughout all phases of the Project
		Ensure that all workers on site are aware of the proper procedure in case of a fire occurring on site.		X	X	X	Emergency Preparedness and Response Plan Training Records	Project Company, Contractors and ECO	Prior to construction and during duration of contract
		Establish the necessary ablution facilities with chemical toilets at appropriate locations on site (1 toilet per every 15 workers).		X		X	Visual Inspection	Contractors	During site establishment and maintenance for duration of contract
Visual									
Visual Impacts associated with the plant	To reduce the visual impact of the Project activities on the surrounding communities	Construction areas to be kept neat and tidy, with litter and dust management measures in place at all times.		X		X	Visual Inspection	Project Company, Contractors	Throughout construction phase
		If construction or operation is to occur during the night, all lights used for illumination will be designed and installed appropriately to avoid excessive light spill		X	X		Visual Inspection	Project Company, Contractors	During construction and operation phases
		Signage related to the Site must avoid commercial messages, be discrete, and be confined to entrance gates unless they serve to inform the public about the facility.			X		Visual Inspection	Project Company	Throughout operation
		All equipment and infrastructure on site will be removed and the impacted areas rehabilitated unless an alternative use for the infrastructure is identified in the closure plan.				X	Visual Inspection	Project Company	Following the decommissioning phase

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
Cultural Heritage									
Impacts to Pre-colonial & Colonial Archaeology, Graves and Cairns		Should any human burials, archaeological or palaeontological materials (fossils, bones, artefacts etc.) be uncovered or exposed during earthworks or excavations, they must immediately be reported to the Heritage Western Cape must be notified (Telephone: 021 483 9685), as well as Environmental and Heritage Section of the Saldanha Bay Municipality		X			Report sent to the Heritage Western Cape	Project Company and Contractor with assistance from heritage specialist	During construction
		After assessment and if appropriate a permit must be obtained from the SAHRA or HWC to remove such remains.		X			Heritage permit	Project Company and Contractor with assistance from heritage specialist	During construction
Impacts to buried Palaeontology		Sub-surface excavations should be monitored by a palaeontologist or archaeologist with appropriate palaeontological knowledge. The frequency of this to be worked out a priori with the contractor to minimise time spent on site.		X			Monitoring reports	Project Company and Contractor with assistance from a palaeontologist	During construction
		Any material recovered will be lodged in the Cenozoic collections of Iziko South African Museum.		X				Project Company and Contractor with assistance from a palaeontologist	During construction
		If any palaeontological material is uncovered, permit for the disturbance and removal of palaeontological material will be required from the Western Cape Provincial Heritage		X			Heritage permit	Project Company and Contractor with assistance from heritage specialist	During construction

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Agency.							
		Training in the nature and value of palaeontological and archaeological remains should be provided to project staff and equipment operators.		X			Training materials and attendance registers	Project Company, ECO, Contractor and Palaeontologist	During construction
		Should anything of a palaeontological nature be encountered on site by the Contractor (or any other party), e.g. bones or wetland deposits, work is to be stopped in that area immediately, and the OM / Principal Agent notified. Failure to do so will result in a penalty and this must be carefully explained to workers during the Environmental Education Programme undertaken by the OM.		X				Project Company, ECO, Contractor	During construction
		In the event of palaeontological material being encountered, the OM will demarcate the area and notify the appointed specialist (palaeontologist/ archaeologist with appropriate experience) who will view the material and ascertain whether further study of the area is required.		X			Visual inspection	Project Company, ECO, Contractor and Palaeontologist	During construction
		Should the specialist confirm a genuine fossil or sub-fossil and recommend further study of the area, work in the applicable area is to cease until further notice while arrangements are put in place. Heritage Western Cape (HWC) is to be informed immediately by the OM (Telephone: 021 483 9685).		x				Project Company, ECO, Contractor and Palaeontologist	During construction
Waste Management									

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
Pollution of the environment caused by waste	Limit the potential for site pollution and the accumulation of waste materials on site.	A suitable area for the storage of waste must be selected and included in the site layout plan.	X					Project Company	Prior to construction
		An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. The requirements of the Waste Management Plan (see *Section 11.17*) should be implemented.	X	X	X	X	Waste Management Plan	Project Company	Plan to be developed prior to construction and implemented throughout Project
		Where required, bunds will need to be constructed for fuel, oil, used oil and chemical storage areas. Bunds must be appropriately surfaced and have sufficient volume to accommodate any leaks as per the requirements of SABS 089:1999 Part 1.	X	X	X		Visual Inspection	Project Company, Contractors	Bund design to be confirmed prior to construction.
		All waste must be separated into clearly marked skips for recycling, reuse and disposal.		X	X	X	Visual Inspection	Project Company, Contractors	
		Vegetative material will be kept on site and mulched after construction to be spread over the disturbed areas to enhance rehabilitation of the natural vegetation, provided that they are free of seed-bearing alien invasive plants.		X			Rehabilitation Plan	Project Company, Contractors	
		Any hazardous waste must be removed by a licensed waste disposal operator.		X	X	X	Waste Disposal Certificates	Project Company, Contractors	
		Hazardous substances must not be stored where there could be accidental leakage into surface or groundwater.		X	X	X	Visual Inspection	Project Company, Contractors	

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Waste must not be disposed of by burning, dumping or burying.		X	X	X	Visual Inspection	Project Company, Contractors	
		Littering on-site is forbidden and clean-up operations will be undertaken to address litter.		X	X	X	Visual Inspection	Project Company, Contractors	Daily clean-up operations to be undertaken.
		Temporary ablutions will be located in convenient locations around the Site, and must be cleaned regularly by a licenced sanitary contractor. All temporary ablutions must be removed from the site when the construction phase is completed		X			Waste Management Policy Visual Inspection	Contractors	
		Effluent from the cement batching plant must be contained within a settling sump and not be allowed to drain into water courses. Effluent will be recycled or removed.		X			Waste Disposal Certificates Visual Inspection	Project Company, Contractors	
		Excess or spilled concrete should be confined to the batching plant and work locations, and be disposed of as waste at a licensed landfill site.		X			Method Statement Waste Disposal Certificate Visual Inspection	Project Company, Contractors	
		The visible remains of the mixing of concrete, either solid or from washings, shall be physically removed and disposed of as waste at a licensed landfill site.		X			Waste Disposal Certificate Visual Inspection	Project Company, Contractors	
		All excess aggregate shall also be removed from site.		X			Visual Inspection	Project Company, Contractors	
		Spill containment and clean up kits will be available onsite and clean-up from any spill will be appropriately		X	X	X	Visual Inspection	Project Company, Contractors	

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		contained and disposed of to a licensed landfill by a licensed operator.							
		Used oil stored on site must be stored in an impervious container, within a bunded area.		X	X	X	Visual Inspection	Project Company, Contractors	
		All waste at the site must be handled appropriately and kept in closed bins not accessible to fauna.		X	X	X	Visual Inspection	Project Company, Contractors	
		General waste must be removed from site by a licensed contractor.		X	X	X	Waste manifest	Project Company, Contractors	
		Hazardous waste such as oils, oily rags, paint tins, bitumen etc. must be disposed of at a licenced hazardous waste facility.		X	X	X	Hazardous Waste Disposal Certificates	Project Company, Contractors	
		An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage.			X		Monitoring system	Project Company	
		Ensure that precautionary measures are in place to limit the possibility of oil and other toxic liquids from entering the soil or stormwater system.	X		X		Engineering Designs	Project Company	
Unplanned Events									
Risk of an incident (i.e. fire or explosion) from a loss of containment of Natural Gas or Propane from pipelines, facilities or ancillary	Ensure legal compliance of the facility.	Completing recognised processes of hazard analysis processes (HAZOP, FMEA, SIL, LOPA etc.) for the proposed CCGT power plant prior to construction	X				Completed processes of hazard analysis	Project Company	After Planning and Design Phase
		Ensuring a Major Hazard Installation (MHI) risk assessment is carried out for the facility in accordance with the	X				MHI Risk Assessment	Project Company	After detailed designs have been completed for the

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
equipment at the proposed Natural Gas pipelines or Propane electricity generator		Major Hazard Installation regulations							pipelines and CCGT power plant
Loss of containment of Natural Gas or Propane from pipelines	To avoid or minimise the risk of an incident (i.e. fire or explosion) through engineering design features	The pipelines to be designed to an international standard such as: • BS EN 14161: Petroleum and natural gas industries – Pipeline transportation systems; • ASME B31.8 Gas Transmission and Distribution Piping Systems; or • Other internationally recognised standards.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		The pipelines' wall thickness to be designed to accommodate the maximum operating pressure of 90 barg with a suitable safety factor.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Isolation valves to be located at least at either end of the pipelines but ideally at intervals such that in the event of a leak only small amounts of Natural Gas would be released.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Leak prevention systems such as cathodic protection and pipeline coatings suitable for the ground conditions to be implemented.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		The pipelines are to include an emergency shutdown system that will shut emergency isolation valves and depressurise the pipelines safely.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Areas of road crossing shall include specific protection measures to account for the weight from road traffic.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		A leak detection system is to be considered for the pipelines.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		The installation of non-return valves on the pipelines is to be considered.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Depth of burial of the pipelines along their length should be equal to, or greater than the minimum depth of burial specified.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Potential other risk reduction measures include concrete sheathing, tiles above pipelines, marker tape above pipelines, route marker posts etc.	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Emergency response plan for the pipeline must be compiled with the user of the pipelines and the Local Authority together.	X				Emergency Response Plan	Project Company	Planning and Design Phase
Loss of containment of Natural Gas or Propane from Propane generator installations on the CCGT power plant site	To avoid or minimise the risk of an incident (i.e. fire or explosion) through engineering design features	The installation must comply with all the requirements of SANS 10087-3:2015 The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 L	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Multiple (at least two) safety systems will be implemented for Propane offloading.	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase. To be implemented in Construction and

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
									Operation.
		There will be effective inspection and pressure/leak tests to prevent transfer system leaks and bursts.		X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase. . To be implemented in Construction and Operation.
		The Propane storage vessel shall be fitted with pressure relief valves, which would only lift when the vessel has reached its maximum operating pressure or level	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		All piping shall be rated to accommodate the required operating pressure of the system and allow for pressure relief to a safe area	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		All pressure relief systems should vent away from the generator air intake system	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		The Propane vessel shall be filled with sparge pipes in the vapour space to limit reverse flow to the off-loading point as well as preventing vessel stresses due to uneven temperature	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		All instrumentation and electrical equipment shall be specified in accordance to the Hazardous Area classification as per SANS 10108	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Off-loading of Propane shall be done on a fully-automated system to prevent overfilling	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Pullaway prevention systems such as wheel chocks should be utilised during Propane offloading	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		Off-loading safety systems such as earthing of the road tanker are required	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Off-loading of Propane shall be done using hoses with breakaway couplings	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Emergency shutdown (ESD) shall be provided that would automatically shut down systems such as feed or off-loading pumps and emergency shut off valves in the event of an emergency	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Emergency shutdown should be initiated by local operators, CCGT control room operators as well as by gas detectors where appropriate.	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Active or passive fire protection on the Propane storage bullet in line with SANS 10087-3:2015	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Propane road tanker offloading deluge system to cool equipment in the event of a fire if required by SANS 10087-3:2015	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Gas detectors with appropriate logic which can initiate emergency shutdown	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		All of the automatic safety systems shall be designed so that they can also be manually activated	X				Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
		Procedures should ensure at least one person be present during Propane offloading	X	X	X		Final Detailed Design	Project Company and appointed Engineers	Planning and Design Phase
Emergency Incident	Reporting and management of emergency incidents	Any Emergency Incidents are to be reported immediately to the relevant		X	X	X	Emergency Response Plan	Project Company and designated responsible	As required

Aspect, Potential Impact / Issue	Objective	Mitigation and Enhancement Commitments	Applicable Phase				Monitoring and Indicators	Responsible Party	Implementation Time Frame and Frequency
			Planning and Design	Construction	Operation	Decommissioning			
		authority by the responsible person to the relevant authority as per the requirements of Section 30 of the National Environmental Management Act (Act No. 107 of 1998). All necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.						person	

11.6.1 Decommissioning Phase

A detailed decommissioning and rehabilitation plan must be developed prior to decommissioning the CCGT gas fired power plant and associated infrastructure. This plan should include, but not be limited to, management of socio-economic aspects such as employment loss, removal, re-use and recycling of materials and vegetative rehabilitation to prevent erosion.

The decommissioning activities will be similar to construction activities and therefore recommendations outlined to manage construction phase impacts should be adhered to during decommissioning. Management actions should focus on the rehabilitation of disturbed areas and the removal of infrastructure.

11.7 SPECIFIC MANAGEMENT PLANS

In accordance with the DEA's acceptance of the Scoping Report, a variety of management plans have been developed as part of the EMPr. These are aimed at ensuring that construction and operation occur in a responsible manner and include:

- Alien Invasive Management Plan;
- Plant Rescue and Protection Plan;
- Revegetation and Rehabilitation Plan;
- Open Space Management Plan;
- Traffic Management Plan;
- Stormwater Management Plan;
- Erosion Management Plan; and
- Emergency Preparedness and Response Plan.

The purpose, objectives and underlying principles of these plans are detailed in the sections that follow. All management and mitigation measures of the plans have been included in *Table 11.9*.

11.8 ALIEN INVASIVE MANAGEMENT PLAN

11.8.1 Objectives

The purpose of the Alien Invasive Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Project. The broad objectives of the plan include the following:

- Ensure alien plants do not become dominant in parts or the whole site through the control and management of alien and invasive species presence, dispersal and encroachment.

- Initiate and implement a monitoring and eradication programme for alien and invasive species.

- Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

11.8.2 Principles

General Clearing and Guiding Principles

- The lighter infested areas should be cleared first to prevent the build-up of seed banks.

- Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently.

- Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses.

- All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing.

- Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. However care should be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Construction Phase Alien Invasive Management Principles

- Clearing of vegetation should be undertaken as the work front progresses – mass clearing should not occur unless the cleared areas are to be surfaced or prepared immediately afterwards.

- Where cleared areas will be exposed for some time, these areas should be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil Saver) may be pegged over the soil to stabilise it.

- Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides should not be used.

- Clearing of vegetation is not allowed within 32m of any wetland, 80m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless permission is granted by the ECO for specifically allowed construction activities in these areas.

- Alien invasive species (such as ryegrass or oats) or straw containing any such species will not be used for temporary soil stabilisation of the pipeline corridor, as these will then rapidly dominate these areas, to the exclusion of indigenous species.

- Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.

Operation Phase Alien Invasive Management Principles

- Ongoing alien invasive plant management will be undertaken on an annual or biannual basis within any undeveloped portions of the power plant site and within the full pipeline servitude.

- No spraying of herbicide will be undertaken in the rehabilitated areas as this kills numerous non-target species.

- Focus will be on removing (using CapeNature approved methodology) all alien invasive shrubs and large herbs, although in some cases it may be possible and necessary to also remove invasive alien grasses.

11.8.3 Monitoring

Document and record alien invasive plant management throughout the life cycle of the project on a biannual basis including:

- alien plant distribution maps;
- alien plant control measures implemented; and
- evaluation of control success rate

11.9 PLANT RESCUE AND PROTECTION PLAN

11.9.1 Purpose

The purpose of the plant rescue and protection plan is to implement avoidance and mitigation measures to reduce the impact of the development of the Project on listed and protected plant species and their habitats during construction and operation.

11.9.2 Rescue and Protection Plan Principles

A plant rescue and translocation operation for protected plants will need to be undertaken prior to site clearing or construction taking place, according to the following principles:

- A suitably qualified botanist must be appointed prior to any construction / land clearing activities taking place, to undertake plant search and

rescue from the entire pipeline development corridor south of the Langebaan – Saldanha road. Search and Rescue will also be undertaken for selected species within the power plant footprint prior to development. Search and rescue operations should be undertaken during the appropriate season as determined by the appointed botanist.

- All translocatable plant species will be bagged up and stored in a nursery for later use, once construction has been completed and rehabilitation is required.

- A Training and Awareness Programme will be developed for employees and contractors to allow for training with regard to the areas of High and Medium – High sensitivity. This will be undertaken in conjunction with an experienced botanist.

- Replanting of the rescued specimens will be undertaken in the first autumn – winter (May – June) after construction has been completed, giving the plants maximum time to establish before the next summer dry period.

- The approved development footprint in this area will be surveyed and clearly demarcated with wire or coloured rope, and strung with warning signs, prior to any construction.

- Immediately after being transplanted, species should be adequately watered.

11.9.3 Monitoring

Plant mortality can be high when plants are transplanted and it is therefore recommended that relocated plants be monitored for a period of at least a month post-translocation to identify any additional plant requirements.

11.10 REVEGETATION AND REHABILITATION PLAN

11.10.1 Purpose

Disturbance of terrestrial vegetation outside the actual development footprint is likely to be inevitable and will likely require rehabilitation post-construction where the vegetation and / or soil surface has been damaged or disturbed. The purpose of this plan is to ensure that areas cleared or impacted during construction activities of the proposed Facility are rehabilitated with a plant cover that reduces the risk of erosion from these areas as well as restores ecosystem function. The purpose of the rehabilitation at the site can be summarised as follows:

- Achieve long-term stabilisation of all disturbed areas to minimise erosion potential;

- Re-vegetate all disturbed areas with suitable local plant species;
- Minimise visual impact of disturbed areas;
- Ensure that disturbed areas are safe for future uses; and
- The movement of people and vehicles within rehabilitated areas must be restricted and controlled.

11.10.2 Principles

The following guidelines provide a clear and practical means of implementing such rehabilitation once construction activities have ceased.

General Recommendations

- Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.
- Once revegetated, areas should be protected to prevent trampling and erosion.
- No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.
- Fencing should be removed once a sound vegetative cover has been achieved.
- Any runnels, erosion channels or wash-aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

Topsoil Management

Effective topsoil management is a critical element of rehabilitation, particularly in arid areas where soil properties are a fundamental determinant of vegetation composition and abundance. Where any excavation or topsoil clearing is required, the topsoil should be used immediately where possible or stockpiled and later used to cover cleared and disturbed areas once construction activity has ceased.

- Topsoil should be retained on site in order to be used for site rehabilitation. Topsoil must be excavated to the correct depth. It is recommended that no more than the top 10cm of topsoil are stored and used for rehabilitation.

- Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This avoids stockpiling and double handling of the soil.

- If direct transfer is not possible, the topsoil should be stored separately from other soil heaps until construction in an area is complete. The soil should not be stored for extended periods and should be used as soon as possible.

- Ideally stored topsoil should be used within one month and should not be stored for longer than three months. In addition, it is recommended that topsoil stores should be a maximum depth of 1m to avoid compaction and the development of anaerobic conditions within the soil.

- If topsoil is stored on a slope then sediment fencing should be used downslope of the stockpile in order to intercept any sediment and runoff should be directed away from the stockpiles upslope.

Seeding

In some areas the natural regeneration of the vegetation may be poor and the application of seed to enhance vegetation recovery may be required. Seed should be collected from plants present at the site and should be used immediately or stored appropriately and used at the start of the following wet season. Seed can be broadcast onto the soil, but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch.

Transplants

Where succulent plants are available or other species which may survive translocation are present, individual plants can be dug out from areas about to be cleared and planted into areas which require revegetation. The primary purpose of using transplants is not to restore plant cover to its former levels, but rather to provide nodes of biological activity and a source of propagules that can spread and recover disturbed areas on their own. As such transplants should be planted in clumps rather than as isolated individuals.

- Plants for transplant should preferably be removed from areas that are going to be cleared.

- Transplants should be placed within a similar environment from where they came in terms of aspect, slope and soil depth.

- Transplants must remain within the site and may not be transported off the site.

As required, additional rehabilitation of the pipeline servitude south of MR559 will be undertaken using the relevant locally indigenous species that

are additional to those used in the Search and Rescue process. This work will be undertaken by an contractor with relevant horticultural experience who has access to suitable locally grown species.

Use of Soil Savers

In areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. The site is windy and wind erosion is likely to be a potentially significant issue at the site following construction and measures to protect the soil surface such as soil savers may to be necessary. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed. In areas where a soil saver is used, it should be pegged down to ensure that it captures soil and organic matter flowing over the surface.

Soil saver may be seeded directly once applied as the holes in the material catch seeds and provide suitable microsites for germination. Alternatively, fresh mulch containing seed can be applied to the soil saver.

11.10.3 Monitoring Requirements

As rehabilitation success is unpredictable, monitoring and follow-up actions are important to achieve the desired cover and soil protection.

- Re-vegetated areas should be monitored every 6 months for the first 18 months following construction.

- Re-vegetated areas showing inadequate surface coverage (less than 10% within 12 months after re-vegetation) should be prepared and re-vegetated.

- Any areas showing erosion, should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

11.11 OPEN SPACE MANAGEMENT PLAN

11.11.1 Purpose

The purpose of the Open Space Management Plan (OSMP) is to provide a framework for the integrated management of the natural spaces within the Project Area. The footprint of the facility will occupy a small proportion of the site, but impacts resulting from the construction and operational activities of the facility may spread well beyond the required footprint and impact biodiversity within the site more generally. The goal of the OSMP is to reduce the ecological footprint of the power plant through ensuring that the facility operates in a biodiversity-compatible manner and does not have a long-term negative impact on the local environment.

11.11.2 Principles

The following mitigation and management measures are considered part of the Open Space Management Plan:

Access Control

- Access to the facility should be strictly controlled.
- All visitors and contractors should be required to sign-in.
- Signage at the entrance should indicate that disturbance to fauna and flora is strictly prohibited.
- The fencing around the facility should consist of a single fence with electrified strands only on the inside of the fence and not the outside.

Prohibited Activities

The following activities should not be permitted within the facility by anyone except as part of the other management programmes of EMPr for the development.

- No fires within the site.
- No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty and with the appropriate permits and landowner permission.
- No dogs should be allowed on site.
- No driving off of demarcated roads.

Fire Risk Management

The National Veld and Forest Fires Act places responsibility on the landowner to ensure that the appropriate equipment as well as trained personnel are available to combat fires. Therefore, the management of the facility should ensure that they have suitable equipment as well as trained personnel available to assist in the event of fire. Fires must be managed in accordance with the plants Emergency Response Plan.

Alien Plant Control

Alien invasive plants should be controlled according to the Alien Invasive Management Plan.

Erosion Management

The facility should be inspected every 6 months for erosion problems or more frequently in the event of exceptional rainfall events. All erosion problems should be rectified according to the Erosion Management Plan.

11.12 TRAFFIC MANAGEMENT PLAN

11.12.1 Purpose

Implementation of the Traffic Management Plan (TMP) will ensure regulatory compliance and the reduction of the significance of impacts related to transport during the construction and operation of the Project. The objectives of this plan are therefore:

- Ensure compliance with all legislation regulating traffic and transportation within South Africa;
- Avoid incidents and accidents;
- Raise greater safety awareness in each drivers;
- Avoid the deterioration of roads; and
- Avoid pollution that can be created from noise and emissions related to transport.

11.12.2 Traffic and Transport Management Principles

The following principles (as included in *Table 11.9*) will be adhered to during the applicable phases of the Project:

- Conduct a road condition survey in order to gauge the damage to the road as a result of the intensive heavy traffic.

- The risk assessment of the proposed improvements to OP7644 should be the subject of a Road Safety Audit (RSA).

- All employees must attend an environmental training programme which will include details of approved access roads and speed limits.

- Adjacent landowners must be notified of the construction and operation schedule.

- Flagging must be provided at access points to the site and must be maintained until construction is completed.

- All vehicles must be maintained in good condition.

- Speed restrictions must be established prior to commencement of construction and enforced over all construction traffic.

- The movement of all vehicles within the site must be on designated roadways.

- All necessary transportation permits to be applied for and obtained from the relevant authorities prior to construction, including access to the site from OP7644 which will include the addition of proposed turning lanes.

- If abnormal loads are required, the appropriate arrangements will be made to obtain the necessary transportation permits and the route agreed with the relevant authorities to minimise the impact of other road users.

- A designated access point to the site must be created and clearly marked to ensure safe entry and exit.

- Signs must be placed along construction roads and at the entrance to the site to identify speed limits, travel restrictions and other standard traffic control information and road markings.

- Where possible, construction vehicles to avoid travelling on the public roadway during the morning and late afternoon commute time, to reduce the impact on other road users.

- Public transport embayments will be provided downstream of the entrance to the power plant and on both sides of the OP7644.

- All internal and access roads that will be used during the operational phase of the Project must be maintained.

11.12.3 Monitoring

Contractors and the Project Company must ensure that all vehicles adhere to the speed limits. A speeding register should be maintained which details the offending drivers and the offence.

11.13 STORMWATER MANAGEMENT PLAN

11.13.1 Purpose

The construction and operation of the Project can negatively impact drainage systems therefore stormwater management systems that take cognisance of natural hydrological patterns and processes will reduce the potentially negative impacts. The main risks associated with poor stormwater management practices are increased erosion risk and risks associated with flooding. Therefore the principles underlying the Erosion Management Plan should be read in conjunction with the Stormwater Management Plan (SWMP).

The objective of this SWMP is to provide measures to address runoff from disturbed portions of the site so that:

- Concentrated flows into natural watercourses are minimised;

- Concrete or other lining of watercourses to protect them from concentrated flows is not required; and

- Natural flow pathways are not diverted.

11.13.2 Stormwater Management Principles

The following sets out the general design principles that will enable effective stormwater management. It should be noted that a detailed SWMP with engineering specifications for proposed stormwater control measures will be prepared by the civil engineers during the detailed design phase. This will be based on the following underlying principles:

Sedimentation

Mitigation of possible sedimentation that may impact drainage systems can be achieved by implementing the following measures:

- Implement energy dissipation structures where concentrated flows occur.

- Implement appropriate measures to trap sediment at sources where areas are going to be disturbed (e.g. construction materials laydown area). Mitigation measures could include sediment fences and erosion control blankets.

- Design road networks to prevent the accumulation of high energy surface flows by specifying surface cross drains at regular intervals, by constructing roads to natural ground level or by including sufficient drainage in the form of culverts.

- Maintain, where possible, the natural vegetation cover and facilitate re-vegetation of disturbed areas to stabilise the soil.

- Stabilise all earthen berm structures by specifying adequate compaction and revegetating.

- Exercise good excavation practises during the construction phase. Backfill and compact all material to acceptable standards as soon as possible after construction and facilitate re-vegetation of all disturbed areas as soon as possible after backfilling.

- Workshop areas will be lined to prevent subsurface ingress of contaminants and drainage from these areas will not be allowed to drain into groundwater.

Flooding

Mitigation of the possible risk of flooding can be achieved by implementing the following measures:

- Only remove natural vegetation where necessary and maintain the natural flow resistance which will decrease flood peaks.

- Implement free draining platforms (if required) for the substations and transformers to prevent the risk of flooding of infrastructure.

- Establish earthen berms to protect infrastructure against flooding.

- Implement attenuation facilities of areas that are drained.

11.13.3 Monitoring

Although it is anticipated that the proposed Project (the pipeline development in particular) will have a limited impact on the drainage characteristics of the area, it is recommended that monitoring of the site be carried out both during and after construction to identify potential impacts on the natural systems as a result of potential altered flow patterns.

In addition, the discharge points from the laydown areas should be monitored for signs of concentrated flows and erosion.

The pipeline access road has the potential to impact negatively on the natural drainage pattern of the area if not designed and implemented correctly. The road network should be monitored regularly to determine areas where stormwater may be concentrated or diverted which may lead to erosion. In addition, the crossing points at the drainage features should be monitored for signs of erosion.

Should signs of erosion and alterations to the natural flow patterns be identified, appropriate interventions should be designed to address the issues as they arise.

11.14 EROSION MANAGEMENT PLAN

11.14.1 Purpose

The erosion management plan addresses the management and mitigation of potential impacts relating to soil erosion during the construction and operation of the Project. The objectives of the plan are to:

- Provide a general framework for soil erosion and sediment control; and

- Outline general methods to monitor, manage and rehabilitate erosion prone areas.

11.14.2 Erosion and Sediment Management Principles

The following management principles will reduce the impact of erosion and enable progressive revegetation and stabilisation of disturbed areas:

- Restrict removal of vegetation and soil cover to the development footprint.
- Soil stockpiles must be protected from wind or water erosion through placement, vegetation or appropriate covering.
- Excavations/trenches should be backfilled slightly higher than the natural ground level to accommodate some degree of settlement of the backfill material.
- Exercise good excavation practises - backfill and compact all material to acceptable standards as soon as possible after construction and facilitate re-vegetation of all disturbed areas as soon as possible after backfilling.
- Construction vehicles will remain on designated and prepared roads. Special care should be taken to avoid driving on any sand dunes in the vicinity of the site.
- Maintain, where possible, the natural vegetation cover and facilitate re-vegetation of disturbed areas to stabilise the soil against erosion.
- Foundations and trenches must be backfilled with originally excavated materials as far as possible. Excess excavation materials must be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.
- Borrow materials must only be obtained from authorised and permitted sites.
- Although soil erosion is not considered significant, it might be necessary to implement control measures such as suitable location on flatter areas with low erosion potential and the rapid establishment of vegetation through seeding of the stockpiles, to promote and reserve indigenous seeds and (soil fertility) organic matter.
- Where space constraints are not limiting, topsoil stockpiles will be constructed as low and long facilities not higher than 2m, or where space constraints limit this, stockpiles will be constructed as terraced stockpiles.
- Compacted areas must have adequate drainage systems to avoid pooling and surface flow.
- Rehabilitation activities must commence at work faces as soon as construction activities have concluded. Phased construction and

progressive rehabilitation should be implemented where practicably possible.

11.14.3 Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on site, the ECO must:

- Assess the significance of the situation and determine the cause of the impact including taking photographs as visual reference;
- Inform the Project Company / contractors that rehabilitation must take place and that a rehabilitation method statement is to be implemented;
- Monitor that the Project Company / contractors are taking action to stop the erosion;
- Report and monitor the progress of the rehabilitation on a weekly basis; and
- Report all actions in a monthly compliance audit report.

11.15 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

ArcelorMittal Saldanha Works have a Standard Operating Procedure (SHERQ-SPS-030, rev4) which provides a detailed emergency preparedness procedure for various unplanned events. The following types of emergencies, amongst other, are planned for:

- Medical emergency
- Threat of sabotage
- Bomb threat
- Gas clouds or chemical hazards
- Fire / explosions
- Structural and facilities failures and accidents
- Energy and / or utility incidents
- Confided space emergencies
- Working at height emergencies
- Vehicles and driving emergencies
- Emergencies involving contractors.

The procedure defines duties and responsibilities of designated persons and how emergencies should be reported (including contact numbers). Communication methods and training requirements are also documented. Maps are provided to indicate assembly points, equipment location, ambulance points and types of alarms, amongst other. The procedure defines how critical valves, pipes and pumps should be identified and shutoff. Re-entry procedures and recovery of equipment is also documented. Firefighting

equipment, spills equipment and other rescue equipment is described and documented. The plan also provides details of emergency drills, how headcounts should be conducted and evacuations procedures.

The document will be updated to include the proposed power plant and LNG import. It will document on-site emergency procedures that will be followed in the event of an incident or accident. All measures included in *Table 11.9* relevant to emergency procedures will be included in the plan. The document cannot be made public due to the sensitive nature of the information it contains, however ArcelorMittal is willing to make it available to the Competent Authority upon request provided that it remains confidential.

11.16 NOISE MANAGEMENT AND MONITORING

Noise monitoring measures are presented in this monitoring programme, but will only be required if there is development within 2000 m of the plant and/or noise complaints are received.

Should a reasonable and valid complaint about noise be registered, it is the responsibility of the developer to investigate this complaint as per the following sections. It is recommended that the noise investigation be done by an independent acoustic consultant.

While this section recommends a noise monitoring programme, it should be used as a guideline as site specific conditions may require that the monitoring locations, frequency or procedure be adapted.

11.16.1 Measurement Localities and Procedures

Measurement Localities

No routine noise measurements or locations are recommended. Noise measurements must be conducted at the location of the person that registered a valid and reasonable noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading. A second instrument should ideally be deployed at a control point close to the potential noise source during the measurement period.

11.16.2 Measurement Frequencies

Once-off measurements if and when a reasonable and valid noise complaint is registered. Results and feedback must be provided to the complainant. If required and recommended by an acoustic consultant, there may be follow-up measurements or a noise monitoring programme can be implemented.

11.16.3 Measurement Procedures

Ambient sound measurements should be collected as defined in SANS 10103:2008. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 24 hours, covering at least a full day- (06:00 – 22:00) and night-time (22:00 – 06:00) period. Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Spectral frequencies should also be measured to define the potential origin of noise. When a noise complaint is being investigated, measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event.

11.16.4 Relevant Standard for Noise Measurements

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. It should be noted that the SANS standard also refers to a number of other standards.

11.16.5 Data Capture Protocols

Measurement Technique

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008.

Variables to be analysed

Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Noise levels should be co-ordinated with the 10-m wind speed. Spectral frequencies should also be measured to define the potential origin of noise.

Database Entry and Backup

Data must be stored unmodified in the electronic file saved from the instrument. This file can be opened to extract the data to a spread sheet system to allow the processing of the data and to illustrate the data graphically. Data and information should be safeguarded from accidental deletion or corruption.

Feedback to Receptor

A measurement report must be compiled considering the requirements of the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. The facility must provide feedback to the potential noise-sensitive receptors

using the channels and forums established in the area to allow interaction with stakeholders, alternatively in a written report.

11.16.6 Standard Operating Procedures for Registering a Complaint

When a noise complaint is registered, the following information must be obtained:

- Full details (names, contact numbers, location) of the complainant;
- Date and approximate time when this non-compliance occurred;
- Description of the noise or event;
- Description of the conditions prevalent during the event (if possible).

11.17 WASTE MANAGEMENT PLAN

11.17.1 Purpose

To design, construct and operate waste management facilities in a manner that minimises adverse impacts to sensitive receptors.

Performance criteria applicable will be the relevant South African Law including the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). A Waste Management Licence (WML) is not expected to be applicable for this Project.

11.17.2 Principles

General Waste Management Strategy

General Waste Management Planning:

- Facilities that generate waste shall characterize their waste according to composition, source, types of wastes produced, generation rates, or according to local regulatory requirements.
- Effective planning and implementation of waste management strategies shall include:
- Identifying expected waste generation, pollution prevention opportunities, and necessary treatment, storage, and disposal infrastructure;
- Establishment of priorities based on potential EHS risks during the waste cycle and the availability of infrastructure to manage the waste in an environmentally sound manner;
- Definition of opportunities for source reduction, as well as reuse and recycling;
- Definition of procedures and operational controls for onsite storage; and
- Definition of procedures and operational controls for treatment and final disposal.

In accordance with the principles outlined in the IFC EHS Guidelines (2007) and international best practice, the waste management hierarchy objectives are:

- Prevent
- Minimise
- Reduce
- Re-use
- Recycle
- Disposal

Waste Prevention:

- Waste management processes should be designed and operated to prevent, or minimize, the quantities of wastes generated and hazards associated with the wastes in accordance with the following strategy:
- Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off specification, contaminated, damaged, or excess to needs;
- Instituting procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over ordering of materials; and
- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste.

Recycling and Reuse:

- In addition to the implementation of waste prevention strategies, the amount of waste generated may be significantly reduced through the implementation of recycling plans, which shall include the following:
- Identification of potentially recyclable materials;
- Investigation of recycling facilities or companies that may be operating in the vicinity of the proposed infrastructure;
- Establishing recycling objectives and formal tracking of waste generation and recycling rates;
- Providing training and incentives to employees to meet objectives; and
- Providing clearly marked (colour coded) bins in public areas for relevant recyclable materials including paper, plastic, glass and metals.

Treatment and Disposal:

- For waste materials that are generated after the implementation of feasible waste prevention and reduction measures and after all options for reuse, recovery and recycling have been exhausted, treatment and/or disposal will be required. Such waste materials should be treated and disposed of to avoid potential impacts to human health and the environment. Waste management approaches will need to be compliant with local regulations, and may include:
    - Biological, chemical, or physical treatment of the waste material to render it non-hazardous prior to final disposal; and

    - Treatment or disposal at permitted facilities specially designed to receive the waste.
- Examples of treatment and disposal include:
    - composting operations for organic non-hazardous wastes;
    - appropriately designed, permitted and operated landfills or incinerators; and
    - other methods of treatment such as bioremediation of appropriate low toxicity organic materials.

Hazardous Waste Management Strategy:
Hazardous wastes should always be segregated from non-hazardous wastes. If generation of hazardous waste cannot be prevented through the implementation of the above general waste management practices, its management should focus on the prevention of harm to health, safety, and the environment, according to the following additional principles:

- Understanding potential impacts and risks associated with the management of any generated hazardous waste during its complete life cycle;
- Ensuring that contractors handling, treating, and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and follow international best practice for the waste being handled; and
- Ensuring compliance with applicable local and international regulations.

Hazardous Waste Storage:

- Hazardous waste should be stored so as to prevent or control accidental releases to air, soil, and water resources as follows:
- Waste must be stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills. Secondary spill containment measures should also be implemented including physical barriers, bunds or containment curbs;
- Waste should be stored in closed containers away from direct sunlight, wind and rain;
- Secondary containment systems shall be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment. Secondary containment must be included wherever liquid wastes are stored in volumes greater than 220 litres. The available volume of secondary containment should be at least 110 percent of the largest storage container, or 25 percent of the total storage capacity (whichever is greater); and
- Adequate ventilation should be provided where volatile wastes are stored.
- Hazardous waste storage activities should also be subject to special management actions, conducted by employees who have received specific training in handling and storage of the relevant wastes, as follows:
- Provision of readily available information on chemical compatibility to employees, including labelling each container to identify its contents;

- Limiting access to hazardous waste storage areas to employees who have received proper training;
- Clearly identifying (label) and demarcating the storage areas, including documentation of its location on a facility map or site plan;
- Conducting periodic inspections of waste storage areas and documenting the findings; and
- Preparing and implementing spill response and emergency plans to address accidental releases of wastes.

Transportation:

- Transportation of waste should be conducted so as to prevent or minimize spills, releases, and exposures to employees and the public. All waste containers designated for off-site shipment should be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards.

Treatment and Disposal:

- Hazardous waste should be disposed of at licensed facilities operated by qualified commercial or government-owned waste vendors. If such facilities are not available, facilities generating waste shall consider using contractors that:
    - Have the technical capability to manage the waste in a manner that reduces immediate and future impact to the environment;
    - Have all required permits, certifications, and approvals, of applicable government authorities; and
    - Have been secured through the use of formal procurement agreements.

Small Quantities of Hazardous Waste:

- Hazardous waste materials are frequently generated in small quantities by many projects through a variety of activities such as equipment and building maintenance activities. Examples of these types of wastes include: spent solvents and oily rags, empty paint cans, chemical containers; used lubricating oil; used batteries (such as nickel-cadmium or lead acid); and lighting equipment, such as lamps or lamp ballasts. These wastes should be managed following the guidance provided in the previous sections.

11.17.3 Monitoring

Monitoring requirements shall include:

- Inspection of vessels for leaks, drips or other indications of loss;
- Identification of cracks, corrosion, or damage to tanks, protective equipment, or floors;
- Documenting results of testing for integrity, emissions, or monitoring stations (air, soil vapour, or groundwater);
- Documenting any changes to the storage facilities, and any significant changes in the quantity of materials in storage;

- Regular audits of waste segregation and collection practices;
- Tracking of waste generation trends by type and amount of waste generated;
- Characterizing waste at the beginning of generation of a new waste stream, and periodically documenting the characteristics and proper management of the waste, especially hazardous wastes;
- Keeping manifests or other records that document the amount of waste generated and its destination;
- Periodic auditing of third party treatment and disposal services, including re-use and recycling facilities when significant quantities of hazardous wastes are managed by third parties. Whenever possible, audits should include site visits to the treatment storage and disposal locations; and
- Monitoring records for hazardous waste collected, stored, or shipped should include:
    - Name and identification number of the components of the hazardous waste;
    - Physical state (i.e., solid, liquid, gaseous or a combination of these);
    - Quantity (e.g., kilograms or litres, number of containers);
    - Waste shipment tracking documentation to include, quantity and type, date dispatched, date transported and date received, record of the originator, the receiver and the transporter;
    - Method and date of storing, repacking, treating, or disposing at an off-site facility, cross-referenced to specific manifest document numbers applicable to the hazardous waste; and
    - Location of each hazardous waste within the facility, and the quantity at each location.

12 SUMMARY AND CONCLUSION

12.1 INTRODUCTION

The aim of the Environmental Impact Assessment (EIA) for the proposed 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant and gas pipeline is to provide information to inform decision-making that will contribute to environmentally sound and sustainable development. This report is to be submitted to the Department of Environmental Affairs (DEA) to provide information and an independent assessment, thus enabling the DEA to make an accountable and properly informed decision regarding whether or not to grant an environmental authorisation for the proposed development in terms of NEMA.

This report will also assist the DEA to define under what conditions the development should go ahead if authorisation is granted. In considering the development of this type of facility, it is inevitable that there will be certain negative environmental impacts. However, these have largely been mitigated and should be viewed along with Saldanha Steel's urgent requirement for stable, economical electricity for the long term future and the requirement for new generation capacity in South Africa.

Through the EIA process, which included stakeholder and specialist input, ERM has identified and assessed a number of potential impacts relating to the development. A brief overview of the EIA findings and key mitigation measures are presented in this chapter.

The preferred layout of the power plant has been designed based on the sensitivity constraints of the site, as established during the EIA process, including ecological sensitivities, as identified during the initial screening process. The pipeline routing was selected to avoid, as far as possible, the high value conservation areas. The technology to be used was selected to minimise safety risks associated with the Project.

12.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED

12.2.1 Construction Phase Impacts

A summary of the bio-physical and socio-economic impacts, including their pre-mitigation and residual impacts post-mitigation, is given in *Table 12.1* below.

Table 12.1 ***Summary of the significance of identified impacts in the construction phase of the proposed Project*** *(+ve = positive; -ve = negative)*

Impact	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Decreased Ambient Air Quality	Negligible (-ve)	Negligible (-ve)
Increase in Ambient Noise Levels	Negligible (-ve)	Negligible (-ve)
Destruction/disturbance of Flora	Minor to Moderate (-ve)	Minor (-ve)
Loss of Faunal Habitat	Moderate (-ve)	Minor (-ve)
Direct Faunal Impacts	Minor (-ve)	Negligible (-ve)
Habitat Degradation for Fauna	Minor (-ve)	Negligible (-ve)
Avifaunal Habitat Loss during Construction	Moderate (-ve)	Minor (-ve)
Disturbance to Avifauna	Moderate (-ve)	Minor (-ve)
Impact on Traffic Levels	Negligible (-ve)	Negligible (-ve)
Land Use Planning Risk, Natural Gas Pipeline	Negligible (-ve)	Negligible (-ve)
Land Use Planning Risk , Propane Generator	Negligible (-ve)	Negligible (-ve)
Location Specific Individual Risk, Natural Gas Pipelines and Propane Generator	Moderate (-ve)	Moderate (-ve)
Employment Creation, Skills Enhancement and Local Business Opportunities	Moderate (+ve)	Moderate (+ve)
Impacts Associated with the Presence of a Workforce and Jobseekers	Moderate (-ve)	Minor - Moderate (-ve)
Impacts Associated with Pressure on Social Infrastructure and Services	Moderate (-ve)	Moderate (-ve)
Impact on Human Health due to Air Emissions and Dust Generation	Negligible (-ve)	Negligible (-ve)
Nuisance due to Noise, Dust and Vibration	Moderate (-ve)	Minor (-ve)
Risk to Workers' H&S due to Hazardous Activities	Minor to Moderate (-ve)	Minor (-ve)
Impacts to Pre-colonial & Colonial Archaeology	Minor (-ve)	Negligible (-ve)
Impacts to buried Palaeontology	Major (-ve)	Negligible (-ve)

As can be seen, the post-mitigation significance of the unplanned events (linked to location specific individual risk) considered by the quantitative risk assessment was determined to be moderate.

The location of the power plant and pipeline route were specifically selected to avoid ecologically sensitive areas. This resulted in minor and negligible post-mitigation significance.

The implementation of palaeontological chance find procedures and mitigation measures reduces the potential impact to negligible.

Negative impacts associated with the proposed development have been mitigated to a level which is deemed appropriate for the construction phase to proceed.

12.2.2 *Operational Phase Impacts*

A summary of the bio-physical and socio-economic impacts associated with the operational phase, including their pre-mitigation and residual impacts post-mitigation, is given in *Table 12.2* below.

Negative impacts associated with the proposed development have been mitigated to a level which is deemed acceptable. The post-mitigation significance of unplanned events considered by the quantitative risk assessment was determined to be moderate. However, these unplanned events are not considered a fatal flaw if the mitigation measures outlined in the Environmental Management Programme (EMPr) are incorporated during the detailed design phase. Similarly, post-mitigation significance of the increased nuisance caused by the Project and change in sense of place was determined to moderate, but is also not considered to be a fatal flaw.

Table 12.2 ***Summary of the significance of identified impacts in the operational phase of the proposed Project*** *(+ve = positive; -ve = negative)*

Impact	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Decreased Ambient Air Quality	Minor (-ve)	Minor (-ve)
Contribution to Climate Change*	Major (-ve)	Major (-ve)
Increase in Ambient Noise Levels	Minor (-ve)	Minor (-ve)
Disturbance of Flora	Negligible to Minor (-ve)	Negligible to Minor (-ve)
Habitat Degradation Fauna	Minor (-ve)	Negligible (-ve)
Disturbance to Avifauna	Moderate (-ve)	Minor (-ve)
Impact on Traffic Levels	Minor (-ve)	Minor (-ve)
Land Use Planning Risk, Natural Gas Pipelines	Negligible (-ve)	Negligible (-ve)
Land Use Planning Risk, Propane Generator	Negligible (-ve)	Negligible (-ve)
Location Specific Individual Risk, Natural Gas Pipelines and Propane Generator	Moderate (-ve)	Moderate (-ve)
Employment Creation, Skills Enhancement and Local Business Opportunities	Minor (+ve)	Minor (+ve)
Impact on Human Health due to Air Emissions and Dust Generation	Minor (-ve)	Minor (-ve)
Increased nuisance factors and change in sense of place	Moderate (-ve)	Moderate (-ve)
Risk to Workers' H&S due to Hazardous Operation Activities	Minor (-ve)	Minor (-ve)
Impacts to Pre-colonial & Colonial Archaeology	Minor (-ve)	Negligible (-ve)

*As far as greenhouse gasses are concerned, the Project is expected to emit >1 000 000 t CO_2e per annum, which according to the benchmarks applied by international lender standards, assigns this project a magnitude of 'Very Large'. This translates into an overall significance rating of Major (Negative)

using the impact significance scale being used for the Project. Whist the mitigation measures proposed will help to ensure emissions are minimised as far as possible, the residual (post-mitigation) significance rating will remain Major (Negative) because of the nature of the significant GHG emissions that result from the operation of any fossil fuel based power plant. It should be noted that in the absence of abatement technologies such as carbon capture and storage (CCS), which is not yet a reality in South Africa, most (if not all) coal and gas power plants will have major negative impacts by nature of their significant GHG emissions. As noted in the report, this finding should be considered in the context of the positive impacts associated with the Project in relation to its high thermal efficiency and low GHG intensity relative to current grid electricity generation in South Africa, and that the Project is being developed in line with South Africa's energy policy, notably the IRP, GUMP and Gas IPP program which together aim to increase the capacity of the South African electricity grid and build gas-based power capacity.

12.3 RECOMMENDATIONS

ERM is confident that suitable effort has been made by the Project to accommodate the mitigation measures recommended during the EIA process, to the extent that is practically possible, without compromising the economic viability of the proposed Project. The implementation of the mitigation measures detailed in *Chapter 10* and listed in the EMPr, including monitoring, will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the Project are respectively enhanced and mitigated to a level which is deemed adequate for the Project to proceed. In addition a cumulative impact assessment has been undertaken, with the relevant input from specialists obtained.

In summary, based on the findings of this assessment, ERM is of the opinion that the CCGT power plant and associated pipeline should be authorised, contingent on the mitigations and monitoring for potential environmental and socio-economic impacts as outlined in the EIA Report and EMPr being implemented.

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Annex A

Details of Environmental Assessment Practitioner

Stuart Heather-Clark

Partner, Impact Assessment & Planning

Stuart Heather-Clark is a Partner in the **Impact Assessment and Planning Team** within ERM Southern Africa based in Cape Town, South Africa.

Mr Heather-Clark's has over 20 years of experience in infrastructure, industrial, oil & gas and renewable energy related ESIAs and Strategic Environmental Assessments (SEA) throughout Africa. His experience has afforded him a sound understanding of the sustainability issues facing development in Africa. He has been involved in a number of internationally funded projects in Cameroon, Ethiopia, Zambia, Tanzania, Angola, Botswana, Namibia, Uganda and Mozambique. All of these projects involved interaction with lenders, developers, local stakeholders, including NGO's, government officials and local communities. Mr Heather-Clark has an in-depth understanding of the Equator Principles and IFC performance Standards.

Mr Heather-Clark has been involved in Environmental and Social Assessment and Management training and capacity building over the past 14 years. He has also facilitating numerous ESIA/SEA and EMS training courses for the World Bank, Universities and the private and public sector in South Africa and other African countries. More recently Mr Heather-Clark has been involved in developing and facilitating training courses on the Equator Principles and IFC Performance Standards for various sectors including various Financial Institutions.

Professional Affiliations & Registrations

- Registered Professional Environmental Assessment Practitioner in South Africa
- International Association for Impact Assessment (IAIA) South Africa – Member

Fields of Competence

- Environmental and social impact assessment
- Environmental and social management plans
- Environmental and Social Due Diligence
- Strategic environmental assessment
- Environmental and social screening studies
- Sustainability strategy and reporting
- Environmental Management capacity building

Education

- BSc Civil Engineering – Univ. of Cape Town (1992)
- MPhil. Environ Science – Univ. of Cape Town (1996)
- Certification Course ISO 14001 SABS (1997)
- Environmental Conflict Management Course (1997)
- Advanced Environ Management Course (1997)
- Coastal Engineering Course (1998)
- Strategic Environmental Assessment Course (1998)

Languages

- English
- Afrikaans

Key Industry Sectors

- Infrastructure including ports and harbour developments
- Large industrial and infrastructure developments
- Oil and gas
- Renewable Energy

Publications:

Sep 2007: Co-author of case study for IIEDs 'User Guide' to effective tools and methods for integrating environment and development. South African case study: *Role of environmental and social screening in informing the conceptual design and planning of large-scale projects in the pre-feasibility stage.*
Aug 2003: Author of a case study on the SEA for the Port of Cape Town, contained in "The Status and Potential of Strategic Environmental Assessment" by Barry Dalal-Clayton and Barry Saddler, DRAFT 17 September 2003.
March 2002: Strategic Integrated Port Planning: Moving from EIA to SEA. International Conference on Coastal Zone Management and Development, Kuwait 18 to 20 March 2002.
Nov 2000: Sustainable Port Development: Report on the preparatory seminar for Africa. 7th International Conference of the International Association for Cities and Ports, Marseilles – France.
Mar 2000: The development of Strategic Environmental Assessment in South Africa: Journal of Impact Assessment and Project Appraisal, Vol 18, Number 3, pg 217-223. September 2000.
April 1999: Integrating environmental opportunities and constraints into Port Planning, Development and Operation. 5th International Conference on Coastal and Port Engineering in Developing Countries, Cape Town, 19 to 23 April 1999.

SOUTH AFRICAN ESIA'S – ALL SECTORS

Environmental and Social Impact Assessment for the Burgan Oil Fuel Storage Deport in the Port of Cape Town, Burgan Oil, South Africa, 2014-15
Mr Heather-Clark was the project director for the ESIA for the Burgan Oil Fuel Storage Deport in the Port of Cape Town.

Environmental and Social Impact Assessment for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure, South Africa, 2012.
Mr Heather-Clark is the Project Director for the ESIA for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure in the Northern and Eastern Cape, South Africa.

Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine, South Africa, Black Mountain Mine (Vedanta) 2012-13
Mr Heather-Clark is the Project Director for the Environmental and Social Impact Assessment for a new Zinc Mine in the Northern Cape Province in South Africa. The ESIA includes the assessment of the mine and all associated infrastructure including waste rock dumps, tailing dams, processing plant, transmission lines, a new township development, upgrade of a water pipeline and associated water treatment facilities, and transport options to the Port of Saldanha via both road and rail. The ESIA is being undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act. The process includes various specialist studies, full stakeholder engagement as well as integration with a Biodiversity Off-sets process.

Environmental and Social Impact Assessment for Venetia Diamond Mine, De Beers, South Africa, 2011
Mr Heather-Clark was the project director for the Scoping and ESIA for the proposed new underground mine and EMP consolidation for existing mining activities. The ESIA was undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act.

Environmental and Social Impact Assessment for a LPG import and distribution facility, Sunrise Energy, South Africa, 2011-2012
Mr Heather-Clark was the Project Director for the Scoping/EIA for a LPG importation, storage and distribution facility which includes a marine offloading facility in Saldanha Bay, a pipeline and a storage facility. The environmental permitting process required the liaison with local and provincial environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 380MW renewable energy facility north of Touwsrivier in the Western Cape, 2010-2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 170MW renewable energy facility east of Touwsrivier in the Western Cape, 2010-2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 670MW renewable energy facility south of Sutherland in the Western and Northern Cape, 2010-2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 500MW renewable energy facility south of Beaufort West in the Western Cape, 2010-2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 120MW renewable energy facility south east of Victoria West in the Northern Cape, 2010-2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

Basic Assessment for the installation of wind measuring masts on six sites in the Western Cape and two sites in the Northern Cape, 2010. Project Director
ERM was commissioned to undertake Basic Assessments to install wind measuring masts at eight sites in South Africa. The scope of work included the submission of the application, public participation, preparation of an EMP and submission of the Basic Assessment report.

Environmental and Social Impact Assessment for two solar farm (pv) development, South Africa, 2010
Mr Heather-Clark was the Project Director of the EIA for the development of two solar power farms (photovoltaic cell plants) in the Northern Cape and Free State Provinces of South Africa. ERM undertook the required studies to obtain environmental approval for these developments, including specialist studies such as landscape and visual and cultural heritage assessments, and stakeholder engagement.

EIA for a 225MW wind farm in the Richtersveld, Western Cape, 2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed wind farm. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 750MW wind farm in the Roggeveld, Western Cape and Northern Cape, 2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed wind farm. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 225MW renewable energy facility between Vredenburg and Velddrif in the in the Western Cape, 2010-2011. Project Director
ERM was commissioned to undertake a Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 100MW renewable energy facility north of Velddrif in the in the Western Cape, 2010. Project Director
ERM was commissioned to undertake a Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.

EIA for a 300MW renewable energy facility east of Lambert's Bay in the Western Cape, 2010. Project Director
ERM was commissioned to undertake a Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.

Environmental and Social Impact Assessment for the services corridor associated with the development of a greenfield CTL Plant, Sasol, South Africa, 2009
Mr. Heather-Clark was the Project Director for an ESIA of a services corridor to support the development of a greenfield CTL plant development in South Africa. The ESHIA process was conducted in accordance to the South African EIA Regulations and the IFC performance standards.

Environmental Assessment for the dredging and disposal of dredge spoil at the Port of Saldanha, Transnet, South Africa, 2008
Mr Heather-Clark was the Project Director for this project and was responsible for guidance of technical studies which included dredging studies and marine sediment contamination characterization. The study included the assessment of dredge spoil dumping alternatives. Stakeholder engagement included an important component of the project.

Environmental and Social Impact Assessment for the upgrade of a 1100 km railway line in South Africa, Transnet, 2008- 2009

Mr Heather-Clark was the Project Director for the Environmental and Social Impact Assessment for the upgrade of a commodities railway line across South Africa. The project included a number of specialist studies, managing subcontractors, interfacing with the railway engineering team, report writing, managing an extensive stakeholder consultation process, client liaison and management of project finances.

EIA for a Metal Recovery Plant and Slag Crushing, Screening and Weathering facility at Arcelor Mittal Saldanha Works, MultiServ, South Africa, 2007 – 2008. As Project Director, Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports. The project involved undertaking an EIA, including a public consultation process and the following specialist studies: air quality, groundwater, noise impact assessment, botanical and archaeology studies and a traffic impact assessment.

EIA for the upgrade and expansion of the existing sinter plant at Vanderbijlpark, ArcelorMittal, South Africa, 2006
Mr. Heather-Clark was the Project Director for the EIA and stakeholder engagement process to meet South African requirements. This included coordination of the technology review, air quality, health and waste management specialist studies and compilation of the integrated Scoping and EIA Report.

EIA of a proposed expansion of the Container Terminal Stacking area at the Port of Cape Town, National Ports Authority, South Africa, 2003-2004
Mr Heather-Clark was the project manager for this EIA. The project included the expansion of the Cape Town container terminal into the sea though dredging 1 million m^3 of material for reclamation. The project included a detailed study on alternative sources for fill material and other studies which focused on marine archaeology, coastal erosion, marine hydrodynamics and water quality, visual, noise and traffic. The EIA included full stakeholder engagement throughout the EIA process.

Environmental Impact Assessment for the Eskom SABRE-GEN wind turbine test facility, Eskom, South Africa, 2002
Mr Heather-Clark was the project manager for the EIA. The EIA included stakeholder engagement throughout the process and included the following specialist studies: visual assessment, bird strike modelling and noise assessment.

Scoping Phase of the Environmental Impact Assessment for the expansion of the Container Terminal at the Port of Cape Town, Portnet, South Africa, 2000
Mr Heather-Clark was the Project Manager for the EIA for the expansion of the container terminal at the Port of Cape Town. The project included the dredging of 1 million m^3 dredge material to provide fill for the expansion of the port. Specialist studies that were required included coastal dynamic modelling, hydrodynamic modelling to assess water quality issues associated with dredging, marine archaeological issues, marine ecology issues, traffic, visual and noise.

ESIA IN OTHER AFRICAN COUNTRIES – ALL SECTORS

Environmental and Social Impact Assessment for the Batoka Gorge Hydropower Project, ZRA, Zambia/Zimbabwe, 2014-15
Mr Heather acted as advisor to the ESIA team undertaking the Environmental and Social Impact Assessment (ESIA) for the proposed Batoka Gorge Hydropower Plant on the Zambezi River below the Victoria Falls. The project includes the construction of a dam wall, hydropower plants, transmission lines and associated infrastructure. The ESIA is being conducted in alignment with the IFC Performance Standards and the World Bank Safeguard Policies.

Environmental and Social Impact Assessment for the Tete-Macuse Railway Line and Macuse Power Development, Italthai, Mozambique, 2014-15
Mr. Heather-Clark was the Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Tete-Macuse railway line and Macuse Port development for the export of coal from Tete Province in Mozambique. The project includes the development of over 700km of railway line and a new port development.

Environmental and Social Impact Assessment for the Rehabilitation of the Kariba Dam Wall, ZRA, Zambia/Zimbabwe, 2014-15
Mr. Heather-Clark acted as the Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Kariba Dam Rehabilitation Project. The project includes the rehabilitation of the plunge pool and spillway of the dam wall. The project is being funded by the World Bank, African Development Bank and the EU.

Environmental and Social Impact Assessment for the Lesotho Highland 150 MW Wind Power Project, Breeze Power, Lesotho, 2011
Mr Heather-Clark was the Project Director for the Scoping Phase of the Environmental and Social Impact Assessment for a 150MW wind farm development in Lesotho. The Scoping Phase included the analysis of available information to identify key environmental and social risks associated with the siting of the wind farm.

Environmental and Social Impact Assessment for the upgrade of the Principe Airport, HBD, Principe, 2011-2012
Mr Heather-Clark was the Project Director for the Environmental and Social Impact Assessment for the upgrade of the airport in Principe.

Environmental and Social Impact Assessment for a river barging project on the Zambezi River, Riversdale Mining, Mozambique, 2010-2011
Mr Heather-Clark was the Project Director for the project which includes the assessment of environmental and social impacts associated with dredging over 500km of the Zambezi River. The project includes full stakeholder engagement, coordination of various specialist studies with extensive field work and the integration of all information into an ESIA report and ESMP.

Environmental and Social Impact Assessment for 2D seismic exploration project in the Rovuma Basin, Petronas, Mozambique, 2009
Mr Heather-Clark was the Project Director for the ESIA for the offshore seismic exploration activities in Blocks 3 & 6, situated in the Rovuma Basin off the coast of Mozambique. The exploration activities comprise 2D seismic surveys in deepwater.

ESIA for an Early Production System (EPS) and Power Plant for Kaiso-Tonya Area, Exploration Area 2, Tullow Uganda Operations Pty Ltd, Uganda, 2007/8
Mr Heather-Clark was the Project Director for the project which included a full ESIA for an Early Production System and associated Power Plant in the Kaiso-Tonya area on the banks of Lake Albert, Uganda. The intent of the project is to produce oil (and small amounts of gas) which will be converted into electrical power and distillate products (kerosene and diesel) for consumption within Uganda. The electrical power will be fed into the main grid supplementing the Ugandan electrical power grid while the distilled products (diesel and kerosene) will be used to displace the currently imported fuels. The ESIA included a detailed assessment of alternative sites for the proposed EPS and power plant, together with various environmental and social baseline studies and stakeholder engagement.

ESIA for a new high voltage overhead transmission power line in Cameroon, AES Sonel, Cameroon, 2007-2009
The project included co-ordinating a multidisciplinary team to undertake an Environmental and Social Impact Assessment and a full Resettlement Action Plan, for a new electricity distribution project, comprising a 113km overhead power line, for AES Sonel. As Project Director, Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.

ESIA monitoring studies for Sasol's Off-shore gas exploration activities in Inhambane and Sofala Provinces, Mozambique, Sasol Petroleum Sofala & Empresa Nacional de Hidrocarbonetos, 2007/8
Mr Heather-Clark directed an extensive environmental monitoring survey programme for Sasol's offshore hydrocarbon exploration activities. Monitoring studies included seismic noise modelling and monitoring, dugong surveys, artisanal fish catch monitoring, coral reef surveys and monitoring, sea turtle monitoring and tourism monitoring.

ESIA for seismic surveys and exploration well drilling and testing in Blocks 16 and 19 off the coast of Mozambique, Sasol Petroleum Sofala & Empresa Nacional de Hidrocarbonetos, 2005 - 2006
Mr Heather-Clark was the Project Manager for the ESIA which involved undertaking an ESIA and compiling EMPs for offshore exploration activities in Blocks 16 & 19, situated to the east of the Bazaruto Archipelago National Park, off the coast of Mozambique. The exploration activities comprised 2D and 3D seismic surveys in deepwater and shallow water as well as exploration well drilling and testing activities.

EIA of the Moatize Coal Mine and associated railway line and deep water port infrastructure, CVRD, Tete Province, Mozambique 2006-2007
Mr Heather-Clark acted as the Project Coordinator and Cost Controller on this project. ERM was commissioned by CVRD, a Brazilian Mining Company, to undertake environmental studies related to the green fields development of a coal mine in Tete Province, Mozambique. The project included the development of a power plant, railway line and port for the export of coal.

ESIA of the proposed seismic survey in licence area 2814a on the continental shelf of Namibia, Shell Exploration and Production Namibia B.V., Namibia, 2001

Mr Heather-Clark was a team member of the ESIA for the offshore seismic exploration project. The ESIA included all issues associated with seismic surveys including seismic noise impacts on marine mammals, oil spill modelling and general environmental management issues.

ESIA of the Phase 2 expansion of the Mozal Aluminium Smelter and Matola Port Terminal in Maputo, BHP Billiton, Mozambique, 2000-2001
Mr Heather-Clark was the Project Manager and integrative writer for this ESIA. The EIA included an assessment of the expansion of the port terminal at the Port of Matola and a review of the Phase 2 expansion of the aluminium smelter. All reports together with the EIA process were reviewed and approved by the International Finance Corporation (IFC).

Environmental Impact Review for the abandonment of the Cuntala Well Protector Platform off the coast of Angola (Block 2), Texaco Panama Inc., Angola, 2001
Mr Heather-Clark was part of the project team who developed a decommissioning plan for a well protector platform off the coast of Angola.

STRATEGIC ENVIRONEMNTAL ASSESSMENT – ALL SECTORS

Strategic Environmental Assessment of the New Town Integrated Development Zone, TFM Mining, Katanga Province, DRC, 2014
Mr Heather-Clark was Project Director for the Strategic Environmental Assessment of the New Town Integrated Development Zone undertaken for Tenke Fungurume Mining (TFM) in Katanga Province, DRC.

Strategic Environmental Assessment for the supporting infrastructure for the Baynes Hydropower Project, Baynes PJTC, Namibia/Angola, 2014-15
Mr Heather-Clark was Project Director for the Strategic Environmental Assessment of the associated infrastructure for the Baynes hydropower project. The SEA covered the assessment of access roads for construction, transmission lines routing in Angola and Namibia and locations of an airfield.

Cumulative Impact Assessment of the development of numerous hydropower plants on the Cuanza River, Odebrecht, Angola, 2014-15
Mr Heather-Clark was the Project Director for the Cumulative Impact Assessment of the development of a number of hydropower plant on the Cuanza River in Angola.

Strategic Environmental Assessment for the Mozambican Regional Gateway Programme, MRGP, Mozambique, Malawi, Zambia, Zimbabwe, 2012
Mr Heather-Clark was the Partner Director for the SEA of the MRGP. The MRGP aims to support the improvement of the Southern African transport (roads, rail and ports), regional infrastructure network, which uses Mozambique as a gateway for international trade. The MRGP geographic scope encompasses the Beira and Nacala Transport Corridors and the respective links to the Maputo and Limpopo Corridors. The SEA identified enviroemtnal and social issues that need to be considered in the long terms planning an dimplemanetion of the rail and port infrastructure that makes up the Beira and Nacala Transport Corridors.

Strategic Environmental Assessment (SEA) for the coastline of Mozambique, MICOA, Mozambique 2012
Mr Heather-Clark is an advisor on the SEA for the coast of Mozambique. The SEA aims to identify potential conflicts between various uses of the coastal zone and to recommend strategic interventions to facilitate sustainable development within the coastal zone. Various users of the coastal zone that are being considered include off-shore oil and gas operations, coastal mining, tourism, conservation and artisanal and industrial fishing.

Strategic Environmental and Social Overview and ESIAs for offshore exploration well drilling activities in Blocks 2 and 3A, Lake Albert, Uganda. Tullow Oil Plc and Heritage Oil and Gas Limited, 2006- 2008
Mr Heather-Clark was Project Director for this project. The project involved undertaking a strategic overview study of Lake Albert that provided background information on the limnological (physical, chemical and biological) features of the lake as well as environmental and socio-economic resources (such as nature reserves, tourism nodes, prime fishing areas etc). It also presented areas of environmental risk and opportunity associated with oil explorations on, and immediately adjacent to, the lake. The strategic overview provided a framework within which ESIAs were undertaken for the offshore drilling project. A site selection study was undertaken for onshore support infrastructure. Baseline studies included shoreline sensitivity mapping, oil spill modelling, water and sediment quality surveys, fish and fisheries surveys, socio-economic surveys and terrestrial ecology surveys. An extensive pubic participation process was undertaken as part of the ESIAs.

Strategic Environmental Assessment (SEA) for the Port of Cape Town, National Ports Authority of South Africa, South Africa, 2003
Mr Heather-Clark was the project manager for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.

Strategic Environmental Assessment (SEA) for the Port of Richards Bay, National Ports Authority of South Africa, South Africa, 2003
Mr Heather-Clark was the project adviser for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.

Strategic Environmental Assessment: Scoping Phase Port of Richards Bay, National Ports Authority of South Africa, South Africa, 2002
Mr Heather-Clark was the Project Leader and integrative writer for the Scoping Phase of the SEA for the Port of Richards Bay. This phase included detailed stakeholder consultation to identify opportunities and constraints to long term port development at the Port of Richards Bay.

ENVIRONMENTAL AND SOCIAL SCREENING STUDIES – ALL SECTORS

Environmental and Social Screening Study for a Gas Power Plant, Confidential Client, South Africa, 2015
Mr Heather-Clark was the Project Director for an Environmental and Social Screening study for the establishment of a gas power plant in South Africa. The screening study outputs included a permitting strategy, environmental opportunities and constraints maps, and input into the site selection process.

Millennium Challenge Account – Malawi: Infrastructure Development Project – Energy Sector (hydropower plants, transmission and distribution lines and substations), MCC, Malaiw, 2014-15
Mr Heather-Clark acted as the Independent Engineer to review all the Contracting Engineers environmental and social studies associated with the Infrastructure Development Project. The project includes the upgrade and development of new infrastructure including hydropower plants, transmission lines, distribution lines and substations.

Environmental and Social Screening Study for port options in Pemba Bay, Anadarko, Mozambique 2012
Mr Heather-Clark was the project lead for a Environmental and Social Screening Study for various port options in Pemba Bay. The screening study includes a multi-criteria assessment of various port locations taking into account marine and terrestrial ecology, social issues, land ownership, legal aspects and physical marine conditions.

Ore Line Expansion Project for the Sishen-Saldanha Ore Line and Port of Saldanha, various Mining Companies and Transnet, South Africa 2011-2012
Mr Heather-Clark is the Project Director for the Environmental and Social Screening Study for the Pre-feasibility Phase of the Ore Line Expansion Project. This included compiling a detail Environmental and Social Design Criteria Report together with initial Stakeholder Engagement. A detailed multi-criteria assessment for various port and stockpile options was undertaken. The project included upgrading over a 1000 km of railway line and upgrading the port facilities including stockpiles, stacker-reclaimers, conveyors and shiploading facilities. The stakeholder engagement process was specifically designed to obtain buy-in from stakeholder who were strongly apposed some components of the port and rail expansion.

Environmental and Social Screening Study for a Mine development in Angola, Confidential Client, Angola 2011-2012
Mr Heather-Clark was the Project Director for the Environmental and Social Screening Study for the Concept Phase for a new mine development in Angola. The study included identifying environmental and social risks to the project and costing a full ESIA according to IFC Performance Standards and Equator Principles.

Environmental Screening Study for a Wind Farm Development in the Southern Cape, South Africa, 2011
Mr Heather-Clark is the Project Director for the Environmental Screening Study for a wind farm development in the Southern Cape.

Environmental Sensitivity Study of the Durban Airport Site Expansion Project , South Africa, Transnet, 2010
Mr Heather-Clark was the Project Director for the Environmental Sensitivity Study for the proposed dig-out port currently being considered by Transnet at the Durban International Airport Site. The aim of this assessment was to determine the biophysical, natural and social opportunities and constraints to the development of the dig-out port, as well as provide a strategic overview of the environmental context of the site. In addition, the sensitivity study provided strategic guidance in terms of the environmental due process and licensing requirements with respect to the National Environmental Management Act, and associated legislation.

Environmental and Social Screening Study for a river barging project on the Zambezi River, Riversdale Mining, Mozambique, 2009
Mr Heather-Clark was the Project Director for the project which included the assessment of environmental and social risks associated with dredging over 500km of the Zambezi River. The project included reviewing existing information, mapping key sensitivities and facilitating a specialist workshop in order to develop Terms of Reference for detailed baseline studies that will be required should the project proceed to a full ESIA.

Environmental and Social Screening Study, Port of Saldanha, Transnet, South Africa, 2008.
Mr Heather-Clark was the Project Director for the screening study which included an assessment of alternative berth options for the export of iron ore at the iron ore terminal at the Port of Saldanha, South Africa. The work included ongoing interaction with the port engineering and design teams, together with stakeholder engagement.

Environmental and Social Baseline Assessment for a green fields coal mine and CTL plant development, Sasol, South Africa, 2008
Mr. Heather-Clark was the Project Director the environmental and social baseline studies to support the evaluation of sites for potential development of a green fields coal mine and associated CTL Plant in South Africa. Mr. Heather-Clark has assisted with review and quality control of the various baseline studies.

Environmental and Social Screening and Qualitative Risk Assessment Western Ports and Rail Corridor, Transnet, South Africa, 2007
As Project Director, Mr Heather-Clark was involved in identifying environmental and social risks associated with future port development in the Port of Saldanha, Port of Cape Town and Port of Mossel Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.

Environmental and Social Screening and Qualitative Risk Assessment Central Ports and Rail Corridor, Transnet, South Africa, 2007
As Project Director, Mr Heather-Clark was involved in identifying environmental and social risks associated with future port development in the Port of East London, Port of Port Elizabeth and Port of Ngqura. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.

Environmental and Social Screening and Qualitative Risk Assessment Eastern Ports and Rail Corridor, Transnet, South Africa, 2007
As Project Director, Mr Heather-Clark was involved in identifying environmental and social risks associated with future port development in the Port of Durban and Port of Richards Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.

Environmental Site Suitability Study for a manganese smelter, Asia Minerals Limited, 2004
Mr Heather-Clark was part of the project team that undertook a preliminary site selection process for a manganese smelter by identifying key environmental and social issues for potential sites within Southern Africa. Sites included the Belualane Industrial Park (Mozambique) and Richards Bay, the Coega Industrial Development Zone (IDZ) and Saldahna (South Africa).

Environmental screening study for the establishment of a deep-water port at Ponta Dobela, Confidential Client, Mozambique, 2001
Mr Heather-Clark was a member of the project team who undertook a screening study to identify environmental, social and economic issues and show stoppers associated with the development of a deep-water port on the coast on Mozambique.

ENVIRONMENTAL AND SOCIAL DUE DILIGENCE AND TRAINING

Environmental and Social Gap Analysis for a 98 MW wind farm in South Africa, Confidential Client, South Africa, 2015
Mr Heather-Clark was the Project Director for the ESDD.

Environmental and Social Gap Analysis for a 2 x 75 MW solar pv farm in South Africa, Confidential Client, South Africa, 2015
Mr Heather-Clark was the Project Director for the ESDD.

Environmental and Social Due Diligence (ESDD) for a 74 MW wind farm in South Africa, Confidential Client, 2015
Mr Heather-Clark was the Project Director for the ESDD.

Equator Principles and IFC Performance Standards Training, Vedanta Resources Plc, Zambia 2012
Mr Heather-Clark was the lead facilitator of a 5-day training course on the implenmtation of the Equator Principles and IFC Performance Standards for a number of Vedanta's mining operations across Southern Africa, Europe and Australia.

Environmental and Social Due Diligence for a Wind Farm Development in Coega, Electrawinds, South Africa, 2011
Mr Heather-Clark is the Project Director for the Environmental and Social Due Diligence for a wind farm development in the Coega.

External adviser and reviewer for an ESIA for a wind farm development in the Eastern Cape, Confidential Client, South Africa, 2010
Mr Heather-Clark is acted as adviser and reviewer for an EIA for the development of a wind farm in the Eastern Cape.

Environmental Advisor Environmental and Social Impact Assessment for the Mphanda Nkuwa Hydropower Project in Mozambique, 2010
Mr Heather-Clark was appointed to act as advisor for the ESIA for the Mphanda Nkuwa Hydropower Project in Mozambique. The core service was to advise the project team on international standards such as the IFC Performance Standards and World Commission on Dams.

Equator Principled and IFC Performance Standards Review and Training, African Housing Solutions, South Africa, 2009
ERM was appointed to review and ESIA and Resettlement Policy Framework, for a housing development in Nigeria, against the Equator Principles and IFC Performance Standards. Mr Heather-Clark was responsible for reviewing the ESIA Report and for presenting a 2 ½ day training course on the Equator Principles and IFC Performance Standards.

Advisor to the Environmental and Social Impact Assessment for the Baynes Hydropower Project in Namibia and Angola, 2009.
Mr Heather-Clark was the Project Advisor for the Environmental and Social Impact Assessment for the proposed Baynes Hydropower Project on the Kunene River. The ESHIA process is being conducted in accordance to the Angolan EIA Regulations, the Namibian EIA Regulations, the World Bank Safeguard Policies and the IFC performance standards.

Implementation of the Equator Principles for Standard Bank's Project Financing Processes, Standard Bank, South Africa, 2008
ERM was commissioned to assist Standard Bank in adopting the Equator Principles. ERM developed an assessment system (based on the IFC Performance Standards) to link with Standard Bank's project finance transaction life-cycle. This involved the development of "tools" and guidance documents to form a system, together with training on the use of the system for all project finance staff. Mr Heather-Clark was one of the lead facilitators who undertook the training component of this project.

Independent Environmental Advisers to the Financing Parties of the Gautrain Rapid Rail Link project, Bowman Gilfillan. 2006
Mr Heather-Clark acted was appointed by The Bombela Consortium as Independent Environmental Advisers as to the Financing Parties. He provided review and advisory services through Bowman Gilfillan on Enviroemntal Management Plans for the Gautrian Rapid Link project.

Development of guideline document for the integration of environmental and social issues into the

project lifecycle for mine development, De Beers, South Africa, 2008
Mr Heather-Clark was part of the project team that assisted the client in developing a detailed guideline document for the integration of social and environmental issues into mine planning. This included all phases of the planning process from Concept through to Pre-feasibility, Feasibility and Implementation. Mr Heather-Clark, as lead facilitator, presented a 2 day training course on these guidelines, to mine planners and engineers.

Comparative review of EIAs undertaken by ERM globally for electricity utilities, Eskom, South Africa, 2007
Mr Heather-Clark was Project Director for this project. The project included research to provide Eskom with an overview of different EIA governance systems and approaches to managing EIAs in other countries, as well as identifying trends in EIA practice.

Corporate Social Responsibility Strategy development for a leading South African retailer, South Africa, 2006
Mr Heather-Clark was the lead facilitator for this project. The project involved identifying and prioritising the company's sustainability issues and defining a strategy to address these issues. The process was driven by the need for the company to be listed on the Johannesburg Stock Exchanges SRI Index.

Review of Sustainability Report and Sustainability Management System, Confidential, South Africa, 2004
Mr Heather-Clark played a lead role in reviewing the Sustainability Report of a leading retailer in South Africa and providing adhoc advice on sustainability issues. This included compiling a monthly news letter to staff on relevant sustainability issues facing the retail industry in South Africa.

EIA/SEA Capacity Building, Environmental Public Authority (EPA), State of Kuwait, 2003
Mr Heather-Clark was the lead facilitator for a 2 day training course on SEA and EIA for the Environmental Public Authority (EPA) of the State of Kuwait.

Training Workshop on Strategic Environmental Assessment for South Eastern Africa and the Western Indian Ocean Island States, SEACAM, Mozambique, 2003
Mr Heather-Clark was the lead course facilitator for the SEA training course funded by SEACAM. The training course included the principles of SEA, SEA process and case studies of SEA's in Southern Africa.

Improving the Effectiveness of EIA and the Potential of SEA in Southern Africa: Case Study on SEA of the National Commercial Ports Policy and SEA for the Port of Cape Town, World Bank/SAIEA, Namibia, 2003.
Mr Heather-Clark was invited to present two case studies on SEA at a regional workshop funded by the World Bank and SAIEA.

Due Diligence of the Phase 2 Maputo Port Revitalisation and Rehabilitation Project, Standard Corporate Merchant Bank, Mozambique, 2003
Mr Heather-Clark acted as the Environmental Adviser to the Standard Corporate Merchant Bank for the review of the EIA and Risk Assessment studies undertaken for the Phase 2 Maputo Port Revitalisation and Rehabilitation Project. The EIA was reviewed against the Mozambican and International Best Practice guidelines and detailed recommendation made on how to manage the environmental risks associated with the revitalisation project.

Environmental Audit and Assessment of the Socio-economic Impacts of the Trans-Kgalagadi Highway, Botswana, Development Bank of Southern Africa, Botswana, 2002
Mr Heather-Clark played a lead role in reviewing the EIA and EMP implementation for the Trans-Kalagadi corridor in Botswana. The review included site visits, detailed interviews and review of secondary data and records.

World Bank EIA Project Management Training Course, World Bank/SAIEA, Zambia, 2002
Mr Heather-Clark was the lead facilitator for the 5 day EIA Project Management Training Course. The course was presented to 20 African delegates from southern Africa. The course focused on the practical aspects of EIA project management including budgeting and scheduling an EIA, contract negotiations with clients, managing specialist studies, managing the public participation phase and compiling an integrated EIA report. The course formed part of a Southern Africa capacity building initiative lead by the SAIEA.

Ecologically Sustainable Industrial Development Programme, United Nations Industrial Development Organisation (UNIDO), Tanzania, 2002
Mr Heather-Clark was part of a project team appointed to review the Industrial Development Strategy for Industrial Development in Tanzania. The focus of the project was to integrate environmental and social issues into the programme.

White Paper on National Commercial Ports Policy, National Ports Authority, South Africa, 2002
Mr Heather-Clark was coordinated the review of the White Paper on National Commercial Ports Policy for South Africa. The review focussed on the integration of environmental and social issues into the port planning process. Mr Heather-Clark made a formal submission and presentation to the Portfolio Committee on Transport in the South African Parliament.

Environmental Liability and Risk Assessment for the Multi-Purpose Terminal at the Port of Saldanha, National Ports Operations, South Africa, 2002
Mr Heather-Clark was the Project Manager for the project. The purpose of the project was to identify key environmental risks associate with the material handling at the Multi-Purpose Terminal at the Port of Saldanha.

Environmental Overview of South Africa's major ports with special reference to future container terminal development, National Ports Authority Container Terminal Strategy, National Ports Authority, South Africa, 2002
Mr Heather-Clark was appointed to undertake a comparative assessment of the relative environmental sensitivity of the seven commercial ports in South Africa with reference to future container terminal development. The study included a detail review of secondary environmental information of all the ports, the identification of specific environmental criteria and the use of these criteria to rank each port in terms of its sensitivity to future container terminal development.

Review of the EIA undertaken for the Maputo Port Privatisation and Rehabilitation Project, Development Bank of Southern Africa (DBSA), South Africa, 2002
Mr Heather-Clark was appointed as the Environmental Adviser to the Development Bank of Southern Africa to review the Phase 1 EIA for the Maputo Port Privatisation and Rehabilitation Project. The review was undertaken against the Mozambican EIA Regulations and International Best Practice.

OTHER STUDIES

Research project on the effects of water scarcity on the fresh produce supply to a major South Africa retailer, South Africa, 2006
As Project Leader Mr Heather-Clark coordinated a group of researchers to identify water scarce areas and to plot these against the location of fresh produce suppliers for a major retailer in South Africa. This researched form a core component of the companies Sustainability Strategy.

DFID funded project to assess progress towards meeting the water relater targets of the Millennium Development Goals, DIFD, Zambia, 2004
Mr Heather-Clark was the Country Coordinator for Zambia on this project. The project included detailed stakeholder surveys secondary data analysis to establish the countries progress towards meeting the Millennium Development Goals, specifically related to water supply and sanitation.

Roll-out of ISO14001 and OHSAS18001 management systems to 2 industrial sites in South Africa, Confidential, South Africa, 2004.
As Project Manager Mr Heather-Clark was responsible for undertaking ISO14001 training at two industrial sites. The project formed part of a global initiative to have several industrial sites throughout Africa and Europe ISO14001 certified.

National Oil Spill Contingency Plan for Cameroon, funded by the World Bank, Cameroon Government, Cameroon, 2003
Mr Heather-Clark was part of the team that compiled a comprehensive Oil Spill Contingency Plan for Cameroon (OSCP). The OSCP form a core component of the Chad Cameroon Pipeline and included contingency plans for both onland and marine based spills. The OSCP was compiled according to the IPEACA guidelines and was reviewed by the World Bank.

Oil Spill Contingency Plan, Agip Angola oil operations, Angola, 2002
Mr Heather-Clark was a member of the team to develop an oil spill contingency plan according to the IPEICA International Guidelines.

Legal, Technical and Economic Feasibility Study for the Commercialisation of the SSF Association Milnerton Tank Farm and its links to the Port of Cape Town, SFF, Cape Town, 2001
Mr Heather-Clark was the Project Manager for this project.

Presentations and Lectures

2014: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2013: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2012: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2011: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2011: EIA Project Management Course, Impacto, Mozambique.

2010: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2009: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
Equator Principles and IFC Performance Standards Training
2008: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2007: EIA Project Management Course. University of Freestate, South Africa. Masters Course.
2006: Corporate Social Responsibility course to University of Cape Town Masters Students
2005: Corporate Social Responsibility course to University of Cape Town Masters Students
EIA Course presenter to Masters Students at the University of the Freesate. A 3 day course focusing on EIA Project Management
EIA Course presenter to Masters Students at the University of the Western Cape
2004: SEA course facilitator and presenter. Training workshop in Mozambique on Strategic Environmental Assessment for the countries of eastern Africa and the Western Indian Ocean Island States, funded by SEACAM.2004:
Course facilitator for the EIA Project Management Course at the University of Freestate and University of Stellenbosch.
Course facilitator for the EIA Project Management Course at the University of Freestate and University of Stellenbosch.
2003: Guest Speaker at the "Successfully Conducting Environmental Impact Assessments" conference held in Midrand on the 24 to 26 November 2003. Presented a paper titled "Moving from EIA to SEA: Proactive integration of biophysical, social and economic issues into the planning stages of the development cycle.
2003: Presenter for the IAIA International SEA Training Course for China funded by the World Bank: Presented the case study of the SEA for the Port of Cape Town (Video presentation).
2002: Various presentations on environmental assessment and management to Peninsula Technikon, Univ. of Stellenbosch (Planning, Environmental and Public Admin Departments), and Univ. of Free State, Amatola District Council.
2001: Various presentations on environmental assessment and management to Cape Tech, Pen Tech, Univ. of Stellenbosch, Univ. of Cape Town and Univ. of Free State.
2000: Introductory Course on Environmental Impact Assessment and Management, presented to the Ethiopian Environmental Protection Authority and other regional authorities – Dire Dawa and Harar, Ethiopia. Various EIA/SEA presentations to Cape Tech, Univ. of Stellenbosch and Univ. of Free State.
1999: Introductory Course on Environmental Impact Assessment and Management, presented to the Ethiopian Environmental Protection Authority - Addis Ababa, Ethiopia.
1999: Various Integrated Environmental Management courses presented to the Department of Health - EIA process and regulations.

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF EAP AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Environmental Assessment Practitioner (EAP):	Environmental Resources Management Southern Africa (Pty) Ltd		
Contact person:	Stuart Heather-Clark		
Postal address:	ERM Cape Town – 2nd Floor, Great Westerford, 240 Main Road, Rondebosch		
Postal code:	7800	Cell:	082 324 3483
Telephone:	021 6815400	Fax:	
E-mail:	Stuart.heather-clark@erm.com		
Professional affiliation(s) (if any)	Registered EAPSA		

Project Consultant:	Environmental Resources Management Southern Africa (Pty) Ltd		
Contact person:	Stephan van den Berg		
Postal address:	ERM Cape Town – 2nd Floor, Great Westerford, 240 Main Road, Rondebosch		
Postal code:	7800	Cell:	084 869 9262
Telephone:	021681 5400	Fax:	
E-mail:	Stephan.vandenberg@erm.com		

4.2 The Environmental Assessment Practitioner

I, Ewart Heather-Clark , declare that –

General declaration:

I act as the independent environmental practitioner in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I will take into account, to the extent possible, the matters listed in regulation 8 of the Regulations when preparing the application and any report relating to the application;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
I will keep a register of all interested and affected parties that participated in a public participation process;
I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
all the particulars furnished by me in this form are true and correct;
will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;

I have a vested interest in the proposed activity proceeding, such vested interest being:

N/A

Signature of the environmental assessment practitioner:

Environmental Resources Managent Southern Africa Pty Ltd

Name of company:

21/07/2016

Date:

Annex B

Stakeholder Engagement

- B1 – I&AP Database
- B2 – Initial Notification Material
- B2.1 – Notification
- B2.2 – Adverts
- B2.3 – Background Information Document
- B3 – Initial Public Meeting
- B3.1 – Attendance Register
- B3.2 – Presentation
- B4– Site Notices
- B5 - Proof of Distribution of Draft Scoping
- B6 – Proof of Distribution of Final Scoping
- B7 – DEA Acceptance of Scoping Report
- B8 – Proof of Distribution of Draft EIA
- B9 – EIA Phase Public Meeting
- B9.1–Meeting Record
- B9.2 Attendance Register
- B9.3 - Presentation
- B10 - Reminder Notifications to Commenting Authorities
- B11 - Comments and Responses Report
- B12 - Comments Received

A preliminary stakeholder database was compiled based on ERM's previous experience in Saldanha Bay. The database has been updated throughout the EIA process and is presented in the following pages.

National Authorities		
Ms Nosipho Ngcaba	Director General	Department of Environmental Affairs
Ms Nyiko Ngoveni		Department of Environmental Affairs
Milicent Solomons	Director: Intergrated Environmental Authorisation	Department of Environmental Affairs
Mohammed Essop	Assistant Director - Strategic Infrastructure Developments	Department of Environmental Affairs
Nitasha Baijnath-Pillay	CWDP	Department of Environmental Affairs
Tshililo Aubrey Ramaru	CWDP	Department of Environmental Affairs
Tiyani Baloyi		Department of Environmental Affairs
Rueben Molale	Directorate: Coastal Pollution Management	Department of Environmental Affairs Branch: Oceans & Coasts
Lucas Mahlangu	Waste	Department of Environmental Affairs
Mark Gordon	Chief Director: Intergrated Env Authorisations	Department of Environmental Affairs
Wayne Hector		Department of Environmental Affairs
Vumile Senene	Air Quality Management	Department of Environmental Affairs
Lerato Moja	Air Quality Management	Department of Environmental Affairs
Mathlatse Shubane		Department of Environmental Affairs
Lerato Mokoena	Waste	Department of Environmental Affairs
Debra Ramalope	Climate Change	Department of Environmental Affairs
Dr Monde Mayekiso	Deputy Director General	Department of Enviromental Affiars : Oceans and Coasts
Mr Lindelani Mudau	Chief Directorate: Integrated Coastal Management	Department of Enviromental Affiars : Oceans and Coasts
Potlako Khati	Chief Director: Integrated Coastal Management and Development (CD: ICM&D).	Department of Enviromental Affiars : Oceans and Coasts
Mr Chumani Mangcu	Directorate: Administration Support	Department of Enviromental Affiars : Oceans and Coasts
Alan Boyd	Oceans and Coasts	Department of Enviromental Affiars : Oceans and Coasts
Andy Cockroft	Ocean and Coasts	Department of Enviromental Affiars : Oceans and Coasts
Dr Yazeed Peterson	Coastal Pollution Management: Director	Department of Enviromental Affiars : Oceans and Coasts
Xola Mkefe	Coastal Biodiversity Conservations : Director	Department of Enviromental Affiars : Oceans and Coasts
Lindelani Madau	Coastal Conservation Strategy: Director	Department of Enviromental Affiars : Oceans and Coasts

Dee Fischer	Integrated Environmental Management: Chief Director	Department of Enviromental Affiars : Oceans and Coasts
Sabelo Malaza	Chief Director: Integrated Environmental authorisation	Department of Enviromental Affiars : Oceans and Coasts
Ishaam Abader	Deputy Director General: Legal Authorisations, Compliance and Enforcement	Department of Enviromental Affiars : Oceans and Coasts
Professor Edith Vries	The Director General: Agriculture	Department of Agriculture, Forestry and Fisheries
Ms S. Ndundane	(Acting) DDG: Fisheries Management	Department of Agriculture, Forestry and Fisheries
Ms Fatima Samodien	Assistant Director	Department of Agriculture, Forestry and Fisheries
Michelle Pretorius	Aquaculture and Economic Development	Department of Agriculture, Forestry and Fisheries
Andrea Bernatzeder	Aquaculture and Economic Development	Department of Agriculture, Forestry and Fisheries
Dr K Prochazka	Directorate: Resource Management & Research	Department of Agriculture, Forestry and Fisheries
Ms Siphokazi Ndundane	Acting Deputy Director General	Department of Agriculture, Forestry and Fisheries
Mr Ceba Matoba	Monitoring Control & Surveillance : West Coast Fisheries Compliance (Chief Director)	Department of Agriculture, Forestry and Fisheries
Fatima Saval	Monitoring Control & Surveillance : West Coast Fisheries Compliance (Director)	Department of Agriculture, Forestry and Fisheries
Wade Theron	Monitoring Control & Surveillance : West Coast Fisheries Compliance	Department of Agriculture, Forestry and Fisheries
Mr Belemane Semoli	Aquaculture Delivery Unit	Department of Agriculture, Forestry and Fisheries
Kishan Sankar	Aquaculture Delivery Unit	Department of Agriculture, Forestry and Fisheries
Mr Asanda Njobeni	Directorate: Sustainable Aquaculture Management	Department of Agriculture, Forestry and Fisheries
Ms Margaret-Anne Diedricks	Director General	Department of Water and Sanitation
Hester Lyons		Department of Water and Sanitation
Nigel Campbell	Acting Regional Manager	South African Maritime Safety Authority (SAMSA)
Ms Debbie James	Asst. to Regional Man & Office Admin	South African Maritime Safety Authority (SAMSA)
Mr H Esterhuizen	Ship Surveyor (Saldanha)	South African Maritime Safety Authority (SAMSA)
David Manley	Principle Officer	South African Maritime Safety Authority (SAMSA)

Mr Martin Slabber	Principal Officer (Saldanha)	South African Maritime Safety Authority (SAMSA)
Mr Paseka Nku	Acting Chief Executive Officer	National Energy Regulator of South Africa (NERSA)
Mr Pule Godfrey PG Selepe	Director General	National Government: Department of Transport
Dr. Wolsey Barnard	Acting Director General	Department of Energy
Fuad Allie	Regional Director	Department of Energy
Ardiel Soeker	Provincial Manager (Western Cape)	National Development Agency (NDA)
Mr Malcolm Nelson		SA Navy Hydrographic Office
Ossie Lamb	Property Management	Department of Public Works
Mr Fred Johnson	Property Management: Chief Director: Regional Coordinator	Department of Public Works
Captain Graham Kuilders	Airforce	SANDF
Edwin Dwyer	Navy	SANDF
Provincial Authorities		
Mr Marius Venter		DEA&DP: Waste Management: Licencing
Mr Mark Khan	Chief Director	Department of Water and Sanitation - Western Cape Region
Piet van Zyl	Head of Department	Department Environmental Affairs and Development Planning
Clement Arendse	Directorate: Environmental and Spatial Planning Coastal Management Unit	Department: Environmental Affairs and Development Planning
Mr M Zain Jumat	Deputy Director Integrated Coastal Management Coastal Management	Department: Environmental Affairs and Development Planning
Lucy Caplan		Department of Transport and Public Works
Ms Jacqueline Gooch	Head of Department	Department of Transport and Public Works
Ms Danielle Manuel		Department of Transport and Public Works
Mr Rivaaj Mahabeer		Department of Transport and Public Works
Mr Alvan Gabriel	Principle Environmental Officer: EIA	WCape Dept Environ Affairs & Development Planning
Dr Joy Leaner	Director: Pollution Management	WCape Dept Environ Affairs & Development Planning
Mr Anthony Barnes	Executive Director: Environmental Mgmt	WCape Provincial Gvt: Env Affairs & Dev Planning
Mr Ayub Mohamed	Director: Spatial Planning	WCape Provincial Gvt: Env Affairs & Dev Planning
Caren George	Coastal Management Unit	Department Environmental Affairs and Development Planning
Zahier Toefy	Director Biodiversity and Coastal Management	Department Environmental Affairs and Development Planning

Marlene Laros	Director Spatial Planning and Coastal Impact Management	Department Environmental Affairs and Development Planning
Kobus Munro	Director Air Quality Management	Department Environmental Affairs and Development Planning
Etienne Roux		DEA&DP: Pollution Management
Ms Alana Duffell-Canham	Scientist: Landuse Advice Unit	Cape Nature
Mr Rhett Smart	Scientist: Land Use Advisor	Cape Nature
Ernst Baard		Cape Nature
Andrew Turner		Cape Nature
Razeena Omar	Chief Executive Officer	Cape Nature
Dr Errol Myburg	Acting CEO	Heritage Western Cape
Mr Sivuyile Mpakane	The Regional Manager	Western Cape Department of Mineral Resources
Adriaan Conradie	Acting DIRECTOR: West Coast/Cape Winelands	Western Cape Provincial Government
Mr AS Roux		Department of Agriculture
Cor van der Walt	Landuse Management	Department of Agriculture
Mr Lars Starke	District Roads Engineer	Transport Management: West Coast
Nigel Gwynne-Evans	Trade and Sectors Development	Department of Economic Development and Tourism (DEDAT)
Jim Petrie	Energy director	Department of Economic Development and Tourism (DEDAT)
Warren Dreyer		Department of Water Affairs and Sanitation
Rasheeq Williams	Directorate: Resource Based Industries	Western Cape Government: Department Economic Development and Tourism
Mr Goodwell Dingaan	Directorate: Resource Based Industries	Western Cape Government: Department Economic Development and Tourism
Claude Orgill	Directorate: Trade and Sector Development	Western Cape Government: Department Economic Development and Tourism
Martinus van Wyk	Directorate: Trade and Sector Development	Western Cape Government: Department Economic Development and Tourism
Ferdie Endemann	Directorate: farmer support and Development	Western Cape Government: Department of Agriculture
Mogale Sebopetsa	Directorate: farmer support and Development	Western Cape Government: Department of Agriculture
Joyene Isaacs	HOD	Western Cape Government: Department of Agriculture
Mr Rashied Khan	Directorate: Water Sector Support	Department of Water and Sanitation
Thembi Mafilela	Directorate: Water Sector Support	Department of Water and Sanitation
Mrs Ashia Petersen	Directorate: Regulations : Acting: Chief Executive Officer	Department of Water and Sanitation
Ms B Hene	Director	Department of Water and Sanitation
Leona Bruiners	Head of Programmes:	Department of Rural Development and Land

	SPLUM	Reform
Ms Duduzile Kunene	Regional Manager	Department of Mineral Resources
Ms Busisiwe Magazi	Secretary	Department of Mineral Resources
Local Municipality		
Mr Francois Schippers	Executive Mayor	Saldanha Bay Municipality
Mr Louis A Scheepers	Municipal Manager	Saldanha Bay Municipality
Mr Jacques Marais	Area Manager	Saldanha Bay Municipality
Quentin Jordaan	IDP Co ordinator	Saldanha Bay Municipality
Mr Lindsey Gaffley	Planning & Strategic Services	Saldanha Bay Municipality
Nazeema Duarte		Saldanha Bay Municipality
Marius Meiring		Saldanha Bay Municipality
Gerrit Smith		Saldanha Bay Municipality
District Municipality		
Mr Henry F Prins	Municipal Manager	West Coast District Municipality
Mr Piet Fabricius	Air Quality Officer	West Coast District Municipality
Ms Doretha Kotze	Town and Regional Planner	West Coast District Municipality
Kiewiet van Rooyen	Tourism Department	West Coast District Municipality
Mr Charles Malherbe	Environmental Officer	West Coast District Municipality
Mr Wilhelm Markus	Director Admin and Community Services	West Coast District Municipality
Mr Nico de Jongh	Senior Manager Municipal Health	West Coast District Municipality
Waldo Julius	Town Engineer (in charge of the office	Langebaan Municipality
IDZ		
Laura Peinke	IDZ Manager Executive: Business Development	Saldanha Bay Industrial Development Zone
Kaashifah Beukes		Saldanha Bay Industrial Development Zone
Lelanie Abrahams	Liaison: Saldanha Bay	Saldanha Bay Industrial Development Zone
Moeketsi Maromo	Chairperson for IDZ Business Forum	Saldanha Bay Industrial Development Zone
Johan Ackron		Saldanha Bay Industrial Development Zone
Ward Councillors		
Cllr Frank Pronk	Ward 5	
Cllr Simon Biko	Ward 1	
Cllr Stefanus Vries	Ward 4	
Cllr Ryan Don	Ward 3	
Cllr Andre Kruger	Ward 6	

Local Forums		
Mr Frans Koch	Chairperson	Afrikaanse Sakekamer
Christo Van Wyk		Saldanha Bay Water Quality Trust
Alan Carnegie and Jill Carnegie		WESSA/Saldanha Bay Water Quality Forum
The Manager		Langebaan Action Group
Mr Jaco Kotze / Frans Palm	The Chairperson	Langebaan Ratepayers Association
Mr Jan Ferreira	The Chairperson	Jacobs Bay Ratepayers Association
Willie Goosen	The Chairperson	Vredenburg Ratepayers Association
Dr Mke Rothenburg	Chairperson	Bluewater Bay Home Owners Association & SBYC
Jaco Kotze		Langebaan Ratepayers and Residents Association
John Selby		Langebaan Ratepayers and Residents Association
Mike Rothenburg		Blue Water Bay Home Owners Association
Ms Antoinette Kemm	The Office Manager	Langebaan Tourism Bureau
The Chairperson	Chambers of Commerce	Weskus Sakekamer
		Vredenburg Tourism Bureau
Mr Johan Wicht	The Secretary	Blouwaterbaai Property Owners Association
Mr Neil Barends		Coastal Towns Fishing
Mr Gerald Cloete		Coastal Town Fishing Crisis Committee
Andile Kushman		Coastal Town Fishing Crisis Committee
Mr Thabiso Mosia		Coastal Town Fishing Crisis Committee
Ms Erna Potgieter		Weskus Sakekamer/West Coast Travel
Mr Leon Steyn		Weskus Skiereiland Oorgangsraad
R Donaggi		West Coast Fishing Association
Neliswa Sihawu	Senior People and Conservation Officer	West Coast National Park
Patricia Bopape	Park Manager	West Coast National Park
Pierre Nel	Acting Park Manager	West Coast National Park
William Brink		West Coast National Park
Mrs Kay Law	The Chairperson	Saldanha Bay Tourism Organisation
Mr Pierre PD Le Roux	Manager: Municipal Health Services	West Coast Regional Tourism Organisation
Ms Kiewiet H van Rooyen	Tourism Manager	West Coast Regional Tourism Organisation
Roy		South African Deep-Sea Trawling Industry Association
Mr. Paulse	Public Relations Officer	Air Force base Langebaan
Dave Osborn		Saldanha Bay Tourism Organisation
NGOs and Interest Groups		
	The Officer Commanding	Airforce Base Langebaanweg
Mr Andre Wicht	Hospitality Industry	Blue Bay Lodge/Blouwaterbaai Dust Group

SP Mahlangobeza		Bongolwethu
Mr Ivvor Lee	Representative	Business Chambers
Dr Mike Rothenburg	Chairperson	BWBPOA & SBYC
Ms Mary Jean Thomas-Johnson	Business Information Officer	Cape Town Chamber
Ms Luna Vermeulen		Cape Town Chamber
Ms Susan Dean		Pan African Energy
Ms Sharon Bosman	WC Regional Manager	Wildlife & Environment Society of SA (WESSA)
Samantha Petersen	Manager	WWF South Africa
Mr Andy Gubb	Regional Manager	Wildlife & Environment Society of SA (WESSA)
Dr Kerry Sink	Marine Program Manager	South African National Biodiversity Institute
Ms Yolan Friedmann	CEO	The Endangered Wildlife Trust
Mr Bruce Adams		W.C.C.H.A.I
Ms Abigail Hopley		West Coast Community HIV/AIDS Initiative
Mr Avril M Hein		West Coast FET College
Ms Olga Duiker		West Coast HIV Initiative - Vredenburg
Ms Appies		Indlu Yothando - Community Development
Dr Dave A Whitelaw	Chairperson: Conservation Committee of CBC	Cape Bird Club
Peter Steyn/Priscilla Beeton	Chairman	Cape Bird Club
Colin de Kock		West Coast Bird Club (WCBC)
Keith Harrison		West Coast Bird Club (WCBC)
Simon Gear	Policy & Advocacy	Birdlife SA
John Thorpe		Cape West Coast Biosphere Reserve
Jimmy Walsh		Cape West Coast Biosphere Reserve
Ryno Pienaar	Cape West Coast Biosphere Reserve	Cape West Coast Biosphere Reserve
Sharon February	Chairperson	Cape West Coast Biosphere Reserve
Ms Marie Nell		WPVV Saldanha
Pippa Haarhof		West Coast Fossil Park
Nicolaas		West Coast Fossil Park
Patrick Lakabane	Chairperson	Community Skills and Training Committee
Barry Clarke		Anchor Environmental
Shandre Summers		West Coast Business Development Centre
Morgan de Beer		Saldanha Bay BBBEE
Rhoda Skei		Saldanha Black Women's Association
Laura		Saldanha Bay Business Alliance
Claire Pengelly		Green Cape
Graeme		

Clemitson		
Raphael Lawrence		Saldanha Freight Services
Petro Swartz		Women in Construction
Thandile Cebisa	BA	SEDA
Annalie van der Merwe		SBTC
Mario Davey		Khumba CED Hub
Mr Grant Ravenscroft	Chairperson	Clean Air Association for Western Cape
Dominee Appies		
Mr Riaan Myburgh	Senior Manager Projects	SACAA: Southern Region
Leona Reynolds	Administrative Officer	SACAA: Southern Region
René de Kock		SANRAL
Shane Wiseman	Manager	SENTECH
Ms Veliswa Baduza	Chief Executive Officer	SAHRA
Ms Lungisa Malgas	Company Secretary	SAHRA
Dumisani Sibayi	Executive Officer: Heritage Resources Management	SAHRA
Local Businesses		
Mr JAV Pienaar		Blue Bay Aquafarm (Pty) Ltd/Mussel & Oyster Forum
Ms Alet Fabricius	Environmental Specialist	Bidfreight Port Operations (Pty) Ltd
S Ferguson		Langebaan Business Chamber
Mr Gert van Zyl	Operations & Programme Manager	West Coast Business Development Centre
Mr Francois Reyneke	Site Manager	Harsco Metals South Africa (Pty) Ltd
Mr Nell Grobbelaar	Senior Account Manager	Industrial Development Corporation
Mr Gert Engelbrecht		Oceana Brand St Helena Bay
Mr Neville Ephraim		Senior Project Manager - iGas
Mr Steve O'Brien	Business Development & BBBEE Coordinator	SMIT Amandla Marine (Pty) Ltd
Mr Gehard Naude	Representative	Petro SA
Mr Stephen Ross	Environmental Co-ordinator	Petro SA
Mr Paul Cloete	Environmental Officer	Sea Harvest Corporation (Pty) Ltd
Mr Frank Hickley	Risk Control Manager	Sea Harvest Corporation (Pty) Ltd
Nico van Houwelingen	Site Engineering Manager	Sea Harvest Corporation (Pty) Ltd
Mr O Scribante	Environmental and Quality Manager	ArcelorMittal South Africa/Saldanha Steel
Gesie Theron	Project Planner : Energy	ArcelorMittal South Africa (Saldanha)
Reinet RL Van Zyl		ArcelorMittal South Africa (Saldanha)

Richard RI Holcroft		ArcelorMittal South Africa (Saldanha)
Mr Brian Adonis		Badisa West Coast - Vredenburg
T Batten	The Secretary	WUSA (Saldanha)
Aquaculture Group		
Antonio Tonin	Chairperson	Saldanha Bay Oyster Company (Pty) Ltd AND Bivalve Shellfish Farmers Association
Dr Sue Jackson		Bivalve Farmers' Association of SA
Mr Wilhelm Herbst		West Coast Aquaculture
Vos Pienaar		Imbaza Mussels Pty Ltd
Johan Voster	Vice Chairperson	Weskus Sakekamer & Shellfish Forum
Mr Franz Von Moltke		Weskus Sakekamer & Shellfish Forum
Schalk Visser		Blue Ocean Mussels
Mr Kevin Ruck	Director	Blue Sapphire Pearls
Melinda Bezuidenhout		West Coast Aquaculture
Nicole Parker		
Nick Loubser		West Coast Aquaculture
SJ Poggenpoel		West Coast Oyster Growers
Libraries		
Ms L Sadie (Lize)	The Head Librarian	Langebaan Public Library
Ms J Maart (Joan)	The Head Librarian	Vredenburg Public Library
D Meyer	The Head Librarian	Saldanha Public Library
Ms E Kordom (Ella)	The Head Librarian	Louwville Public Library
Bettie van Kolver	The Head Librarian	Diazville Library
E Kordom	The Head Librarian	Louwville Library
Eskom		
Mr K Barnard (Kobus)		Eskom Holdings Ltd Distribution: Western Region
S Scheppers (Segomoco)	System Planning Manager	Eskom Transmission
Jana Klopper		Eskom
Astrid October		Eskom
Adrian Francis	Transmission Section : Energy	Eskom
Ahilan Kailasanathan		Eskom
Transnet		
Quinton Brink	Port of Saldanha: Harbour Master	Transnet National Ports Authority
Willem Roux	Port of Saldanha: Port Manager	Transnet National Ports Authority
Gail Williams	Port of Saldanha: Secretary to Port Manager	Transnet National Ports Authority
Dorian Bilse	Head Office Chief Engineer	Transnet National Ports Authority

Theo Sethosa	Port of Saldanha: Port Engineer	Transnet National Ports Authority
Quentin Kordom	Port of Saldanha: SHE Manager	Transnet National Ports Authority
Abigail Links	Port of Saldanha: Port Planner	Transnet National Ports Authority
Nimi Ramchand	Head Office Chief Planner	Transnet National Ports Authority
Quentin Kordom		Transnet National Ports Authority
Nelson Mataba	Environmental Manager	Transnet National Ports Authority Head Office
Jeanette Smit	Port Engineer	Transnet National Ports Authority
Nicole Abrahams	Property and New Business Development Manager	Transnet National ports Authority Port of Saldanha
Neighbouring Landowners		
Gavin Stigling		Globeleq Landowner
Laura Peinke	IDZ Manager Executive: Business Development	
Doug Southgate		Saldanha Bay Industrial Development Zone
Carol Bagarette		Saldanha Bay Industrial Development Zone
Duncan Bosch	Technical Services Manager	AfriSam (South Africa) Pty Ltd
Project Landowners		
		Transnet SOC Ltd
		Tronox Mineral Sands
		Arcelor Mittal
		Transnet SOC Ltd
		BJ Pieterse
		All Billboard Solutions
		FGH Tolken
		Engen Petroleum ltd
		Arcelor Mittal
		Thys van Niekerk boerdery trust
		Bitline SA 146 CC
		J&R Archer Eiendomme Pty Ltd
		Springfontein Trust
		Eskom Holdings
Interested and Affected Parties		
Susan Dean		Avedia Energy
Terence Thackwray		
Lance Tiet		Smit Amandla Marine
David Dean		Mainstream Renewable Power South Africa
Helen Bamford	Staff Writer	Cape Argus
Russell Stow		
Darryl Hunt		Dynamic Energy Consultants cc
Mike Mulcahy		Green Cape
Kelly Stroebel		CSIR
Alan Carnegie and Jill Carnegie		WESSA/Saldanha Bay Water Quality Forum

Robert Løseth		Blystad Energy Management
Andre' H Wicht		Blue Bay Lodge (PTY) LTD
Neville Ephraim	Senior Project Manager	CEF Group
Dominic José Goncalves	Business Development Manager (Africa)	Abengoa
Johan Lewin		Seeland Development Trust
Izel van Rooy	Town Planner	Vortum Energy (Pty) Ltd
Daniele Ventura	Project Design Engineer	Vortum Energy (Pty) Ltd
Mr Steenkamp		Weskus Sakekamer
Adri La Meyer	Directorate: Development Facilitation	Department of Environmental Affairs and Development Planning
Cassi Goodman		
Hiadee von Well	Environmental Consultant	Ages (Pty) Ltd
Engela Grobler	EAP	Ages (Pty) Ltd
Helene Meissenheimer	Weslander Editor	Weslander
Karin Otto	Conservation Office Administrator	Cape West Coast Biosphere Reserve
John Selby		Langebaan Ratepayers and Residents Association
Cpt Peter Stowe		
Nigel Rossouw	Environmental Planner	Shell South Africa (Upstream International Integrated Gas)
Nicholas Champion		
Harvey Foster		
Rhoda Skei	Secretary	Saldanha Bay Black Business Association
Esca Coetzee	Senior Environmental Scientist Engineering Services: Environmental Engineering Group Technology	Sasol
Amitha Maharaj		Sasol
Godwin		Encorex
Daniel Daniels		FTC Saldanha
Gert Engelbrecht	Engineering Manager	Lucky Star, St Helena Bay
Sofia Wagner	Facility Manager	FerroMarine Africa Pty Ltd
Carlo Matthysen	LNG Project Manager	PetroSA
Joe Wengrowe	Consultant	Independent pipeline and subsea consultant
Sandile Mtshali	Business Development & B-BBEE Officer	SMIT Amandla Marine (Pty) Ltd
Doretha Kotze	Town Planner	West Coast District Municipality
Lorraine Masipa	CEO	Semona International
Zayed Brown	Pollution Monitoring and Information Management (PMIM) Directorate: Pollution and Chemicals Management (D: PCM)	Department: Environmental Affairs and Development Planning Western Cape Government
Wilna Kloppers		Department: Environmental Affairs and Development Planning Western Cape Government

Quentin Raoul Jordaan	IDP / Ward Committee Coordinator	Saldanha Bay Municipality
K.H.B. Harrison		West Coast Bird Club
Michelle Pretorius	Aquaculture and Economic Development	Department of Agriculture, Forestry and Fisheries
Bertus van Niekerk	Technical Project Manager	Mulilo Thermal Project Developments (Pty) Ltd
Johan Brits		Westarcor Engineering
Carol Michaels	Operations Administrator	SFG Engineering Services (Pty) Ltd
Kristan Callaghan		Binnington Copeland & Associates
Lizette Venter	Resource Development Manager	Erakis
Shane Pillay		Capital Energy Resources
Alessandro Sessa	Business Development Enel Global Generation	Enel s.p.a.
Gonzalo Ramirez	Director: Development	Excelerate Energy
Annelize Joubert	Project and Office Administrator	CCA Environmental (Pty) Ltd
Viv Crone	CEO	VJC Consulting
Jonathan Hoffman		Globeleq
Jon Frick		Globeleq
Leila Mahomed-eideman		Globeleq
Johannes Clausen	Chief Financial Officer	RS Africa Diving (Pty) Ltd
Eloise Costandius	Senior Environmental Consultant	CCA Environmental (Pty) Ltd
Lusani Rathanya	Project Analyst	acwapower
Hennie Steenkamp		
Akhona Mbenyana		Department of Transport and Public Works
Danielle Manuel		Department of Transport and Public Works
Rivaaj Mahabeer		Department of Transport and Public Works
Karen Low	Environmental Manager	Mulilo Renewable Project Developments
Daniel Alkaster		Sea Breeze Community Development
ZG Damonse		Sea Breeze Community Development
Glenville Marinus		West Coast Project Management and Investment
Russell Sabor	Director	GVJ Electrical & Instrumentation Contractors (Pty) Ltd
Faith Filtane		Filtane Training Academy (Pty/Ltd)

Michael Madangatya		Khula-khula transport services cc
Samuel Adams		
Marilyn Matroos		M and M Contracting
Dawood Shabudin	Operations Director	Vusani Engineering Services (Pty) Ltd
Segopotso Elvis Tong		SE Tong (Pty) Ltd
Alta Le Roux		Constantia Engineering
Dicky Koekemoer	Warehouse Manager	ArcelorMittal South Africa
Amos Saul		
Mikne Talmarkes		Made for Maid Cleaning Services
Richard Murray		
W. Coetzee		Sea Harvest Coroporation
Jackie Louw		West Coast Maintenance and Civils
Albert Bossart	Regional Sales Manager- Power Generation	ABB
Nosipho Nozakane		Shinoanov Solutions (Pty) Ltd
Beatrice Landsberg		Harcourts
Helena Koch	Relationship Executive |	Absa Retail and Business Banking
Portia Reinertz	Transactional Banker	Absa Retail and Business Banking
Murchel Francke	Client Service Consultant	Absa Business Bank
Talana Loots		
Gavin Stigling		Advanced Projects
Bill Eloff	Consultant	All Billboard Solutions Cape. Trans African Murals Newco Ltd
Sophia Steynberg	Administration Manager	PPC Saldanha
Anthony V Mlata		Cederberg Golfery Association (Pty) Ltd
Nathan Birch		Bevline
Zain Abrahams		Bevline
Everite van Wyk		Bevline
Bernard Venter		PPC
Gerrit Nortje		Sea Harvest
Jackie Louw		West Coast Maintenance and Civils
Garth Duncan		Duncan Electrical

Jerome Vraagom		CFG Logistics Services
Glen Marinus		WCPM & Investment
Sarel Schoeman		Bid Freight Port OPS
Bernice Damon		View from the top
Ivor Damon		View from the top
Ethan Francke		Saldanha Accommdation
Kevin Friester		Bio Green Solution
Arthur Nom		Namndiphe
Vusi Mathebula		Namndiphe
Titania Stefanus-Zincke		Lucky Star
Anita Brooks		Elmada Clothing
Selina Figland		Elmarda Clothing
Ashwin Jooste		RAA
Zelda Williams		ZWJ Trading
Joe Juke		ZWJ Trading
Sedick Abrahams		Gnomma Khoi Trust
Natasha Engelbrecht		Mogwe (Pty) Ltd
Rustin Engelbrecht		Mogwe (Pty) Ltd
Reginald Abrahams		PPC
Morgan De Beer		Saldanha Bay Black Business Association
Eugene De Toit		BBBB Chamber
Paulina Mali		Business Forum
Enslin Benham		Brainwave Projects
William Laubscher		Brainwave Projects
Gasan Khan		SIS
Shabier Jumat		SIS
Dominic Damonse		Sea Breeze Community Development
Zharon Damonse		Sea Breeze Community Development
Barthlo Harmse		Sunrise
Lukas van der Walt		Gasdome
Francois van der Bank		Arcellor Mittal
Elmondo Paulse		Transnet
Jeff Longley		AMSA
Colleen Daniels		AMSA

Jan Hattingh		Duferco Steel
Sabelo Tabata		Transnet
Joseph Jordaan		VKC/Hybrid Capital
Wajdi Abrahams		VKC Chamber
Debbie Ocheng		Shirdanov Solutions
Xolisa Peter		Nox Holdings
William Mugal		Coastal Computers
Charl Howburg		Westland Civils
Bertram Vraagom		Sandelmi
Ettiene Swanepoel		Sirollon Int.
Peter Kok		Sandelmi
Christo van der Merwe		Sandelmi
Deon Olivier		CAD Tech and Industrial
LF De Wit		Sandelmi
Justine Wyngaardt	Environmental Manager: Land Development	Eskom: Western Cape Operating Unit
Owen Peters	Land and Rights	Eskom: Western Cape Operating Unit
Michelle Herbert		Advisian
Ramakulukusha Moses	Environmental Officer Specialised Production	Department of Environmental Affairs
Johann Bester		Thebe Investment Corporaton
Lana Ignjatović	Branch Administrator	Leads to Business
David Joubert	Senior Manager: Strategic Planning and Enterprise Risk Services	Saldanha Bay Municipality
Mr John Geeringh	Eskom Transmission	Eskom
Gabriele Wood	Public Participation and Social Consultant	Savannah SA
Basson Geldenhuys		Department of Public Works
Stefano Boggia	Sales Manager	Ansaldo Energia South Africa
Carika S. van Zyl	Chairperson	West Coast Environmental Protection Association / Weskus Omgewings Bewarings Assosiasie
Elsa Wessels	Editor	weskusonTheline
IPP Stakeholders		
Seiji Iijima	Head of Business Development Power & Energy	ITOCHU Corporation
Eiichi		ITOCHU Corporation

Takahashi		
Tebogo More	Business Development	GDF SUEZ Energy Southern Africa (Pty) Ltd
David Peinke	Director	Atlantic Renewable Energy Partners (Pty) Ltd
Sonia Miszczak	Analyst	Atlantic Renewable Energy Partners (Pty) Ltd
Giovanni Serra		ENEL Power
Taf Mhlanga		Tirsano Partners
Mluleki Majola		MOGS
Vi Truong Dinh	Business development	EDF South Africa
Mike Fitzpatrick	Project Director G2P Programme	IPP-Projects
Werner Pieterse	Project Manager G2P Programme	IPP - Projects
Gus Hojem	Technical Director	PRDW
Public Meeting on the 16 February 2016		
Mr WC van der Merwe	Sales Manager	Sandelim
Mr FS van der Bank	Energy Advisor	AMSA
Mr Seth Olivier	Director Gas	IPCSA
G. Theron	Project Manager	AMSA
R. van Zyl	Bi Energy Manager	AMSA
Keith Harrison	Conservationist	West Coast Birds Club
Otto Scribante	Aux Quality	AMSA
Helena Koch	ABSA	Relationship Executive
Helene Meissenheimer	Weslander Editor	Weslander
Bertus van Niekerk	Project Developer	Mulilo Thermal
Charlene De Kock	Audit Manager	Alliott Anderson Nell
Riaan Refelinghuys	Manager	Harcourts Real Estate
Louis de Wet	Shareholder	Sandelim
A. L. Sam	Manager General	A.D.L.
Dr. Sue Jackson	Representative	Birdlife, shellfish, farmers association of SA.
DH Coetzee	FM	DSP
W. Turner	FM	Turnerland
Melinda Murray		Safety First
Gerrit Reinertz		Pam Golding
Raymond Francis		GVJ Electrical
Portia Reinertz		ABSA
Chris Le Roux	CEO	
Grant Berndsen	Director	Infrastream Advisory
Piet Swanepoel	Consultant	Harcourts Real Estate
P. La Grange	Owner	H.I.S.
B. Eloff	Consultant Advisor	ABS
M. Vermootsen	Director	GVJ Electrical
Mr. Dennis Britz	Specialist	AMSA
Mr. Michael Olivier	Director	IPCSA
Ms. Elmien de Bruyn	Environmental Co ordinator	Duferco Steel processing

Richard Murray	CEO	Safety First
Neville Epharam	Senior Project Manager	Igas
Richard Holcolt	GM	AMSA
Mr Darryl Hunt	Member	Dynamic Energy Consultants
Mr. Glen Drewry		Ferro Marine Africa
Sofia Wagner		Ferro Marine Africa
Doug Southgate	CEO	SBIDZ
Jannie Moeller	GM	Mulilo Thermal
Adam Young	PM	Infrastream Advisory
Francois de Kock	Private	
PG Kock		Sandelmi
B.T. Vraagom	Deputy Chair	BEE Forum
Sunday Mpotane		
Z.F. Futan	Owner	Lathiswaand and Junior Pty Fultanie Training Acc
Segopotso Elvis Tong		SE Tong (Pty) Ltd

B2 INTITIAL NOTIFICATION MATERIAL

B2.1 NOTIFICATION LETTER

Notification of commencement of an Environment Impact Assessment process and initial notification was distributed to all I&APs in the stakeholder database on 21 January 2016. The notification included an invitation to an Public Meeting in Saldanha Bay. A copy of the notification letter, as well as proof of distribution is provided below.

Environmental Resources Management

2nd Floor
Great Westerford
240 Main Road, Rondebosch
7700, Cape Town, South Africa

Postnet Suite 90
Private Bag X12
Tokai, 7966
Cape Town, South Africa

Tel: +27 21 681 5400
Fax: +27 21 686 0736
www.erm.com

21 January 2016

ERM Ref: 0315829

Dear Stakeholder,

RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.

The Project requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, through an Environmental Impact Assessment (EIA) process.

This notification serves to announce the commencement of the EIA process and invites you to attend a public meeting to find out more about the Project. You will also be able to raise issues and pose questions to the Project team.

When: 16 February 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

For further information about the EIA, the associated public participation process and how you can register as an Interested and Affected Party (I&AP), please refer to the attached Background Information Document.

To RSVP or register as an I&AP contact Tougheeda Aspeling of ERM:
Tel: 021 681 5400
Fax: 086 540 4072
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Visit the Project website: www.erm.com/saldanhasteel

Yours sincerely
Tougheeda Aspeling
Stakeholder Engagement Consultant

Figure 2.2 Proof of Email to Stakeholders

From: ERM South Africa EIA Mailbox
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
Bcc: "nngcaba@environment.gov.za"; "nngoveni@environment.gov.za"; "msolomons@environment.gov.za"; "MEssop@environment.gov.za"; "NBPillay@environment.gov.za"; "taramaru@environment.gov.za"; "rmolale@environment.gov.za"; "lmahlangu@environment.gov.za"; "mgordon@environment.gov.za"; "WHector@environment.gov.za"; "vsenene@environment.gov.za"; "lmoja@environment.gov.za"; "Mshubame@environment.gov.za"; "Lmokoena@environment.gov.za"; "Dramalope@environment.gov.za"; "mmayekiso@environment.gov.za"; "lmudau2@environment.gov.za"; "pkhati@environment.gov.za"; "cmangcu@environment.gov.za"; "ajboyd@environment.gov.za"; "AndrewC@daff.gov.za"; "ypeterson@environment.gov.za"; "xmkefe@environment.gov.za"; "LMudau2@environment.gov.za"; "dfischer@environment.gov.za"; "SMalaza@environment.gov.za"; "IAbader@environment.gov.za"; "DG@daff.gov.za"; "SiphokaziN@daff.gov.za"; "fatimaS@daff.gov.za"; "michellePR@daff.gov.za"; "AndreaB@daff.gov.za"; "KimP@daff.gov.za"; "SiphokaziN@daff.gov.za"; "MujahidaH@daff.gov.za"; "CebaM@daff.gov.za"; "FatimaSA@daff.gov.za"; "WadeT@daff.gov.za"; "BelemaneS@daff.gov.za"; "KishanS@daff.gov.za"; "kishansankar@gmail.com"; "AsandaN@daff.gov.za"; "Centralp@dwa.gov.za"; "lyonsh@dws.gov.za"; "ncampbell@samsa.org.za"; "djames@samsa.org.za"; "hesterhuizen@samsa.org.za"; "DManley@samsa.org.za"; "mslabber@samsa.org.za"; "paseka.nku@nersa.org.za"; "selepeg@dot.gov.za"; "Wolsey.Barnard@energy.gov.za"; "Fuad.allie@energy.gov.za"; "westerncapeprovince@nda.org.za"; "hydrosan@iafrica.com"; "Ossie.Lamb@dpw.gov.za"; "Fredrick.johnson@dpw.gov.za"; "online2276859@telkomsa.net"; "saldanhanature@gmail.com"; "marius.venter@westerncape.gov.za"; "khanr@dws.gov.za"; "pieter.vanzyl@westerncape.gov.za"; "Clement.Arendse@westerncape.gov.za"; "zain.jumat@westerncape.gov.za"; "Transport.Publicworks@westerncape.gov.za"; "Lucy.Caplan@westerncape.gov.za"; "Jacqui.Gooch@westerncape.gov.za"; "Danielle.manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "Alvan.gabriel@westerncape.gov.za"; "Joy.Leaner@westerncape.gov.za"; "anthony.barnes@westerncape.gov.za"; "Ayub.mohamed@westerncape.gov.za"; "Caren.George@westerncape.gov.za"; "coastal.enquiries@westerncape.gov.za"; "Zahier.toefy@westerncape.gov.za"; "Marlene.laros@westerncape.gov.za"; "Kobus.Munro@westerncape.gov.za"; "EtienneAlfred.Roux@westerncape.gov.za"; "aduffell-canham@capenature.co.za"; "landuse@capenature.co.za"; "ebaard@capenature.co.za"; "aaturner@capenature.co.za"; "romar@capenature.co.za"; "ceoheritage@westerncape.gov.za"; "sivuyile.mpakane@dmr.gov.za"; "AdriaanC@elsenburg.com"; "franciss@elsenburg.com"; "Landuse.elsenburg@elsenburg.com"; "Lars.Starke@westerncape.gov.za"; "Nigel.Gwynne-Evans@westerncape.gov.za"; "Jim.Petrie@westerncape.gov.za"; "dreyerw@dws.gov.za"; "Rasheeq.Williams@westerncape.gov.za"; "Goodwell.dingaan@westerncape.gov.za"; "Claude.Orgill@westerncape.gov.za"; "Martinus.vanwyk@westerncape.gov.za"; "Ferdie.endemann@gmail.com"; "FerdieE@elsenburg.com"; "MogaleS@elsenburg.com"; "info@elsenburg.com"; "KhanR@DWS.gov.za"; "ClaassenM@DWS.gov.za"; "MafilelaS@DWS.gov.za"; "Petersena@dws.gov.za"; "heneB@dws.gov.za"; "Sokhayaj@dws.gov.za"; "leona.bruiners@drdlr.gov.za"; "Duduzile.Kunene@dmr.gov.za"; "francois.schippers@sbm.gov.za"; "mun@sbm.gov.za"; "benice.rossouw@sbm.gov.za"; "Jacques.Marais@sbm.gov.za"; "shane.cordom@sbm.co.za"; "shanecordom@yahoo.com"; "piet.fabricius@sbm.co.za"; "pietfab@gmail.com"; "lindsey.gaffley@sbm.co.za"; "driekas@saldanha.co.za"; "nazeema.duarte@sbm.gov.za"; "Marius.Meiring@sbm.gov.za"; "Gerrit.Smith@sbm.gov.za"; "hfprins@wcdm.co.za"; "smitk@swartland.org.za"; "hhfbester@wcdm.co.za"; "pietf@saldanhabay.co.za"; "pietfab@gmail.com"; "dkotze@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "cjmalherbe@wcdm.co.za"; "wmarkus@wcdm.co.za"; "ndejongh@wcdm.co.za"; "waldo.julius@sbm.gov.za"; "laura@sbidz.co.za"; "kaashifah@sbidz.co.za"; "lelanie@sbidz.co.za"; "moeketsi@sbidz.co.za"; "proactive@mweb.co.za"; "frank.pronk@sbm.gov.za"; "Mzwandile.biko@sbm.gov.za"; "stephanus.vries@sbm.gov.za"; "ryan.don@sbm.gov.za"; "andre.kruger@sbm.gov.za"; "info@wowlangebaan.co.za"; "ldpwes@mweb.co.za"; "metsal@imaginet.co.za"; "jillcarnegie@gmail.com"; "info@langebaanratepayers.co.za"; "proactiv@mweb.co.za"; "info@langebaanratepayers.co.za"; "info@villaverano.co.za"; "jbrachairman@gmail.com"; "goosenwp@yahoo.com"; "mikero@vodamail.co.za"; "info@langebaanratepayers.co.za"; "johnselby@worldonline.co.za"; "mikero@vodamail.co.za"; "info@langebaaninfo.co.za"; "info@weskussakekamer.co.za"; "vredenburg@sbto.co.za"; "jhwicht@cis.co.za"; "cloetegerald@yahoo.com"; "andile.kushman@labour.gov.za"; "tabsom2202@yahoo.co.uk"; "wct@mweb.co.za"; "stereosteyn@gmail.com"; "NeliswaS@sanparks.org"; "Pat.bopape@sanparks.org"; "Pierre.Nel@sanparks.org"; "william.brink@sanparks.org"; "bureau@kingsley.co.za"; "mverster@hotmail.com"; "ppdleroux@wcdm.co.za"; "tourism@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "tourism@wcdm.co.za"; "johann@sadstia.co.za"; "chairman@sadstia.co.za"; "dave@sbto.co.za"; "langebaanweg@telkomsa.net"; "andre@blouwaterbaai.com"; "ivorlee@intekom.co.za"; "ivvorlee@intekom.co.za"; "mikero@vodamail.co.za"; "mary-jean@capechamber.co.za"; "mj@capechamber.co.za"; "mjjssj@gmail.com"; "luna@capeglobal.co.za"; "mjjssj@gmail.com"; "susandean@tiag.co.za"; "sharon@wessa.co.za"; "marketing@wessa.co.za"; "spetersen@wwf.org.za"; "andy@wessa.co.za"; "postmaster@wessa.wcape.school.za"; "k.sink@sanbi.org.za"; "yolanf@ewt.org.za"; "b.adams@webmail.co.za"; "abicshop@gmail.com"; "AHein@westcoastcollege.co.za"; "reddaisy@telkomsa.net"; "amsterdam@new.co.za"; "info@capebirdclub.org.za"; "Coldek@icon.co.za"; "keithhbharrison@lando.co.za"; "info@capebiosphere.co.za"; "jthorpe@capebiosphere.co.za"; "info@capebiosphere.co.za"; "Rynop@capebiosphere.co.za"; "sharonfebs@gmail.com"; "darlingwines@telkomsa.net"; "saligna2030@gmail.com"; "slabigh@gmail.com"; "wva-wcfa@telkomsa.net"; "info@fossilpark.org.za"; "pjh@fossilpark.org.za"; "eco@fossilpark.org.za"; "coldek@icon.co.za"; "patrick@sbidz.co.za"; "barry@anchorenvironmental.co.za"; "shandre@wcbdc.co.za"; "morgandebeer11@gmail.com"; "sbbwa.secretary@gmail.com"; "laura@sbidz.co.za"; "clairpengelly@greencape.co.za"; "gclemitson@gmail.com"; "Raphaell@salfreight.co.za"; "petroswartz@yahoo.com"; "tcebisa@seda.org.za"; "tourismmanager@sbto.co.za"; "mario.davey@angloamerican.com"; "nacawc@gmail.com"; "bbmussel@mweb.co.za"; "alet.fabricius@bidports.co.za"; "Gert@wcbusinessdevelopment.org.za"; "maxwell.malan@exxaro.com"; "freyneke@harsco.com"; "nellg@idc.co.za"; "gerte@ob.co.za";

"NevilleE@cefgroup.co.za"; "gerhard.naude@petrosa.co.za"; "elsas@cefgroup.co.za"; "stephen.ross@petrosa.co.za"; "stephenr@cefgroup.co.za"; "elsas@cefgroup.co.za"; "stephen.ross@petrosa.co.za"; "paulc@seaharvest.co.za"; "carint@seaharvest.co.za"; "frankh@seaharvest.co.za"; "carint@seaharvest.co.za"; "nicov@seaharvest.co.za"; "Otto.Scribante@arcelormittal.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanZyl@arcelormittal.com"; "Richard.Holcroft@arcelormittal.com"; "badisaweskus@telkomsa.net"; "toni@saldanhabayoysters.co.za"; "sue@saldanhabayoysters.co.za"; "wherbst@mussels.co.za"; "bbmussel@mweb.co.za"; "info@weskussakekamer.co.za"; "franzvm@mweb.co.za"; "schalk@blueoceanmussels.com"; "kevin@ruck.co.za"; "melinda@mussels.co.za"; "nparker@xpandit.co.za"; "nick@vikingaquaculture.co.za"; "sj@vikingaquaculture.co.za"; "lbnlib@webmail.co.za"; "joan.maart@gmail.com"; "mun@saldanhabay.co.za"; "antjiev@gmail.com"; "Mun@Saldanhabay.Co.Za"; "BarnarJM.BFN.FS_Bloemfontein@eskom.co.za"; "segomoco.scheppers@eskom.co.za"; "KloppeJM@eskom.co.za"; "OctobeA@eskom.co.za"; "FranciA@eskom.co.za"; "KailasA@eskom.co.za"; "Quinton.Brink@transnet.net"; "willem.roux@transnet.net"; "gail.williams@transnet.net"; "dorian.bilse@transnet.net"; "theo.sethosa@transnet.net"; "Quentin.Kordom@transnet.net"; "Abigail.Links@transnet.net"; "nimi.ramchand@transnet.net"; "quentin.kordom@transnet.net"; "nelson.mbatha@transnet.net"; "Jeanette.Smit@transnet.net"; "Nicole.Abrahams@transnet.net"; "gavstig@mweb.co.za"; "laura@sbidz.co.za"; "doug@sbidz.co.za"; "carol@sbidz.co.za"; "duncan.bosch@za.afrisam.com"; "susandean@tiag.co.za"; "tct@petrostruct.co.za"; "L.tiet@smit.com"; "david.dean@mainstreamrp.com"; "helen.bamford@inl.co.za"; "russells@gcs-sa.biz"; "darryl.hunt@dynamicenergy.co.za"; "mike@green-cape.co.za"; "KStroebel@csir.co.za"; "jillcarnegie@gmail.com"; "robert.loseth@blystadenergy.com"; "andre@bluebaylodge.co.za"; "NevilleE@cefgroup.co.za"; "dominic.goncalves@abengoa.com"; "johanlewin@hotmail.com"; "vortumenergy@gmail.com"; "planwize@telkomsa.net"; "vortumenergy@gmail.com"; "development@vidigenix.co.za"; "nooitgedacht@sandveld.net"; "Adri.LaMeyer@westerncape.gov.za"; "cassi@icon.co.za"; "hvonwell@ages-group.com"; "egrobler@ages-group.com"; "helene@media24.com"; "conservationoffice@capebiosphere.co.za"; "johnselby@worldonline.co.za"; "peter.stowe@gmail.com"; "nigel.rossouw@shell.com"; "n_champion@yahoo.com"; "haf@Vitol.com"; "sbbwa.secretary@gmail.com"; "Esca.coetzee@sasol.com"; "Amitha.Maharaj@sasol.com"; "gsweto@encorex.co.za"; "daniel@ftcsaldanha.co.za"; "GertE@luckystar.co.za"; "sw@atlantiscorp.co.za"; "CARLO.Matthysen@petrosa.co.za"; "joewengrowe@afrihost.co.za"; "s.mtshali@smit.com"; "dkotze@wcdm.co.za"; "ezekiel@semona.co.za"; "zayed.brown@westerncape.gov.za"; "Wilna.Kloppers@westerncape.gov.za"; "Quentin.Jordaan@sbm.gov.za"; "jordaanquentin@gmail.com"; "keithhbharrison@lando.co.za"; "angil@westcoastmail.co.za"; "michellePR@daff.gov.za"; "bertus@mulilo.com"; "johan@westarcor.co.za"; "carol@sfgengineering.co.za"; "KristanCallaghan@hillintl.com"; "Lizette@erakis.co.za"; "s.pillay@capitalenergyresources.co.uk"; "alessandro.sessa@enel.com"; "gonzalo.ramirez@excelerateenergy.com"; "ajoubert@slrconsulting.com"; "vivcrone@vjcz.com"; "jonathan.hoffman@globeleq.co.za"; "jon.frick@globeleq.co.za"; "leila.mahomed-weideman@globeleq.co.za"; "johs@rs-africa-diving.com"; "ecostandius@slrconsulting.com"; "eloise@ccaenvironmental.co.za"; "lrathanya@acwapower.com"; "Vjmabunda@acwapower.com"; "asingh@acwapower.com"; "inc431@mweb.co.za"; "iijima@itochu.co.za"; "takahashi-e@itochu.co.jp"; "tebogo.more@gdfsuez.com"; "david@atlanticep.com"; "sonia@atlanticep.com"; "giovanni.serra@enel.com"; "taf@tirisanopartners.com"; "mluleki@mogs.co.za"; "vi-externe.truong-dinh@edf.fr"; "mike.fitzpatrick@ipp-projects.co.za"; "werner.pieterse@ipp-projects.co.za"; "ghojem@prdw.com"; "jeanette.smit@transnet.net"; "donovan.samuels@transnet.net"; "simonbiko44@gmail.com"; "paltopteam@westcoastmail.co.za"; "gsweto@encorex.co.za"; "nombuyiselom@sassa.gov.za"; "daniel@ftcsaldanha.co.za"; "dmdaniels@yahoo.com"; "pietfab@gmail.com"; "craig@lwandle.co.za"; "gert@luckystar.co.za"; "Jillcarnegie@gmail.com"; "harvery@vesquin.co.za"; "n.champion@yahoo.com"; "billeloff@vodamail.co.za"; "tebogo.more@gdfsuez.com"; "graphixmatrix@telkomsa.net"; "sumayaf@phuthumaprojects.co.za"; "jbotha@ages-group.com"; "abigail.links@transnet.net"; "willem.roux@transnet.net"; "iijima@itochu.co.za"; "mhlantlathandiswa@gmail.com"; "atmorerodgers99@gmail.com"; "quentin.brink@transnet.net"; "tcebisa@seda.org.za"; "meganthoran.ruthenavelu@transnet.net"; "petroswartz@yahoo.com"; "peter.stowe@gmail.com"; "cgbein@wcdm.co.za"; "Keithharrison@lando.co.za"; "planwize@telkomsa.net"; "vortumenergy@gmail.com"; "mikero@vodamail.co.za"; "sue@saldanhabayoysters.co.za"; "andre@bluebaylodge.co.za"; "coldek@icon.co.za"; "goosenwup@yahoo.com"; "sbwgt@salnet.co.za"; "rynop@capebiosphere.co.za"; "mikero@vodamail.co.za"; "metsal@imaginet.co.za"; "qclemitson@gmail.com"; "info@langebaanratepayers.co.za"; "jillcarnegie@gmail.com"; "Pierre.Nel@sanparks.org"; "paltopteam@westcoastmail.co.za"; "Raphaell@salfreight.co.za"; "tourismmanager@sbto.co.za"

Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Date: 21 January 2016 04:25:00 PM

Attachments: IPCSA Background Information Document_electronic.pdf
image001.png

Dear Stakeholder,

The International Power Consortium South Africa (Pty) Ltd (”IPCSA”) with Saldanha Steel (ArcelorMittal South Africa “AMSA”) being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West

Coast District Municipality and the Western Cape Province.

The Project requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, through an Environmental Impact Assessment (EIA) process.

This notification serves to announce the commencement of the EIA process and invites you to attend a public meeting to find out more about the Project. You will also be able to raise issues and pose questions to the Project team.

When: 16 February 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

For further information about the EIA, the associated public participation process and how you can register as an Interested and Affected Party (I&AP), please refer to the attached Background Information Document.

To RSVP or register as an I&AP contact Tougheeda Aspeling of ERM:
Tel: 021 681 5400
Fax: 086 540 4072
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Visit the Project website: www.erm.com/saldanhasteel

If you wish to be removed from this database, please reply to this email to inform ERM.

Yours sincerely

Tougheeda Aspeling
Stakeholder Engagement Consultant

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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B2.2 NEWSPAPER ADVERTISEMENTS

The Project was advertised on 21 January 2016 in the following papers: Die Burger (Afrikaans); and in the Die Weslander (English).

A copy of the advert, as well as proof of placement is provided below.

Figure 2.3 Copy of the advertisement which was placed in the regional newspaper (Die Burger)

ERM-verwysingsnr.: 0315829

Omgewinsimpakassessering vir 'n Gasaangedrewe Onafhanklike Kragaanleg om Saldanha Staal en ander nywerhede in Saldanhabaai te ondersteun
UITNODIGING OM TE REGISTREER EN KOMMENTAAR TE LEWER

Die Internasionale Kragkonsortium Suid-Afrika (IPCSA), met Saldanha Staal (ArcelorMittal Suid-Afrika "AMSA") as die hoofaankoper, is voornemens om 'n gasaangedrewe kragaanleg in Saldanhabaai te ontwikkel. Die projek sal in die behoeftes van Saldanha Staal voorsien en oortollige elektrisiteit sal beskikbaar gestel word om bestaande nywerhede te ondersteun en te onderhou en om ekonomiese groei aan te moedig in die Saldanhabaai Plaaslike Munisipaliteit, Weskus Distriksmunisipaliteit en die Provinsie Wes-Kaap. Die projek sal beide ingevoerde Saamgeperste Aardgas (CNG) en Vloeibare Aardgas (LNG) as sy hoofbrandstof ondersteun. Die gas sal per skip voorsien word na die Saldanhabaaise hawe, waar dit afgelaai sal word via 'n dompelpomp-pyplyn óf vanaf 'n ankergebied wat aflands geleë is of 'n vasmeerplek in die Saldanhabaaise hawe.

Kennis geskied hiermee van die openbare deelnameproses wat vereis word as deel van die Omgewingsimpakassesseringsproses (OIA) ingevolge die Nasionale Omgewingsbestuurswet (NEMA) (No. 107 van 1998). Die voorgestelde projek gee aanleiding tot die volgende Gelysde Aktiwiteite ingevolge die OIA-Regulasies van 2014 onder NEMA:

- Aktiwiteit 2 Lyskennisgewing 2 SK R984: Die ontwikkeling en verwante bedryf van fasiliteite of infrastruktuur vir die opwekking van elektrisiteit vanaf 'n niehernubare hulpbron, waar die elektrisiteituitset 20 megawatt of meer is.
- Aktiwiteit 7 Lyskennisgewing 2 SK R984: Die ontwikkeling en verwante bedryf van fasiliteite of infrastruktuur vir grootmaatvervoer van gevaarlike produkte- (i) in gasvorm, buite 'n nywerheidskompleks, deur die gebruik van pyplyne, wat 1000 meter in lengte oorskry, met 'n deursetkapasiteit van meer as 700 ton per dag.

Bykomend tot die Aktiwiteite hierbo uiteengesit, word verwag dat die Projek aanleiding sal gee tot die volgende Gelysde Aktiwiteite:

- OIA-Regulasies Lyskennisgewing 1 (SK R983 van 2014) Aktiwiteite 10, 12, 14, 15, 17, 19, 24, 25, 27, 28.
- OIA-Regulasies Lyskennisgewing 2 (SK R984 van 2014) Aktiwiteite 4, 6, 9, 11, 14, 15, 23, 25, 26, 28.
- OIA-Regulasies Lyskennisgewing 3 (GK R985 van 2014) Aktiwiteite 2, 4, 12.

Die Nasionale Departement van Omgewingsake (DEA) is die bevoegde owerheid vir hierdie projek. Environmental Resources Management (ERM) is aangestel as die onafhanklike Omgewingsassessering-praktisyn (OAP) om die OIA en verwante openbare deelnameproses te onderneem.

Belanghebbendes word uitgenooi om as Belanghebbende en Geaffekteerde Persone (B&GP) te registreer om aan die OIA-proses deel te neem deur kwessies van kommer te identifiseer en voorstelle te maak om voordele te verbeter. 'n Konsep-Omvangbepalingsverslag en Konsep-Omgewingsimpakassesseringverslag sal beskikbaar gemaak word vir kommentaar gedurende die OIA-proses. Geregistreerde B&GP'e sal op hoogte gehou word oor die projek en sal in kennis gestel word wanneer hierdie verslae vir kommentaar beskikbaar is.

Die Konsep-Omvangsbepalingsverslag is beskikbaar vir kommentaar en kan afgelaai word by: www.erm.com/G2P/ArcelorMittalEIA
Die kommentaartydperk sal oop wees van xx tot xx. Stuur asb. u kommentaar aan Tougheeda Aspeling by ERM, besonderhede hieronder, op of voor xxx.

ERM sal 'n openbare vergadering hou om meer inligting oor die Projek te verskaf:
Datum: xxx • Plek: xxx • Tyd: xxx

RSVP aan Tougheeda Aspeling (besonderhede hieronder).

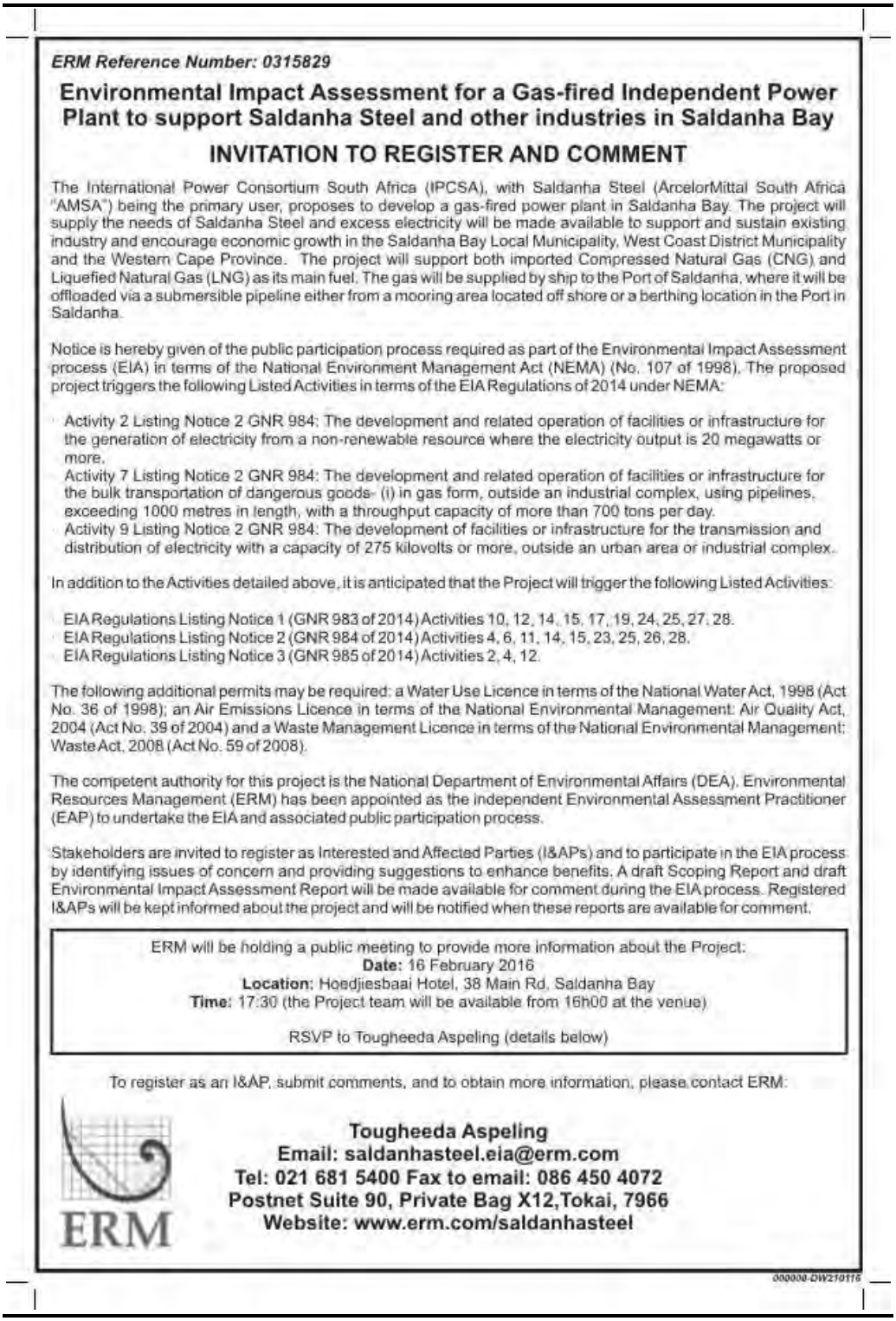
Om as 'n B&GP te registreer, kommentaar in te dien, en om meer inligting te verkry, kontak asb. vir ERM:

Tougheeda Aspeling
Postnet Suite 90, Privaat sak X12,
Tokai, 7966
Tel: 021 681 5400 Faks na e-pos: 086 719 5869
E-pos: G2Parcelormittal.eia@erm.com

ERM

ERM

Figure 2.4 *Copy of the advertisement which was placed in the community newspaper (Die Weslander)*



ERM Reference Number: 0315829

Environmental Impact Assessment for a Gas-fired Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay

INVITATION TO REGISTER AND COMMENT

The International Power Consortium South Africa (IPCSA), with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a gas-fired power plant in Saldanha Bay. The project will supply the needs of Saldanha Steel and excess electricity will be made available to support and sustain existing industry and encourage economic growth in the Saldanha Bay Local Municipality, West Coast District Municipality and the Western Cape Province. The project will support both imported Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel. The gas will be supplied by ship to the Port of Saldanha, where it will be offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha.

Notice is hereby given of the public participation process required as part of the Environmental Impact Assessment process (EIA) in terms of the National Environment Management Act (NEMA) (No. 107 of 1998). The proposed project triggers the following Listed Activities in terms of the EIA Regulations of 2014 under NEMA:

- Activity 2 Listing Notice 2 GNR 984: The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more.
- Activity 7 Listing Notice 2 GNR 984: The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods- (i) in gas form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 700 tons per day.
- Activity 9 Listing Notice 2 GNR 984: The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.

In addition to the Activities detailed above, it is anticipated that the Project will trigger the following Listed Activities:

- EIA Regulations Listing Notice 1 (GNR 983 of 2014) Activities 10, 12, 14, 15, 17, 19, 24, 25, 27, 28.
- EIA Regulations Listing Notice 2 (GNR 984 of 2014) Activities 4, 6, 11, 14, 15, 23, 25, 26, 28.
- EIA Regulations Listing Notice 3 (GNR 985 of 2014) Activities 2, 4, 12.

The following additional permits may be required: a Water Use Licence in terms of the National Water Act, 1998 (Act No. 36 of 1998); an Air Emissions Licence in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) and a Waste Management Licence in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

The competent authority for this project is the National Department of Environmental Affairs (DEA). Environmental Resources Management (ERM) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the EIA and associated public participation process.

Stakeholders are invited to register as Interested and Affected Parties (I&APs) and to participate in the EIA process by identifying issues of concern and providing suggestions to enhance benefits. A draft Scoping Report and draft Environmental Impact Assessment Report will be made available for comment during the EIA process. Registered I&APs will be kept informed about the project and will be notified when these reports are available for comment.

ERM will be holding a public meeting to provide more information about the Project:
Date: 16 February 2016
Location: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

RSVP to Tougheeda Aspeling (details below)

To register as an I&AP, submit comments, and to obtain more information, please contact ERM:

ERM

Tougheeda Aspeling
Email: saldanhasteel.eia@erm.com
Tel: 021 681 5400 Fax to email: 086 450 4072
Postnet Suite 90, Private Bag X12,Tokai, 7966
Website: www.erm.com/saldanhasteel

000000-DW210116

B2.2.1 Proof of Placement of Advertisement

Figure 2.5 Die Burger published on 21 January 2016

2 Aktueel

DIE BURGER Donderdag 21 Januarie 2016

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SAL: Tesourie praat met banke

Maryna Lamprecht

Staking kom oor wette op pensioen

Llewellyn Prince

STAAT SE PENSIOENFONDS BETREK

Korporasie gee glo miljoene vir ANC

Openbare beskermer gevra om ondersoek in te stel

Philda Essop

Bantu Holomisa

Buthelezi vra vir eerlikheid in staatsrede

Jan Gerber

Dr. Mangosuthu Buthelezi, IVP-leier, word gister deur Donwald Pressly, voorsitter van die Kaapstadse Persklub, aan die woord gestel. Foto: LEANNE STANDER

ERM-verwysingsnommer: 0315929

Omgewingsinslagverslag vir 'n Gas-aangedrewe Onafhanklike Kragaanleg ter ondersteuning van Saldanha Staal en ander industrieë in Saldanhabaai

UITNODIGING OM TE REGISTREER EN KOMMENTAAR TE LEWER

ERM sal 'n openbare vergadering hou om meer inligting oor die projek te verskaf:

Datum: 16 Februarie 2016

ERM

Figure 2.6 Die Weslander published on the 21 January 2016

20 Weslander 21 Januarie 2016

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Environmental Impact Assessment for a Gas-fired Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay
INVITATION TO REGISTER AND COMMENT

ERM

SUPERVISOR
HOUSEKEEPING DEPARTMENT

B2.3 *BACKGROUND INFORMATION DOCUMENT*

Background Information Documents (BIDs) were distributed via email on 21 January 2016 to all I&APs on the stakeholder database. Hard copies of the BID were available at the public meeting.

A copy of the BID is provided in the following pages.

Background Information Document

EIA for a Gas-fired Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay

ERM Ref Number: 0315829

Purpose of this Document

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user proposes to develop a 1400 MW natural gas-fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha Bay, West Coast District Municipality and the Western Cape Province. The Project is not dependant on the Department of Energy's (DoE) proposed Independent Power Producer (IPP) program, but will be able to participate if required.

IPCSA is the overall developer and owner of the Project. With it's partners it is sourcing the natural gas, leading the development and construction of the power plant and the interconnections to Saldanha Steel and the national grid. IPCSA and ArcelorMittal South Africa (AMSA) have signed a Co-operation and Pre-Offtake Agreement in terms of which the EIA is a critical input.

The Project requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, through an Environmental Impact Assessment (EIA) process. The DEA is the competent authority under these regulations and has powers to authorise the development or refuse it.

This document provides background information on the Project and the EIA process. It helps Interested and Affected Parties (I&APs) understand the Project and provides guidance on getting involved. I&APs play a very important role in the EIA process. We encourage you to register as an I&AP which will enable ERM to keep you informed throughout the EIA processes. By doing so you will be able to engage in discussions on issues, provide comment on the draft Scoping Report, various specialist study findings and comment on the draft EIA Report to be produced in due course.

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

ERM's Role

In co-ordination with IPCSA, AMSA has appointed ERM as the independent Environmental Assessment Practitioner (EAP) for the EIA. The EIA will ultimately set out the anticipated impacts and propose measures on how these might be managed. The EIA report will then inform an environmental authorisation decision to be taken by the DEA.

Register as an Interested and Affected Party.

Please complete the enclosed registration/comment sheet or contact ERM to register as an I&AP. You can contact us using the details below:

Tougheeda Aspeling of ERM Southern Africa:

Tel: 021 681 5400; Fax to email: 086 5404072

Email: saldanhasteel.eia@erm.com

Postnet Suite 90, Private Bag X12, Tokai, 7966

Project Website: www.erm.com/saldanhasteel

Example of a gas-fi ed power plant

Project Description

The Project will be located on ArcelorMittal property adjacent to the existing Saldanha Steel plant on a portion of Yzervarkensrug 129/0 and Jackals Kloof 195/2. The Project will involve the construction and operation of a 1400 MW Combined Cycle Gas Turbine (CCGT) power plant with capacity to expand up to 3000 MW base load in future. The wider aim is for the Project to not just meet Saldanha Steel's needs but the needs of the neighbouring industries. It is anticipated that this Project will be the key to unlock the wider planned industrial economy of Saldanha Special Economic Zone (SEZ) and Western Cape Province.

The Project will support both imported Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel supply. CNG and LNG will be supplied by ship to the Port of Saldanha, where it will be offloaded via a submersible pipeline either from a mooring area located offshore or a berthing location in the Port of Saldanha. The gas off-loading facility will incorporate sufficient gas storage capacity to cater for the power plant needs and to support other party requirements if needed. The gas will be transported via the onshore landing to site through an underground pipeline.

The infrastructure that forms the Project and will be included in the EIA includes:

- A CCGT power plant (1400MW with possible expansion to 3000MW)
- Onshore natural gas pipeline from the Port of Saldanha to the site (between 2.5 km and 5 km in length); and
- Power transmission line to connect to an existing nearby substation.

Note that ERM are undertaking separate EIAs for the Department of Energy for LNG import facilities.

Why is this Project important?

Existing industry in the West Coast District, specifically Saldanha, is facing overwhelming changes in the export markets – to the extent that the future of these businesses is under theat. Aggravating the situation is the electricity price hike and increasing risk to the availability thereof. The socio-economic impact of possible closure may have severe consequences, including large job losses.

Such a scenario can be averted if a comprehensive and integrated "start-to-end" solution for power generation in the region can be obtained and realized. This Project makes provision for the importation of natural gas as a fuel source and generation of electricity at a significant lower input cost and a more predictable forward price path. The solution does not exclude future upscaling and will provide capacity for other off-takers and parties, either for electricity or for participants in the future gas market.

Most importantly it is envisaged to ensure the sustainability and growth of West Coast industries and is expected to ignite development through the availability of electricity and gas in the region and the country in general.

The Environmental Impact Assessment Processes

The Project triggers listed activities in EIA Regulations Listing Notice 1 (GNR R983), Notice 2 (GNR 984) and Notice 3 (GNR 985), as well as activities listed in the National Environmental Management: Waste Act, 2008. Therefore, the Project will require full Scoping and EIA Processes to support any environmental authorisation decisions. A typical full Scoping/EIA Process is explained below.

Scoping Phase

The purpose of the scoping phase is to communicate the Project to I&APs, to identify possible positive and negative impacts, alternatives, as well as to determine the terms of reference for specialist studies to be conducted in the EIA phase. This will be set out in the **Scoping Report**. **The Draft Scoping Report for the Project will be made available for a thirty (30) day public comment period.**

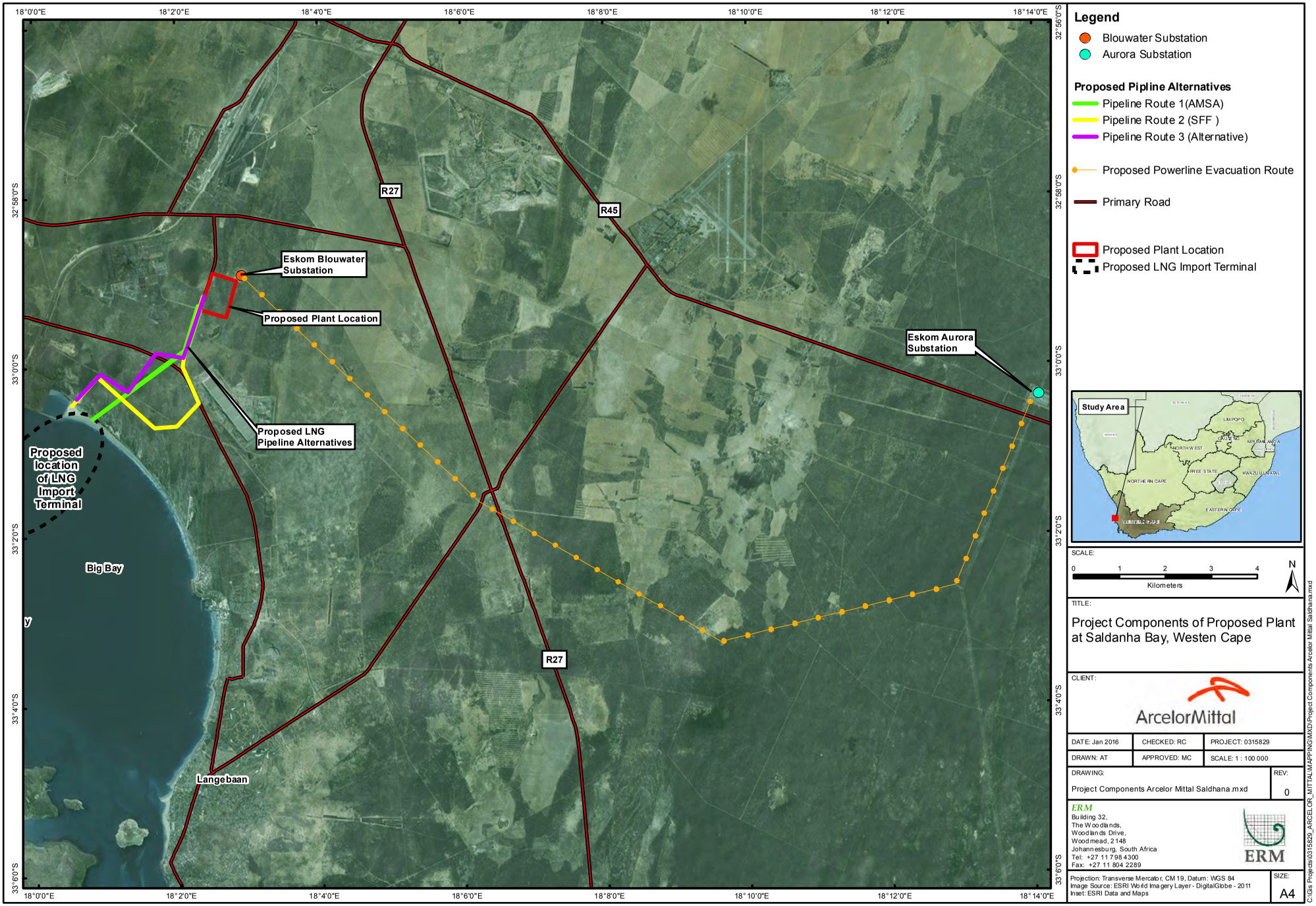
EIA Phase

The possible positive and negative impacts identified in the scoping reports will be assessed in the EIA Reports. The significance of the impacts will be rated using a prescribed methodology. The **Environmental Impact Report** will include Environmental Management Programme, which will detail proposed management measures to minimise negative impacts and enhance positive impacts. **The draft EIA Report will be made available for a thirty (30) day public comment period.**

Addition permits may also be required additional to environmental authorisation. These include, but are not limited to, permits associated with:

- Water Use Licences in terms of the National Water Act (Act No. 36 of 1998);
- Air Emissions Licences in terms of the National Environmental Management: Air Quality Act (Act No. 39 of 2004); and
- Waste Management Licence in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

The Final Scoping Report and Environmental Impact Assessment Report, along with all stakeholder comments, will be submitted to the Department of Environmental Affairs for decision making.



EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes		No
I would like to receive my notifications by:	Email	Post	Fax

Comments;			
Title and Name:			
Organisation:			
Telephone:		**Fax:**	
Cellphone:		**Email:**	
Postal Address:			

Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

B3 INITIAL PUBLIC MEETING

A public meeting were held at Hoedjiesbaai Hotel, Saldanha Bay 16 February 2016 to present the proposed Project and solicit input from stakeholders into the scoping process.

B3.1 ATTENDANCE REGISTER

A record of attendance from the public meeting is provided in the following pages.

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
MR GLENN DRURY SOFIA WARNER.	FERRO MARINE AFRICA		021 880 2070 071 351 1644.	021 880 2071	POST NET SUITE #481 PRIVATE BAG X5061 ~~STELLENBOSCH~~	SW@ATLANTISCORP.CO.ZA.
Doug Southgate	~~SBIDZ~~	CEO	083 45 4991	✓	—	doug@sbidz.co.za
Jannie Mueller	Mulilo Thesen	GM	~~021~~			jannie@mulilo.com
Adam Young	Infrastream	PM	—	—	—	ayoung@infrastream.co.za
Francois de Kock	RT		072 232 6323			primaplumb@gmail.com

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
FG Kok	SANPDELMI		083-269 3657		PO Box 1163 Saldanha 7395	sandelmi@telkomsa.net
B.T. VRAAGOM Sunday Mpotam	Bee forum	Deputy Chair	073852 7821		Saldanha	btvraagom@gmail.com
SUNDAY MPOTANA			079769992 5		SALDANHA.	—
Z.F. Filtane	Lathiswa & Junior Pty Filtane Training Acc.	Owner	0734736 231	0866075 7747	Vredenburg	ftacademy1@gmail..com
S.G TONG	S.G TONG (PTY) LTD	OWNER	0738575453		VREDENBURG	segoedsdong@telkomsa.co.za

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
MR WC VAN DER MERWE	Scandelmi	Sales manager	0825654095		426 VREDENBURG	CHRISTOUDM@VODAMAIL.CO.ZA
MR F.S VAN DER BANK	AMSA	Energy Advisor	083450 6812		P.O BOX 28082 Sonkandpark 1464.	francois.vanderbank@arcelormittal.com
Mr Seth Olivier	IPCSA	Director gas	0729767492		21 Ethel ave Northcliff JHB 2195	setho@ipcsafrica.com
G. THERON	AMSA	Proje. Man.	0824941330			gose.theron@arcelormittal.com
R. van Zyl	AMSA	BI & Energy Manager	0832602732			Reinet.vanzyl@arcelormittal.com

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
KEITH HARRISON	WEST COAST BIRD CLUB	CONSERVATION	022-7133026	022-7133026	P.O.BOX 1090 VREDENBURG 7380	KEITH HARRISON @LANTO.CO.ZA
OTTO SCRIBANTE.	AMSA.	ENV. FORUM	0227094596		SALDANHA WORKS.	ottoscribante@arcelormittal.com
Helena Koch	ABSA	Relationship Executive	082 494 4531	—	22 Main Street. Vlbury	helena-koch@absa.co.za.
Helene Meisenheimer	Weslander	Editor	022 713 1251	—		helene@media24.com
Bertus van Niekerk	Mulilo Thermal	Project Developer	071 570 5168	—		bertus@mulilo.com

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address.
Charlene de Kock	Alliott Andersen Nell	Audit Manager	0810254282			charlene@aan.co.za.
Riaan Redelinghuys.	Harcourts Real Estate.	Manager	0813658168			riaan.r@harcourts.co.za.
Louis de Wet	Sandelani	Shareholder	0823780594			louis.dewet10@gmail.com
A.d Saul	A.i.d.l Trans D	Manager	0793743044		109 Vredenburg 7380	
Dr Sue Jacks—	Bivalve Shellfish Farmers' Assoc. of SA	Representa	082 4100449			sue@saldanhabayoysters.co.za

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
D H Coetzee	DSP	FM	0227097058			dirk.coetzee@dnferco.co.za
W. Turner	Tumerland	FM	0836618920	022 7231458		accounts@tumerland.co.za

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
Melinda Murray	Safety First		074 449 8643		11 Moosdam str.	\
GERRIT REINERTZ	PAM GOLDING		082 809 0586		POSBUS 761 VREDENBURG	gerrit.reinertz@pamgolding.co.za.
Raymond Francis	GOJ Electrical		0735132813		P.O Box 844 Vredenburg	info@goj.co.za
Portia Reinertz.	ABSA.		082 459 7301		Posbus 761 Vredenburg	portia.reinertz@absa.co.za.
CHRIS LE ROUX	CONSTITUENCY	CEO	0836572162		5 PIET RETIEF VREDENBURG.	chrisleroux@webmail.co.

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
Grant Berndsen	Infrastream Advisory	Director	0825513552	—	-	gberndsen@infrastream.co.za
PIET SWANEPOEL	HARCOURTS REAL ESTATE	CONSULTANT	082 461 3966	—	—	piet.swanepoel@harcourts.co.za

Public Meeting
16 February 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
P. La Grange	H.I.S.	Owner.	083453 2877			HIS@yebo.co.za
B Eloff	ABS	Consultant Adviser	08244 88767			billeloff@ vodamail.co.za
M. Vermooten	GVJ Electrical	Director	022 7131997 0824153142		Po Box 844 Vredenburg	mick@gvj.co.za
Mr. Dennis Britz	AMSA	Specialist	016 8892046		P.O. Box 2 Vanderbijlpark	dennis.britz@arcelormittal.com.
Mr. Michael Olivier	I.P.C.S.A	Director.	0828813283		21 Ether Ave Northcliff Jhb	molv@global.co.za

Public Meeting
16 February 2016

ATTENDANCE REGISTER

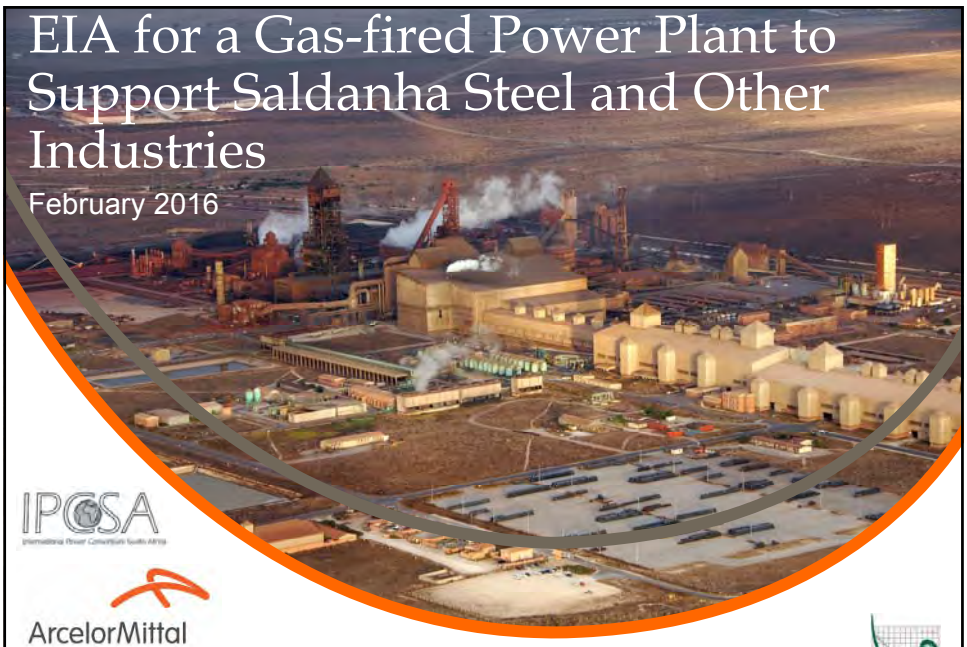
Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Postal Address	Email Address
Ms. Elmien de Bruyn	Dufesco Steel Processing	Environmental Co-Ordinator	022 709 7127 083 308 5988	022 709 7342	P.Bag X12 Saldanha 7395	elmiendbeedsp.co.za
RICHARD MURRAY	SAFETY FIRST	CEO.	0736237149	-	11 MAASDAM STR. DIAZVILLE SALDANHA	rsmurray@gmail.com
NEVILLE EPARAM	iGas	SNR PROJECT MANAGER	0798908272 021 5247273	—		nevilbe@cefgroup.co.za
Richard Holcott	AMSA	GM	083 448 2149			richard.holcott@arcelormittal.com
Mr. Darryl Hunt	Dynamic Energy Consultants	Member	0828043907	—		darryl.hunt@telkomsa.net

B3.2 *PRESENTATION*

A copy of the presentation given at the public meeting held on the 16 February 2016 is provided in the following pages.

EIA for a Gas-fired Power Plant to Support Saldanha Steel and Other Industries

February 2016



IPCSA

ArcelorMittal

ERM

The world's leading sustainability consultancy

Agenda

1. Introduction to ERM and Project Team
2. Project Motivation
3. Introduction to IPCSA
4. Project Description
5. EIA Process
6. Specialist Studies
7. Opportunities to be Involved: Public Participation Process
8. Way Forward

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Introduction to Project Team

- Richard Holcroft (AMSA)
- Reinet van Zyl (AMSA)
- Francois vd Bank (AMSA)
- Gesie Theron (AMSA)
- Mike Olivier (IPCSA)
- Seth Olivier (IPCSA)
- Muller Coetzee (ERM)
- Stephan vd Berg (ERM)
- Tougheeda Aspeling (ERM)

Introduction to ERM

- ERM has been appointed as the independent Environmental Assessment Practitioner
- ERM is responsible for running the EIA and public participation process
- ERM will facilitate active involvement of Interested and Affected Parties

Project Motivation

- We need to sustain current industry
  - Sustain jobs
  - Sustainable economic activity is critical for ALL
- Prevailing economic outlook does not support this, but industry has found a solution
- If high “energy cost” can be addressed it will sustain current industry and encourage economic growth
- Economic growth will create opportunities for skills development and training
- This will lead to new opportunities for the community and area

Project Motivation

- Appears that excess global steel capacity, low global iron ore prices and low steel prices are here to stay – structural change not a cycle
- Saldanha Works is primarily export focused (East & West Africa) and faces tough competition from China, Japan and India
- Saldanha Works has to be able to compete in Export Markets therefore must strive to keep production costs down

Current focus is on low cost and efficient production

Project Motivation

- Energy efficiency controlled cost through 2015, but is not enough for long term sustainability
- Secure, affordable, electricity through an independent Gas fired Power Station 1.4 GW would provide a solution
- ArcelorMittal South Africa & Saldanha Works has to be profitable to ensure sustainability, and maintain jobs and economic activity
- If energy cost can be addressed there is significant potential for expansion of current industry

Introduction to IPCSA

- IPCSA formed as a Special Purpose Vehicle (SPV) for the development and ownership of the Saldanha Power Project in 2013
- Founding members have over 65 years combined experience in project development
- IPCSA have pooled together international experience and resources to develop the Gas to Power Project in Saldanha
- Have resources in America, Canada, Europe
- IPCSA have provided services to major companies in the energy sector globally and have support

Introduction to IPCSA

9

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Introduction to IPCSA

10

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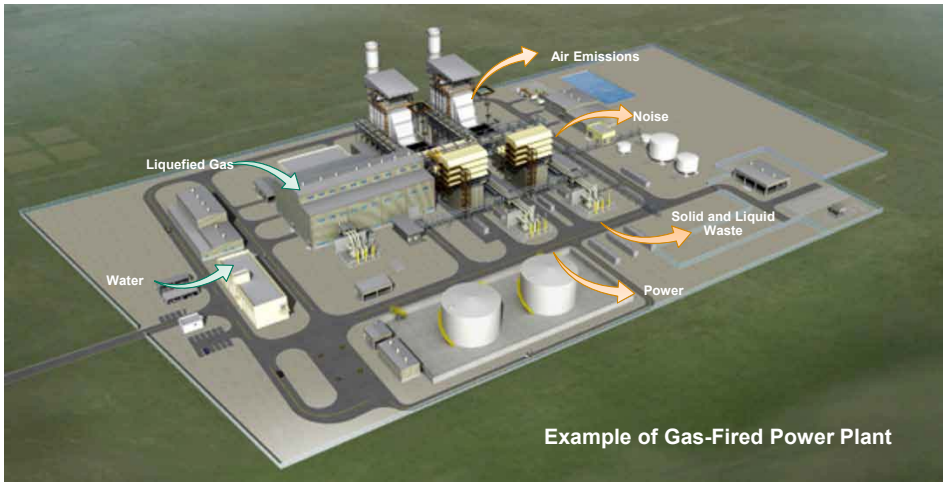
Project Location

Project Location

Project Description: Inputs and Outputs



13

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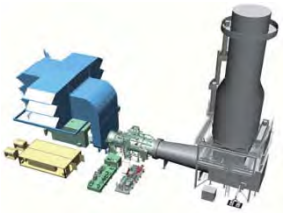
Project Description: Power Plant Selection

- 1 507MW of Installed Capacity



- **BASE LOAD** – 1 115MW operating at 87%
  - 3 X Siemens SGT5-4000F in Combines Cycle
  - Air Cooled
  - Benson Boiler (closed loop system) low water consumption

- **PEAKING** – 225MW
  - 5 X Rolls Royce (Siemens) Trent 60's
  - Air Cooled, small & Compact
  - Take care of AMSA's needs in Saldanha

- **SERVICE CENTRE & TRAINING ACADEMY**
  - Pumps, Motors
  - Turbines & Engines (Land & Marine)

14

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Project Description: Natural Gas

- Equity Gas from the USA
- Negotiated long-term 20 year gas supply
- 2 Million tons contracted
- Negotiations additional supply:
  - Angola
  - Nigeria
  - Tanzania

- Regas using Floating Storage & Regas Unit (FSRU)
  - Semi-permanent
  - 15 Day storage
  - 3 Ships delivering in rotation

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Project Description: Natural Gas

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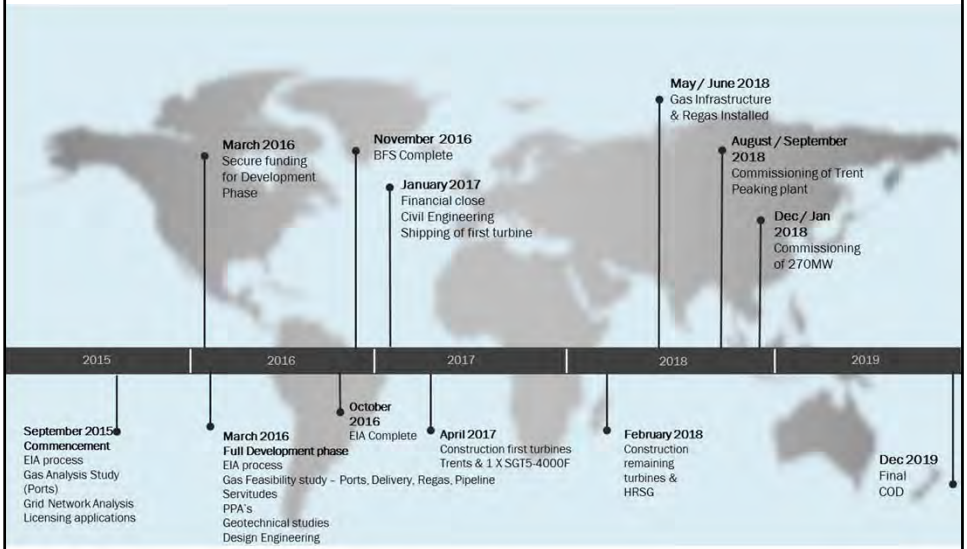
Project Description: Project Timelines



Project Description: Job Creation

- Development Phase: Approx. 45
- Construction Phase: Approx. 600
- Operations Phase: Approx. 170

DoE Gas to Power Programme

- Project is different from other IPP projects for which EIA's have been initiated (part of DOE initiative)
- DoE projects are aimed at addressing Eskom shortage; not focussed on sustaining industry
- IPCSA project focus on affordability to support industry

EIA Process: Scoping Overview

Full Scoping and EIA Processes in terms of:

- National Environmental Management Act, 1998, (Act No. 107 of 1998), as amended (NEMA)
- EIA Regulations Listing Notice 1 (GNR R983), Notice 2 (GNR 984) and Notice 3 (GNR 985)

Scoping Phase Objectives

- To communicate the proposed project to interested and affected parties
- To identify possible impacts, alternatives, and define the terms of reference for specialist studies

EIA Process: EIA Objectives

- Assess possible positive and negative impacts identified
- Rate significance of the impacts
- Develop mitigation measures to manage negative impacts and enhance Project benefits

EIA Process: Potential Impacts and Benefits

Potential environmental and social impacts

- Noise and air emissions
- Potential impact on terrestrial animals and plants
- Issues associated with Project induced in-migration
- Waste management
- Potential impact on heritage resources

Benefits associated with the Projects

- Increased energy production for the Saldanha Bay Local Municipality
- Employment creation during construction
- Employment security for existing employees
- Community upliftment

EIA Process: Studies to be included in EIA

Proposed studies to address the impacts include:

- Air Quality Study
- Noise Impact Study
- Cultural Heritage and Palaeontology Study
- Terrestrial Ecology Study (Fauna and Flora)
- Socio-economic Study

EIA Process: Opportunity for Comment

- Register as an I&AP:
  - Receive notification when reports are available for comment
  - Submit your comments, questions or suggestions to the Project team and receive a response as part of the EIA Report

- The Draft Scoping Report and Draft EIA will each be available for a thirty (30) day public comment period
- The next public meeting will take place after the release of the Draft EIA

EIA Process: Way Forward

- Release of Draft Scoping Report (30 day comment period)
- Specialist studies to commence
- Final Scoping Report to the DEA

Registered I&APs will be notified when draft reports are available for comment

Further comment

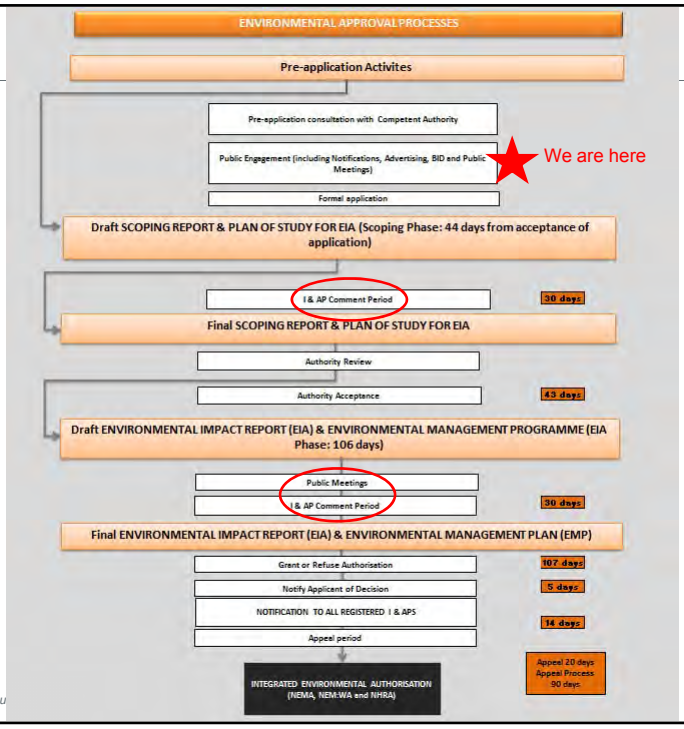
CONTACT DETAILS: ERM CAPE TOWN OFFICE

Tougheeda Aspeling
Tel: 021 681 5400
Fax: 086 540 4072
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Project website: www.erm.com/saldanhasteel

Thank you for your participation

Questions?

Questions?



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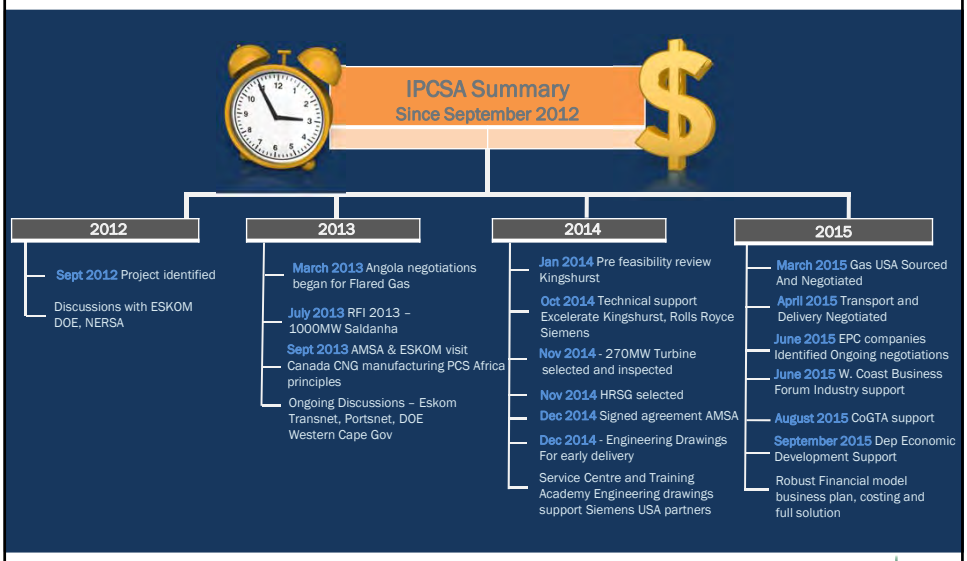
Project Description: Milestones Achieved



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B4 SITE NOTICES

Site notices were placed at the Project Site in Saldanha Bay, as well as at the Saldanha Bay Library and at the Saldanha Bay Muncipality: Diazville Office, Langebaan Office and Saldanha Bay Office.

Figure 4.1 Site Notice at Proposed Site in Saldanha

Figure 4.2 Saldanha Bay Public Library

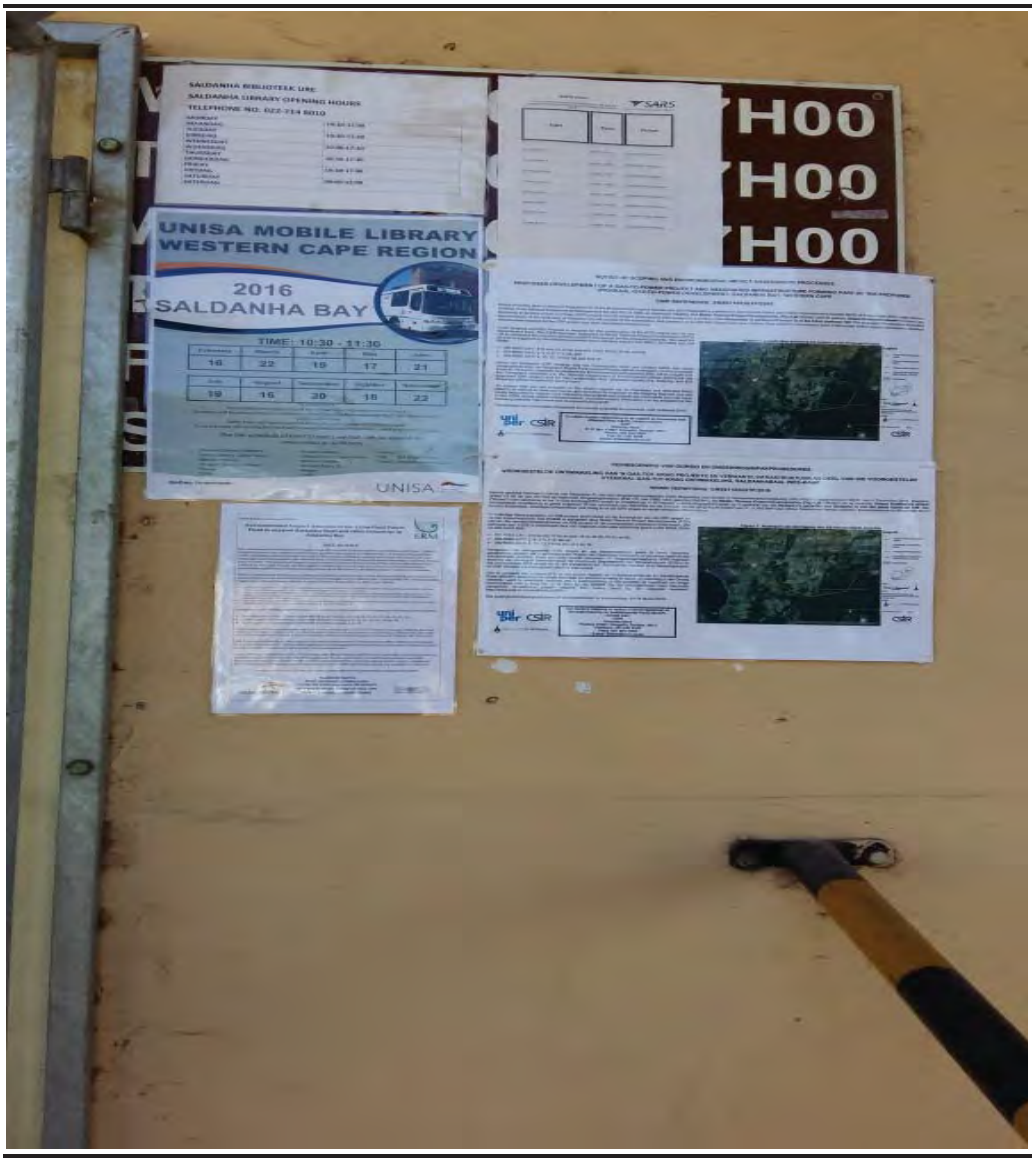


Figure 4.3 *Saldanha Bay Municipality: Saldanha Bay Office*

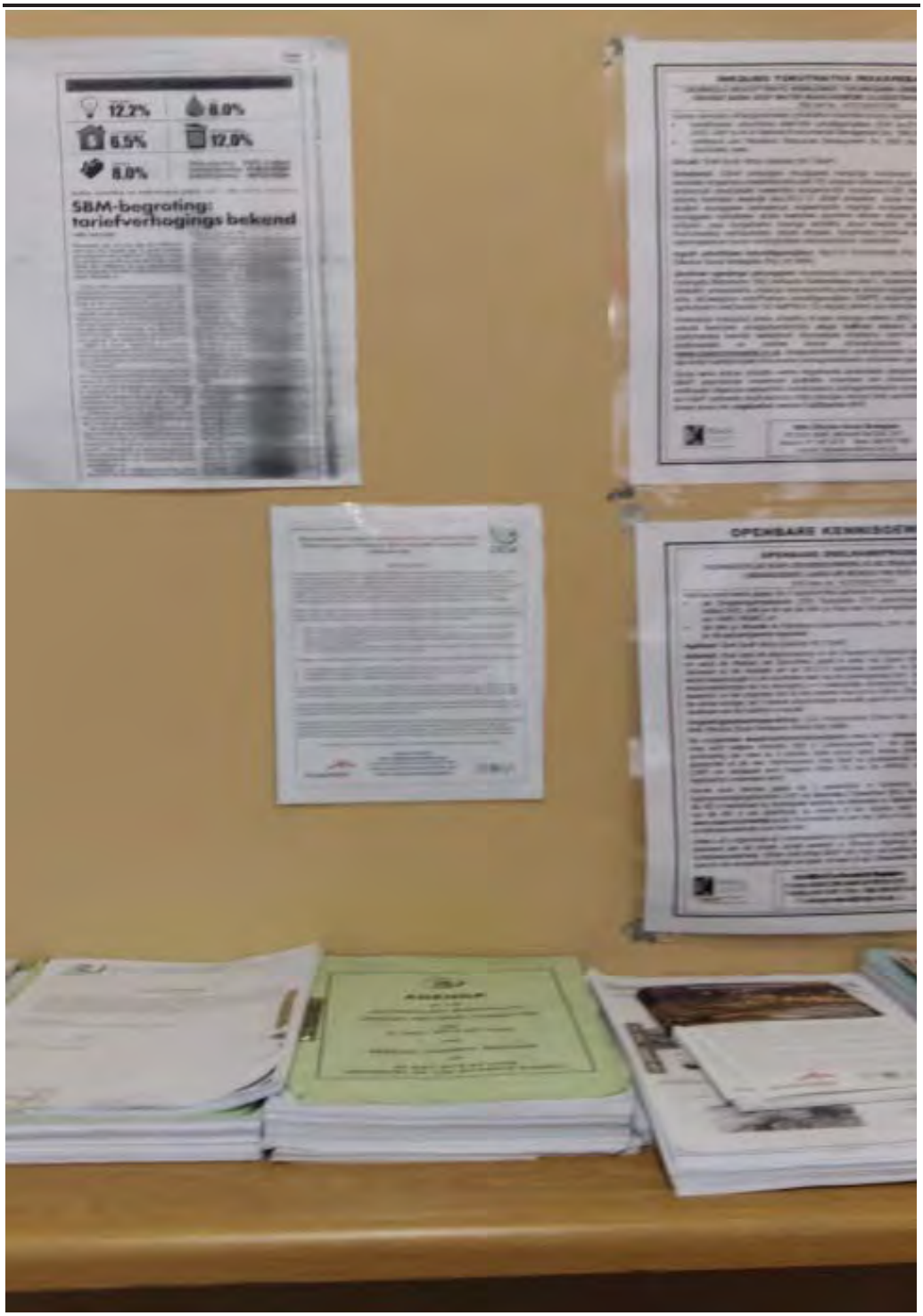
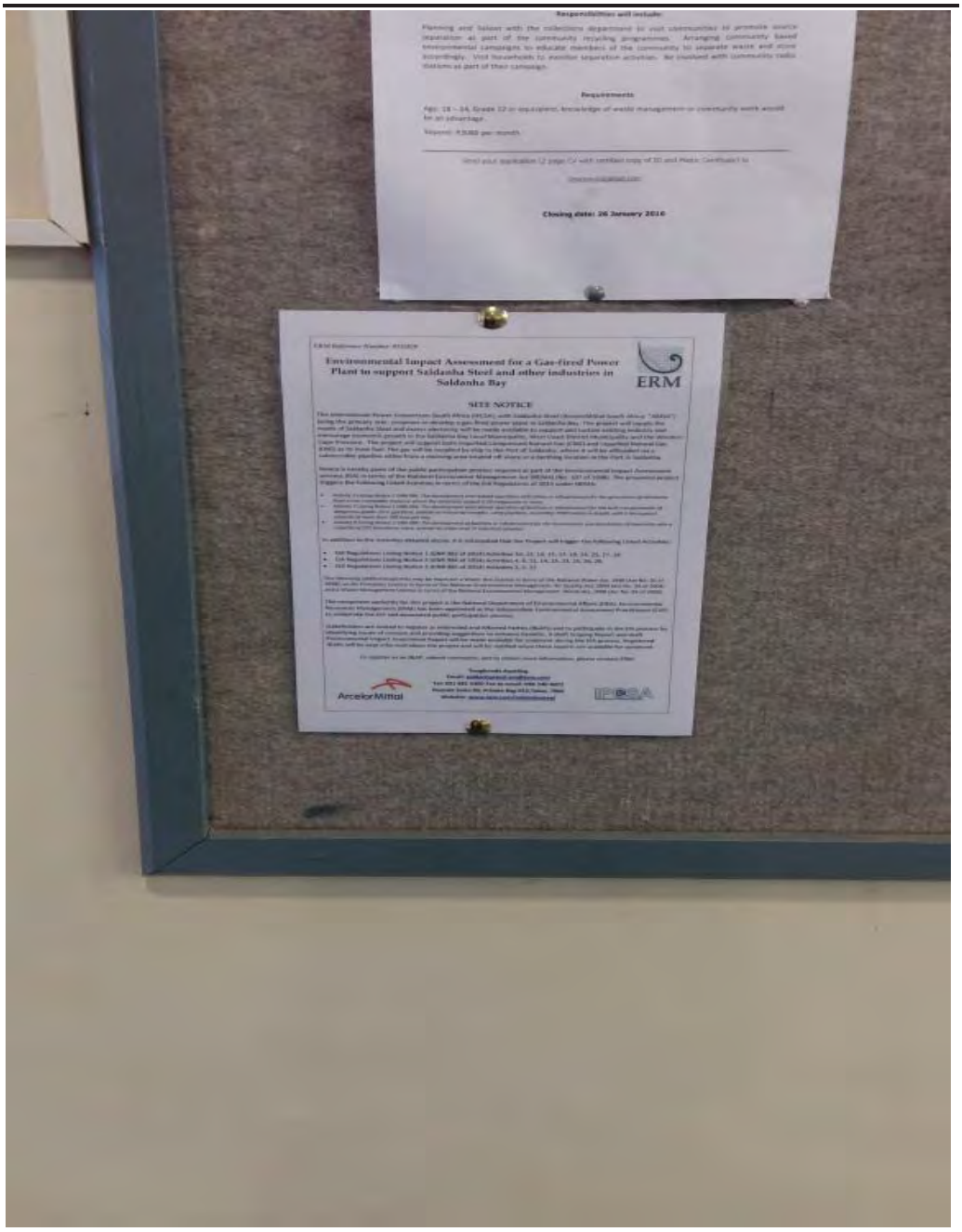


Figure 4.4 *Saldanha Bay Municipality: Langebaan Municipality*

Figure 4.5 Saldanha Bay Municipality: Diazville Office



B5 PROOF OF DISTRIBUTION OF DRAFT SCOPING

B5.1 NOTIFICATION LETTER

Notification of the Draft Scoping Report was distributed to all I&AP's in the stakeholder database on the 4 March 2016. A copy of the notification letter, as well as proof of its distributions is provided below.

Figure 5.1 Copy of Notification Letter

Environmental Resources Management

2nd Floor
Great Westerford
240 Main Road, Rondebosch
7700, Cape Town, South Africa

Postnet Suite 90
Private Bag X12
Tokai, 7966
Cape Town, South Africa

Tel: +27 21 681 5400
Fax: +27 21 686 0736
www.erm.com

ERM

ERM Ref: 0315829

Dear Stakeholder,

RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

This notification serves to inform you that the Draft Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 04 March to 06 April 2016.

The Draft Scoping Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford (Newlands, Cape Town)

You are invited to submit your comments on the Draft Scoping Report to Tougheeda Aspeling of ERM:
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 0865404072

Your comments, and our response, will be incorporated into the Final Scoping Report to be submitted to DEA for consideration.

Please remember that your comments must reach ERM on or before **06 April 2016.**

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling
Stakeholder Engagement Consultant

Figure 5.2 Proof of Email to Stakeholders

From: ERM South Africa EIA Mailbox
To: Tougheeda Aspeling
Bcc: "nngcaba@environment.gov.za"; "nngoveni@environment.gov.za"; "msolomons@environment.gov.za"; "MEssop@environment.gov.za"; "NBPillay@environment.gov.za"; "taramaru@environment.gov.za"; "tibaloyi@environment.gov.za"; "rmolale@environment.gov.za"; "lmahlangu@environment.gov.za"; "mgordon@environment.gov.za"; "WHector@environment.gov.za"; "vsenene@environment.gov.za"; "lmoja@environment.gov.za"; "Mshubame@environment.gov.za"; "Lmokoena@environment.gov.za"; "Dramalope@environment.gov.za"; "mmayekiso@environment.gov.za"; "lmudau2@environment.gov.za"; "pkhati@environment.gov.za"; "cmangcu@environment.gov.za"; "ajboyd@environment.gov.za"; "AndrewC@daff.gov.za"; "ypeterson@environment.gov.za"; "xmkefe@environment.gov.za"; "LMudau2@environment.gov.za"; "dfischer@environment.gov.za"; "SMalaza@environment.gov.za"; "IAbader@environment.gov.za"; "DG@daff.gov.za"; "SiphokaziN@daff.gov.za"; "fatimaS@daff.gov.za"; "michellePR@daff.gov.za"; "AndreaB@daff.gov.za"; "KimP@daff.gov.za"; "SiphokaziN@daff.gov.za"; "MujahidaH@daff.gov.za"; "CebaM@daff.gov.za"; "FatimaSA@daff.gov.za"; "WadeT@daff.gov.za"; "BelemaneS@daff.gov.za"; "KishanS@daff.gov.za"; "kishansankar@gmail.com"; "AsandaN@daff.gov.za"; "Centralp@dwa.gov.za"; "lyonsh@dws.gov.za"; "ncampbell@samsa.org.za"; "djames@samsa.org.za"; "hesterhuizen@samsa.org.za"; "DManley@samsa.org.za"; "mslabber@samsa.org.za"; "paseka.nku@nersa.org.za"; "selepeg@dot.gov.za"; "Wolsey.Barnard@energy.gov.za"; "Fuad.allie@energy.gov.za"; "westernCapeprovince@nda.org.za"; "hydrosan@iafrica.com"; "Ossie.Lamb@dpw.gov.za"; "Fredrick.johnson@dpw.gov.za"; "online2276859@telkomsa.net"; "saldanhanature@gmail.com"; "marius.venter@westerncape.gov.za"; "khanr@dws.gov.za"; "pieter.vanzyl@westerncape.gov.za"; "Clement.Arendse@westerncape.gov.za"; "zain.jumat@westerncape.gov.za"; "Transport.Publicworks@westerncape.gov.za"; "Lucy.Caplan@westerncape.gov.za"; "Jacqui.Gooch@westerncape.gov.za"; "Danielle.manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "Alvan.gabriel@westerncape.gov.za"; "Joy.Leaner@westerncape.gov.za"; "anthony.barnes@westerncape.gov.za"; "Ayub.mohamed@westerncape.gov.za"; "Caren.George@westerncape.gov.za"; "coastal.enquiries@westerncape.gov.za"; "Zahier.toefy@westerncape.gov.za"; "Marlene.laros@westerncape.gov.za"; "Kobus.Munro@westerncape.gov.za"; "EtienneAlfred.Roux@westerncape.gov.za"; "aduffell-canham@capenature.co.za"; "landuse@capenature.co.za"; "ebaard@capenature.co.za"; "aaturner@capenature.co.za"; "romar@capenature.co.za"; "ceoheritage@westerncape.gov.za"; "sivuyile.mpakane@dmr.gov.za"; "AdriaanC@elsenburg.com"; "franciss@elsenburg.com"; "Landuse.elsenburg@elsenburg.com"; "Lars.Starke@westerncape.gov.za"; "Nigel.Gwynne-Evans@westerncape.gov.za"; "Jim.Petrie@westerncape.gov.za"; "dreyerw@dws.gov.za"; "Rasheeq.Williams@westerncape.gov.za"; "Goodwell.dingaan@westerncape.gov.za"; "Claude.Orgill@westerncape.gov.za"; "Martinus.vanwyk@westerncape.gov.za"; "FerdieE@elsenburg.com"; "MogaleS@elsenburg.com"; "info@elsenburg.com"; "KhanR@DWS.gov.za"; "ClaassenM@DWS.gov.za"; "MafilelaS@DWS.gov.za"; "Petersena@dws.gov.za"; "heneB@dws.gov.za"; "Sokhayaj@dws.gov.za"; "leona.bruiners@drdlr.gov.za"; "Duduzile.Kunene@dmr.gov.za"; "francois.schippers@sbm.gov.za"; "mun@sbm.gov.za"; "benice.rossouw@sbm.gov.za"; "Jacques.Marais@sbm.gov.za"; "shane.cordom@sbm.co.za"; "shanecordom@yahoo.com"; "piet.fabricius@sbm.co.za"; "pietfab@gmail.com"; "lindsey.gaffley@sbm.co.za"; "driekas@saldanha.co.za"; "nazeema.duarte@sbm.gov.za"; "Marius.Meiring@sbm.gov.za"; "Gerrit.Smith@sbm.gov.za"; "hfprins@wcdm.co.za"; "smitk@swartland.org.za"; "hhfbester@wcdm.co.za"; "pietf@saldanhabay.co.za"; "pietfab@gmail.com"; "dkotze@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "cjmalherbe@wcdm.co.za"; "wmarkus@wcdm.co.za"; "ndejongh@wcdm.co.za"; "waldo.julius@sbm.gov.za"; "laura@sbidz.co.za"; "kaashifah@sbidz.co.za"; "lelanie@sbidz.co.za"; "moeketsi@sbidz.co.za"; "proactive@mweb.co.za"; "frank.pronk@sbm.gov.za"; "Mzwandile.biko@sbm.gov.za"; "stephanus.vries@sbm.gov.za"; "ryan.don@sbm.gov.za"; "andre.kruger@sbm.gov.za"; 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"ivvorlee@intekom.co.za"; "mikero@vodamail.co.za"; "mary-jean@capechamber.co.za"; "mj@capechamber.co.za"; "mjissj@gmail.com"; "luna@capeglobal.co.za"; "mjissj@gmail.com"; "susandean@tiag.co.za"; "sharon@wessa.co.za"; "marketing@wessa.co.za"; "spetersen@wwf.org.za"; "andy@wessa.co.za"; "postmaster@wessa.wcape.school.za"; "k.sink@sanbi.org.za"; "yolanf@ewt.org.za"; "b.adams@webmail.co.za"; "abicshop@gmail.com"; "AHein@westcoastcollege.co.za"; "reddaisy@telkomsa.net"; "amsterdam@new.co.za"; "info@capebirdclub.org.za"; "Coldek@icon.co.za"; "keithhbharrison@lando.co.za"; "info@capebiosphere.co.za"; "jthorpe@capebiosphere.co.za"; "info@capebiosphere.co.za"; "Rynop@capebiosphere.co.za"; "sharonfebs@gmail.com"; "darlingwines@telkomsa.net"; "saligna2030@gmail.com"; "slabigh@gmail.com"; "wva-wcfa@telkomsa.net"; "info@fossilpark.org.za"; "pjh@fossilpark.org.za"; "eco@fossilpark.org.za"; "coldek@icon.co.za"; "patrick@sbidz.co.za"; "barry@anchorenvironmental.co.za"; "shandre@wcbdc.co.za"; "morgandebeer11@gmail.com"; 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"s.pillay@capitalenergyresources.co.uk"; "alessandro.sessa@enel.com"; "gonzalo.ramirez@excelerateenergy.com"; "ajoubert@slrconsulting.com"; "vivcrone@vjcz.com"; "jonathan.hoffman@globeleq.co.za"; "jon.frick@globeleq.co.za"; "leila.mahomed-weideman@globeleq.co.za"; "johs@rs-africa-diving.com"; "costandius@slrconsulting.com"; "eloise@ccaenvironmental.co.za"; "lrathanya@acwapower.com"; "Vjmabunda@acwapower.com"; "asingh@acwapower.com"; "inc431@mweb.co.za"; "Akhona.Mbenyana@westerncape.gov.za"; "Danielle.Manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "karen@mulilo.com"; "danielalkaster@yahoo.com"; "Zharon.lady@gmail.com"; "glenmarinus1@gmail.com"; "russell@gvj.co.za"; "ftacademy1@gmail.com"; "khulatrans@telkomsa.net"; "samueladams.sa95@gmail.com"; "matroos.ian@gmail.com"; "eaglesrest2012@gmail.com"; "dawood@vusanigroup.com"; "segopotsotong@hotmail.co.za"; "altaleroux20@gmail.com"; "dicky.koekemoer@arcelormittal.com"; "jsnyders66@gmail.com"; "sauldelia2@gmail.com"; "mtalmarkes@yahoo.com"; "rsmurray66@gmail.com"; "welmariec@seaharvest.co.za"; "jackielouw4@gmail.com"; "albert.bossart@za.abb.com"; "nosipho@shinoanosolutions.co.za"; "westcoast@harcourts.co.za"; "helena.koch@absa.co.za"; "portiar@absa.co.za"; "murchelk@absa.co.za"; "Talana.Hanekom@absa.co.za"; "gaustig@mweb.co.za"; "billeloff@vodamail.co.za"; "Sophia.steynberg@ppc.co.za"; "anthonymlata@gmail.com"; "nmbirch26@gmail.com"; "zain@bevline.co.za"; "Evy@bevline.co.za"; "bventer@ppc.co.za"; "gerritn@seaharvest.co.za"; "jackielouw4@gmail.com"; "mwjudyd@mweb.co.za"; "jeromevraagom@gmail.com"; "glenmarinus1@gmail.com"; "sarel.schoeman@bidports.co.za"; "info@saldanhaaccommodation.co.za"; "info@saldanhaaccommodation.co.za"; "info@saldanhaaccommodation.co.za"; "friestkj.kf@gmail.com"; "2boy.arthur@webmail.com"; "mathehy47@outlook.com"; "titania@luckystar.co.za"; "anitabrooks1965@gmail.com"; "mtalmarkes@yahoo.com"; "joosteashwin@gmail.com"; "zelda.williams05@gmail.com"; "joseph.julies57@gmail.com"; "gnomma.khoi1673@gmail.com"; "natasha@mogwe.com"; "rustin@mogwe.com"; "reginald.abrahams@ppc.co.za"; "morgandebeer@gmail.com"; "dutoit12@gmail.com"; "paulinamali60@gmail.com"; "brainwavelaaiplek@telkomsa.net"; "brainwavelaaiplek@telkomsa.net"; "gasank@sisworks.co.za"; "shabier@sisworks.co.za"; "dominic@seabreezecomdev.co.za"; "Zharon@seabreezecomdev.co.za"; "barthlo@sunrise-energy.co.za"; "Ivanderwalt@telkomsa.net"; "franciosvanderbank@arcelormittal.com"; "elmondo.paulse@transnet.net"; "jeff.longley@arcelormittal.com"; "colleen.daniels@arcelormittal.com"; "janh@dsp.co.za"; "sabelo.tabata@transnet.net"; "jo@vkc.co.za"; "wajdia@vkc.co.za"; "debbie@shirdanovsolutions.co.za"; "xolisa@gmail.com"; "william.mugal01@gmail.com"; "mwestld@mweb.co.za"; "btvraagom@gmail.com"; "Ettiene.s@sirollon.co.za"; "sandelmi@telkomsa.net"; "christo.vdm@vodamail.co.za"; "deon@cad-supplies.co.za"; "lours.dewet10@gmail.com"; "wyngaajo@eskom.co.za"; "PetersOw@eskom.co.za"; "michelle.herbert@advisian.com"; "MRamakulukusha@environment.gov.za"; "iijima@itochu.co.za"; "takahashi-e@itochu.co.jp"; "tebogo.more@gdfsuez.com"; "david@atlanticep.com"; "sonia@atlanticep.com"; "giovanni.serra@enel.com"; "taf@tirisanopartners.com"; "mluleki@mogs.co.za"; "vi-externe.truong-dinh@edf.fr"; "mike.fitzpatrick@ipp-projects.co.za"; "werner.pieterse@ipp-projects.co.za"; "ghojem@prdw.com"; "christo.vdm@vodamail.co.za"; "francois.vanderbank@arcelormittal.com"; "setho@ipcsafrica.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanzyl@arcelormittal.com"; "Keithharrison@lando.co.za"; "otto.scribante@arcelormittal.com"; "helena.koch@absa.co.za"; "helene@media24.com"; "bertus@mulilo.com"; "charlene@aan.co.za"; "riaan.r@harcourts.co.za"; "louis.dewet10@gmail.com"; "sue@saldanhabayoysters.co.za"; "dirk.coetzee@dufero.co.za"; "accounts@turnerland.co.za"; "gerrit.reinentz@pamgolding.co.za"; "info@gvj.co.za"; "portiare@absa.co.za"; "chrisleroux@webmail.com"; "gberndsen@infrastream.co.za"; "piet.swanepoel@harcourts.co.za"; "his@yebo.co.za"; "billeloff@vodamail.co.za"; "mick@gvj.co.za"; "dennis.britz@arcelormittal.com"; "moliv@global.co.za"; "elmiendb@dsp.co.za"; "rsmurray@gmail.com";

	"nevillee@cefgroup.co.za"; "richard.holcolt@arcelormittal.com"; "darryl.hunt@telkomsa.net"; "sw@atlantiscorp.co.za"; "sw@atlantiscorp.co.za"; "doug@sbidz.co.za"; "jannie@mutilo.com"; "ayoung@infrastream.co.za"; "primaplumb@gmail.com"; "sandelmi@telkomsa.net"; "btvroogom@gmail.com"; "ftacademy1@gmail.com"; "segopotsotong@hotmail.co.za"; Stephan van den Berg; Claire Alborough
Subject:	Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	04 March 2016 04:16:00 PM
Attachments:	image001.png

ERM Ref: *0315829*
DEA Ref: *14/12/16/3/3/2/910*

Dear Stakeholder

This notification serves to inform you that the Draft Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 04 March to 06 April 2016.

The Draft Scoping Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford (Newlands, Cape Town)

You are invited to submit your comments on the Draft Scoping Report to Tougheeda Aspeling of ERM:
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 0865404072

Your comments, and our response, will be incorporated into the Final Scoping Report to be submitted to DEA for consideration.

Please remember that your comments must reach ERM on or before **06 April 2016.**

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

B6.1 NOTIFICATION LETTER

Notification of the Final Scoping Report was distributed to all I&AP's in the stakeholder database on the 12 April 2016. A copy of the notification letter, as well as proof of its distributions is provided below.

Figure 6.1 Copy of Notification Letter

Environmental Resources Management

2nd Floor
Great Westerford
240 Main Road, Rondebosch
7700, Cape Town, South Africa

Postnet Suite 90
Private Bag X12
Tokai, 7966
Cape Town, South Africa

Tel: +27 21 681 5400
Fax: +27 21 686 0736
www.erm.com

ERM

12 April 2016

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

This notification serves to inform you that the Final Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay has been submitted to the Department of Environmental Affairs for adjudication.

A copy of the Final Scoping Report is available on the Project website, www.erm.com/saldanhasteel and a copy of the Comments and Responses Report has been attached to this email. You are encouraged to read through the comments and responses report and ensure that your comment has been recorded and responded to.

Should you have any questions, please contact Tougheeda Aspeling of ERM:
Email: G2Psaldanhabay.eia@erm.com
Tel: 021 681 5400
Fax: 0865404072

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling
Stakeholder Engagement Consultant

Registered Office Address
Environmental Resources Management
Southern Africa (Pty) Ltd
1st Floor, Building 32
The Woodlands Office Park
Woodlands Drive, Woodmead
[illegible], Johannesburg, South Africa

Company Registration Number
[illegible]

Directors
[illegible] Bailey (UK) (Chairman)
[illegible] (Non-Executive)
[illegible]
[illegible]
[illegible] van der Merwe

A member of the Environmental Resources Management Group

Figure 6.2 Proof of Email to Stakeholders

From: ERM South Africa EIA Mailbox
To: Tougheeda Aspeling
Cc: Lindsey Bungartz
Bcc: "nngcaba@environment.gov.za"; "nngoveni@environment.gov.za"; "msolomons@environment.gov.za"; "MEssop@environment.gov.za"; "NBPillay@environment.gov.za"; "taramaru@environment.gov.za"; "tibaloyi@environment.gov.za"; "rmolale@environment.gov.za"; "lmahlangu@environment.gov.za"; "mgordon@environment.gov.za"; "WHector@environment.gov.za"; "vsenene@environment.gov.za"; "lmoja@environment.gov.za"; "Mshubame@environment.gov.za"; "Lmokoena@environment.gov.za"; "Dramalope@environment.gov.za"; "mmayekiso@environment.gov.za"; "lmudau2@environment.gov.za"; "pkhati@environment.gov.za"; "cmangcu@environment.gov.za"; "ajboyd@environment.gov.za"; "AndrewC@daff.gov.za"; "ypeterson@environment.gov.za"; "xmkefe@environment.gov.za"; "LMudau2@environment.gov.za"; "dfischer@environment.gov.za"; "SMalaza@environment.gov.za"; "IAbader@environment.gov.za"; "DG@daff.gov.za"; "SiphokaziN@daff.gov.za"; "fatimaS@daff.gov.za"; "michellePR@daff.gov.za"; "AndreaB@daff.gov.za"; "KimP@daff.gov.za"; "SiphokaziN@daff.gov.za"; "MujahidaH@daff.gov.za"; "CebaM@daff.gov.za"; "FatimaSA@daff.gov.za"; "WadeT@daff.gov.za"; "BelemaneS@daff.gov.za"; "KishanS@daff.gov.za"; "kishansankar@gmail.com"; "AsandaN@daff.gov.za"; "Centralp@dwa.gov.za"; "lyonsh@dws.gov.za"; "ncampbell@samsa.org.za"; "djames@samsa.org.za"; "hesterhuizen@samsa.org.za"; "DManley@samsa.org.za"; "mslabber@samsa.org.za"; "paseka.nku@nersa.org.za"; "selepeg@dot.gov.za"; "Wolsey.Barnard@energy.gov.za"; "Fuad.allie@energy.gov.za"; "westerncapeprovince@nda.org.za"; "hydrosan@iafrica.com"; "Ossie.Lamb@dpw.gov.za"; "Fredrick.johnson@dpw.gov.za"; "online2276859@telkomsa.net"; "saldanhanature@gmail.com"; "marius.venter@westerncape.gov.za"; "khanr@dws.gov.za"; "pieter.vanzyl@westerncape.gov.za"; "Clement.Arendse@westerncape.gov.za"; "zain.jumat@westerncape.gov.za"; "Transport.Publicworks@westerncape.gov.za"; "Lucy.Caplan@westerncape.gov.za"; "Jacqui.Gooch@westerncape.gov.za"; "Danielle.manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "Alvan.gabriel@westerncape.gov.za"; "Joy.Leaner@westerncape.gov.za"; "anthony.barnes@westerncape.gov.za"; "Ayub.mohamed@westerncape.gov.za"; "Caren.George@westerncape.gov.za"; "coastal.enquiries@westerncape.gov.za"; "Zahier.toefy@westerncape.gov.za"; "Marlene.laros@westerncape.gov.za"; "Kobus.Munro@westerncape.gov.za"; "EtienneAlfred.Roux@westerncape.gov.za"; "aduffell-canham@capenature.co.za"; "landuse@capenature.co.za"; "ebaard@capenature.co.za"; "aaturner@capenature.co.za"; "romar@capenature.co.za"; "ceoheritage@westerncape.gov.za"; "sivuyile.mpakane@dmr.gov.za"; "AdriaanC@elsenburg.com"; "franciss@elsenburg.com"; "Landuse.elsenburg@elsenburg.com"; "Lars.Starke@westerncape.gov.za"; "Nigel.Gwynne-Evans@westerncape.gov.za"; "Jim.Petrie@westerncape.gov.za"; "dreyerw@dws.gov.za"; "Rasheeq.Williams@westerncape.gov.za"; "Goodwell.dingaan@westerncape.gov.za"; "Claude.Orgill@westerncape.gov.za"; "Martinus.vanwyk@westerncape.gov.za"; "Ferdie.endemann@gmail.com"; "FerdieE@elsenburg.com"; "MogaleS@elsenburg.com"; "info@elsenburg.com"; "KhanR@DWS.gov.za"; "ClaassenM@DWS.gov.za"; "MafilelaS@DWS.gov.za"; "Petersena@dws.gov.za"; "heneB@dws.gov.za"; "Sokhayaj@dws.gov.za"; "leona.bruiners@drdlr.gov.za"; "Duduzile.Kunene@dmr.gov.za"; "francois.schippers@sbm.gov.za"; "mun@sbm.gov.za"; "benice.rossouw@sbm.gov.za"; "Jacques.Marais@sbm.gov.za"; "shane.cordom@sbm.co.za"; "shanecordom@yahoo.com"; "piet.fabricius@sbm.co.za"; "pietfab@gmail.com"; "lindsey.gaffley@sbm.co.za"; "driekas@saldanha.co.za"; "nazeema.duarte@sbm.gov.za"; "Marius.Meiring@sbm.gov.za"; "Gerrit.Smith@sbm.gov.za"; "hfprins@wcdm.co.za"; "smitk@swartland.org.za"; "hhfbester@wcdm.co.za"; "pietf@saldanhabay.co.za"; "pietfab@gmail.com"; "dkotze@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "cjmalherbe@wcdm.co.za"; "wmarkus@wcdm.co.za"; "ndejongh@wcdm.co.za"; "waldo.julius@sbm.gov.za"; "laura@sbidz.co.za"; "kaashifah@sbidz.co.za"; "lelanie@sbidz.co.za"; "moeketsi@sbidz.co.za"; "proactive@mweb.co.za"; "frank.pronk@sbm.gov.za"; "Mzwandile.biko@sbm.gov.za"; "stephanus.vries@sbm.gov.za"; "ryan.don@sbm.gov.za"; "andre.kruger@sbm.gov.za"; "info@wowlangebaan.co.za"; "ldpwes@mweb.co.za"; "metsal@imaginet.co.za"; "jillcarnegie@gmail.com"; "info@langebaanratepayers.co.za"; "proactiv@mweb.co.za"; "info@langebaanratepayers.co.za"; "info@villaverano.co.za"; "jbrachairman@gmail.com"; "goosenwp@yahoo.com"; "mikero@vodamail.co.za"; "info@langebaanratepayers.co.za"; "johnselby@worldonline.co.za"; "mikero@vodamail.co.za"; "info@langebaaninfo.co.za"; "info@weskussakekamer.co.za"; "vredenburg@sbto.co.za"; "jhwicht@cis.co.za"; "cloetegerald@yahoo.com"; "andile.kushman@labour.gov.za"; "tabsom2202@yahoo.co.uk"; "wct@mweb.co.za"; "stereosteyn@gmail.com"; "NeliswaS@sanparks.org"; "Pat.bopape@sanparks.org"; "Pierre.Nel@sanparks.org"; "william.brink@sanparks.org"; "bureau@kingsley.co.za"; "mverster@hotmail.com"; "ppdleroux@wcdm.co.za"; "tourism@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "tourism@wcdm.co.za"; "johann@sadstia.co.za"; "chairman@sadstia.co.za"; "dave@sbto.co.za"; "langebaanweg@telkomsa.net"; "andre@blouwaterbaai.com"; "ivorlee@intekom.co.za"; "ivvorlee@intekom.co.za"; "mikero@vodamail.co.za"; "mary-jean@capechamber.co.za"; "mj@capechamber.co.za"; "mjjssj@gmail.com"; "luna@capeglobal.co.za"; "mjjssj@gmail.com"; "susandean@tiag.co.za"; "sharon@wessa.co.za"; "marketing@wessa.co.za"; "spetersen@wwf.org.za"; "andy@wessa.co.za"; "postmaster@wessa.wcape.school.za"; "k.sink@sanbi.org.za"; "yolanf@ewt.org.za"; "b.adams@webmail.co.za"; "abicshop@gmail.com"; "AHein@westcoastcollege.co.za"; "reddaisy@telkomsa.net"; "amsterdam@new.co.za"; "info@capebirdclub.org.za"; "Coldek@icon.co.za"; "keithhbharrison@lando.co.za"; "info@capebiosphere.co.za"; "jthorpe@capebiosphere.co.za"; "info@capebiosphere.co.za"; "Rynop@capebiosphere.co.za"; "sharonfebs@gmail.com"; "darlingwines@telkomsa.net"; "saligna2030@gmail.com"; "slabigh@gmail.com"; "wva-wcfa@telkomsa.net"; "info@fossilpark.org.za"; "pjh@fossilpark.org.za"; "eco@fossilpark.org.za"; "coldek@icon.co.za"; "patrick@sbidz.co.za"; "barry@anchorenvironmental.co.za"; "shandre@wcbdc.co.za"; "morgandebeer11@gmail.com"; "sbbwa.secretary@gmail.com"; "laura@sbidz.co.za"; "clairpengelly@greencape.co.za"; "gclemitson@gmail.com"; "Raphaell@salfreight.co.za"; "petroswartz@yahoo.com"; "tcebisa@seda.org.za"; "tourismmanager@sbto.co.za"; "mario.davey@angloamerican.com"; "nacawc@gmail.com"; "bbmussel@mweb.co.za"; "alet.fabricius@bidports.co.za"; "Gert@wcbusinessdevelopment.org.za"; "maxwell.malan@exxaro.com"; "freyneke@harsco.com"; "nellg@idc.co.za"; "gerte@ob.co.za";

"NevilleE@cefgroup.co.za"; "gerhard.naude@petrosa.co.za"; "elsas@cefgroup.co.za"; "stephen.ross@petrosa.co.za"; "stephenr@cefgroup.co.za"; "elsas@cefgroup.co.za"; "stephen.ross@petrosa.co.za"; "paulc@seaharvest.co.za"; "carint@seaharvest.co.za"; "frankh@seaharvest.co.za"; "carint@seaharvest.co.za"; "nicov@seaharvest.co.za"; "Otto.Scribante@arcelormittal.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanZyl@arcelormittal.com"; "Richard.Holcroft@arcelormittal.com"; "badisaweskus@telkomsa.net"; "toni@saldanhabayoysters.co.za"; "sue@saldanhabayoysters.co.za"; "wherbst@mussels.co.za"; "bbmussel@mweb.co.za"; "info@weskussakekamer.co.za"; "franzvm@mweb.co.za"; "schalk@blueoceanmussels.com"; "kevin@ruck.co.za"; "melinda@mussels.co.za"; "nparker@xpandit.co.za"; "nick@vikingaquaculture.co.za"; "sj@vikingaquaculture.co.za"; "lbnlib@webmail.co.za"; "joan.maart@gmail.com"; "mun@saldanhabay.co.za"; "antjiev@gmail.com"; "Mun@Saldanhabay.Co.Za"; "BarnarJM.BFN.FS_Bloemfontein@eskom.co.za"; "segomoco.scheppers@eskom.co.za"; "KloppeJM@eskom.co.za"; "OctobeA@eskom.co.za"; "FranciA@eskom.co.za"; "KailasA@eskom.co.za"; "Quinton.Brink@transnet.net"; "willem.roux@transnet.net"; "gail.williams@transnet.net"; "dorian.bilse@transnet.net"; "theo.sethosa@transnet.net"; "Quentin.Kordom@transnet.net"; "Abigail.Links@transnet.net"; "nimi.ramchand@transnet.net"; "quentin.kordom@transnet.net"; "nelson.mbatha@transnet.net"; "Jeanette.Smit@transnet.net"; "Nicole.Abrahams@transnet.net"; "gavstig@mweb.co.za"; "laura@sbidz.co.za"; "doug@sbidz.co.za"; "carol@sbidz.co.za"; "duncan.bosch@za.afrisam.com"; "cofrili@mweb.co.za"; "pamela.magwa@engenoil.com"; "thys@thalithali.co.za"; "wolfiesfontein@gmail.com"; "susandean@tiag.co.za"; "tct@petrostruct.co.za"; "L.tiet@smit.com"; "david.dean@mainstreamrp.com"; "helen.bamford@inl.co.za"; "russells@gcs-sa.biz"; "darryl.hunt@dynamicenergy.co.za"; "mike@green-cape.co.za"; "KStroebel@csir.co.za"; "jillcarnegie@gmail.com"; "robert.loseth@blystadenergy.com"; "andre@bluebaylodge.co.za"; "NevilleE@cefgroup.co.za"; "dominic.goncalves@abengoa.com"; "johanlewin@hotmail.com"; "vortumenergy@gmail.com"; "planwize@telkomsa.net"; "vortumenergy@gmail.com"; "development@vidigenix.co.za"; "nooitgedacht@sandveld.net"; "Adri.LaMeyer@westerncape.gov.za"; "cassi@icon.co.za"; "hvonwell@ages-group.com"; "egrobler@ages-group.com"; "helene@media24.com"; "conservationoffice@capebiosphere.co.za"; "johnselby@worldonline.co.za"; "peter.stowe@gmail.com"; "nigel.rossouw@shell.com"; "n_champion@yahoo.com"; "haf@Vitol.com"; "sbbwa.secretary@gmail.com"; "Esca.coetzee@sasol.com"; "Amitha.Maharaj@sasol.com"; "gsweto@encorex.co.za"; "daniel@ftcsaldanha.co.za"; "GertE@luckystar.co.za"; "sw@atlantiscorp.co.za"; "CARLO.Matthysen@petrosa.co.za"; "joewengrowe@afrihost.co.za"; "s.mtshali@smit.com"; "dkotze@wcdm.co.za"; "ezekiel@semona.co.za"; "zayed.brown@westerncape.gov.za"; "Wilna.Kloppers@westerncape.gov.za"; "Quentin.Jordaan@sbm.gov.za"; "jordaanquentin@gmail.com"; "keithhbharrison@lando.co.za"; "angil@westcoastmail.co.za"; "michellePR@daff.gov.za"; "bertus@mulilo.com"; "johan@westarcor.co.za"; "carol@sfgengineering.co.za"; "KristanCallaghan@hillintl.com"; "Lizette@erakis.co.za"; "s.pillay@capitalenergyresources.co.uk"; "alessandro.sessa@enel.com"; "gonzalo.ramirez@excelerateenergy.com"; "ajoubert@slrconsulting.com"; "vivcrone@vjcz.com"; "jonathan.hoffman@globeleq.co.za"; "jon.frick@globeleq.co.za"; "leila.mahomed-weideman@globeleq.co.za"; "johs@rs-africa-diving.com"; "ecostandius@slrconsulting.com"; "eloise@ccaenvironmental.co.za"; "lrathanya@acwapower.com"; "Vjmabunda@acwapower.com"; "asingh@acwapower.com"; "inc431@mweb.co.za"; "Akhona.Mbenyana@westerncape.gov.za"; "Danielle.Manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "karen@mulilo.com"; "danielalkaster@yahoo.com"; "Zharon.lady@gmail.com"; "glenmarinus1@gmail.com"; "russell@gvj.co.za"; "ftacademy1@gmail.com"; "khulatrans@telkomsa.net"; "samueladams.sa95@gmail.com"; "matroos.ian@gmail.com"; "eaglesrest2012@gmail.com"; "dawood@vusanigroup.com"; "segopotsotong@hotmail.co.za"; "altaleroux20@gmail.com"; "dicky.koekemoer@arcelormittal.com"; "jsnyders66@gmail.com"; "sauldelia2@gmail.com"; "mtalmarkes@yahoo.com"; "rsmurray66@gmail.com"; "welmariec@seaharvest.co.za"; "jackielouw4@gmail.com"; "albert.bossart@za.abb.com"; "nosipho@shinoanosolutions.co.za"; "westcoast@harcourts.co.za"; "helena.koch@absa.co.za"; "portiar@absa.co.za"; "murchelk@absa.co.za"; "Talana.Hanekom@absa.co.za"; "gaustig@mweb.co.za"; "billeloff@vodamail.co.za"; "Sophia.steynberg@ppc.co.za"; "anthonymlata@gmail.com"; "nmbirch26@gmail.com"; "zain@bevline.co.za"; "Evy@bevline.co.za"; "bventer@ppc.co.za"; "gerritn@seaharvest.co.za"; "jackielouw4@gmail.com"; "mwjudyd@mweb.co.za"; "jeromevraagom@gmail.com"; "glenmarinus1@gmail.com"; "sarel.schoeman@bidports.co.za"; "info@saldanhaaccommodation.co.za"; "info@saldanhaaccommodation.co.za"; "info@saldanhaaccommodation.co.za"; "friestkj.kf@gmail.com"; "2boy.arthur@webmail.com"; "mathehy47@outlook.com"; "titania@luckystar.co.za"; "anitabrooks1965@gmail.com"; "mtalmarkes@yahoo.com"; "joosteashwin@gmail.com"; "zelda.williams05@gmail.com"; "joseph.julies57@gmail.com"; "gnomma.khoi1673@gmail.com"; "natasha@mogwe.com"; "rustin@mogwe.com"; "reginald.abrahams@ppc.co.za"; "morgandebeer@gmail.com"; "dutoit12@gmail.com"; "paulinamali60@gmail.com"; "brainwavelaaiplek@telkomsa.net"; "brainwavelaaiplek@telkomsa.net"; "gasank@sisworks.co.za"; "shabier@sisworks.co.za"; "dominic@seabreezecomdev.co.za"; "Zharon@seabreezecomdev.co.za"; "barthlo@sunrise-energy.co.za"; "lvanderwalt@telkomsa.net"; "franciosvanderbank@arcelormittal.com"; "elmondo.paulse@transnet.net"; "jeff.longley@arcelormittal.com"; "colleen.daniels@arcelormittal.com"; "janh@dsp.co.za"; "sabelo.tabata@transnet.net"; "jo@vkc.co.za"; "wajdia@vkc.co.za"; "debbie@shirdanovsolutions.co.za"; "xolisa@gmail.com"; "william.mugal01@gmail.com"; "mwestld@mweb.co.za"; "btvraagom@gmail.com"; "Ettiene.s@sirollon.co.za"; "sandelmi@telkomsa.net"; "christo.vdm@vodamail.co.za"; "deon@cad-supplies.co.za"; "lours.dewet10@gmail.com"; "wyngaajo@eskom.co.za"; "PetersOw@eskom.co.za"; "michelle.herbert@advisian.com"; "MRamakulukusha@environment.gov.za"; "johan@thebe.co.za"; "iijima@itochu.co.za"; "takahashi-e@itochu.co.jp"; "tebogo.more@gdfsuez.com"; "david@atlanticep.com"; "sonia@atlanticep.com"; "giovanni.serra@enel.com"; "taf@tirisanopartners.com"; "mluleki@mogs.co.za"; "vi-externe.truong-dinh@edf.fr"; "mike.fitzpatrick@ipp-projects.co.za"; "werner.pieterse@ipp-projects.co.za"; "ghojem@prdw.com"; "christo.vdm@vodamail.co.za"; "francois.vanderbank@arcelormittal.com"; "setho@ipcsafrica.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanzyl@arcelormittal.com"; "Keithharrison@lando.co.za"; "otto.scribante@arcelormittal.com"; "helena.koch@absa.co.za"; "helene@media24.com"; "bertus@mulilo.com"; "charlene@aan.co.za"; "riaan.r@harcourts.co.za"; "louis.dewet10@gmail.com"; "sue@saldanhabayoysters.co.za"; "dirk.coetzee@dufero.co.za"; "accounts@turnerland.co.za"; "gerrit.reinentz@pamgolding.co.za"; "info@gvj.co.za"; "portiare@absa.co.za"; "chrisleroux@webmail.com"; "gberndsen@infrastream.co.za";

	"piet.swanepoel@harcourts.co.za"; "his@yebo.co.za"; "billeloff@vodamail.co.za"; "mick@gvj.co.za"; "dennis.britz@arcelormittal.com"; "moliv@global.co.za"; "elmiendb@dsp.co.za"; "rsmurray@gmail.com"; "nevillee@cefgroup.co.za"; "richard.holcolt@arcelormittal.com"; "darryl.hunt@telkomsa.net"; "sw@atlantiscorp.co.za"; "sw@atlantiscorp.co.za"; "doug@sbidz.co.za"; "jannie@mutilo.com"; "ayoung@infrastream.co.za"; "primaplumb@gmail.com"; "sandelmi@telkomsa.net"; "btvroogom@gmail.com"; "ftacademy1@gmail.com"; "segopotsotong@hotmail.co.za"
Subject:	Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	12 April 2016 05:00:00 PM
Attachments:	image001.png Comment and Responses Report.pdf

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

This notification serves to inform you that the Final Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay has been submitted to the Department of Environmental Affairs for adjudication.

A copy of the Final Scoping Report is available on the Project website, www.erm.com/saldanhasteel and a copy of the Comments and Responses Report has been attached to this email. You are encouraged to read through the comments and responses report and ensure that your comment has been recorded and responded to.

Should you have any questions, please contact Tougheeda Aspeling of ERM:
Email: saldanhasteel.eia@erm.com
Tel: 021 681 5400
Fax: 0865404072

Thank you for your participation in this process.

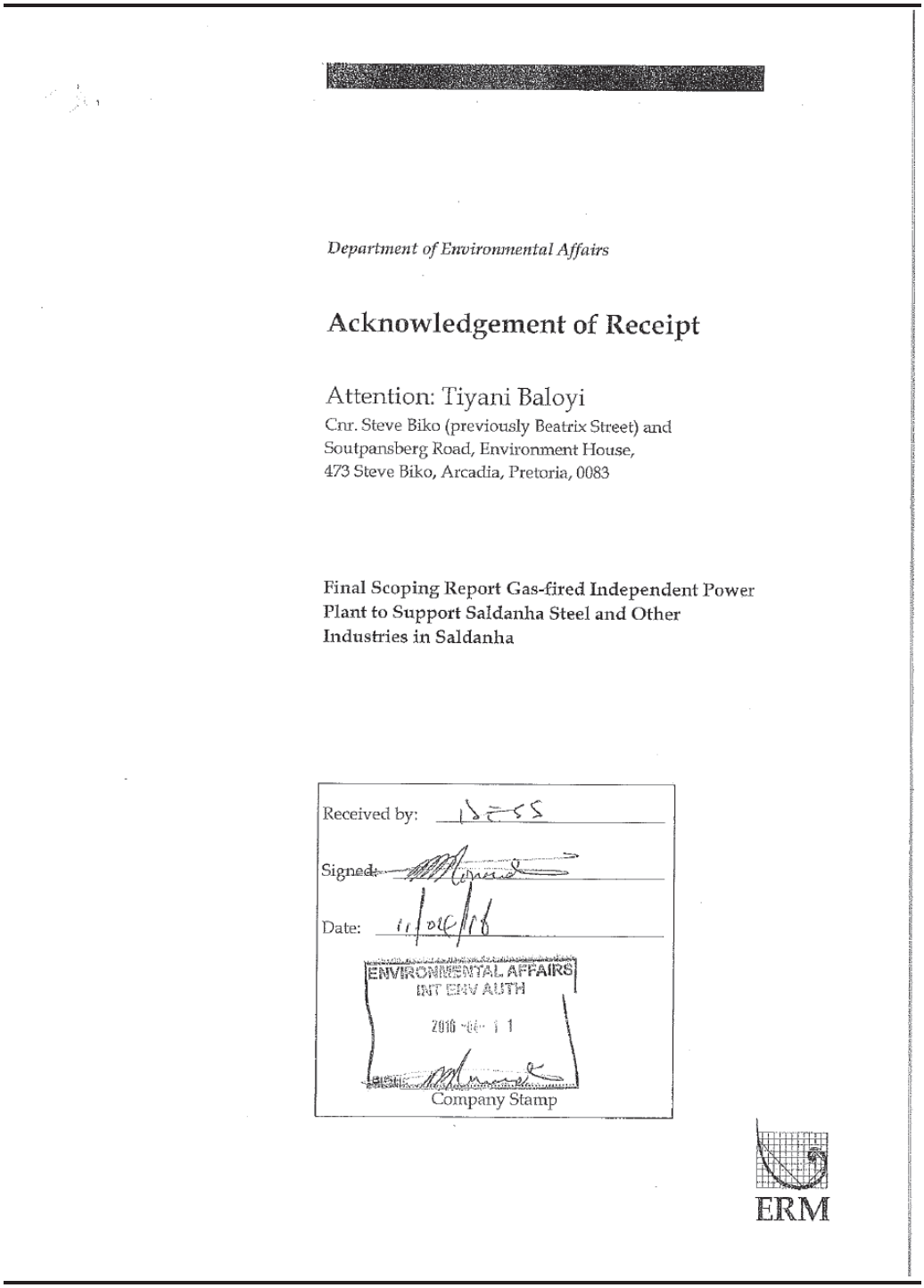
Regards

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

The world's leading sustainability consultancy

Figure 6.3 ***Proof of delivery of Final Scoping Report to Department of Environmental Affairs***



Department of Environmental Affairs

Acknowledgement of Receipt

Attention: Tiyani Baloyi
Cnr. Steve Biko (previously Beatrix Street) and
Soutpansberg Road, Environment House,
473 Steve Biko, Arcadia, Pretoria, 0083

Final Scoping Report Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha

Received by: 12:55

Signed:

Date: 11/04/18

ENVIRONMENTAL AFFAIRS
INT ENV AUTH
2016 -04- 11

Company Stamp

ERM

B.7 DEA ACCEPTANCE OF SCOPING REPORT

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447· PRETORIA · 0001· Environment House · 473 Steve Biko Road · Arcadia · PRETORIA
Tel (+ 27 12) 399 9372

DEA Reference: 14/12/16/3/3/2/910
Enquiries: Ms Thabile Sangweni
Telephone: (012)399 9409 **E-mail:** TSangweni@environment.gov.za

Mr Stuart – Heather Clark
Environmental Resources Management South Africa
Postnet Suite 90
Private Bag X12
TOKAI
7966

Telephone Number: (021) 681 5400
Email Address: Stuart.heather-clark@erm.com

PER EMAIL / MAIL

Dear Mr Clark

ACCEPTANCE OF THE SCOPING REPORT FOR THE PROPOSED 1507 MW SALDANHA STEEL GAS – FIRED POWER PLANT AND ITS ASSOCIATED INFRASTRUCTURE IN SALDANHA BAY WITHIN THE SALDANHA BAY MUNICIPALITY IN THE WESTERN CAPE PROVINCE

The Scoping Report (SR) and Plan of Study for Environmental Impact Assessment (PoSEIA) dated April 2016 and received by this Department on 11 April 2016 refer.

This Department has evaluated the submitted SR and the PoSEIA dated April 2016 and is satisfied that the documents comply with the minimum requirements of the Environmental Impact Assessment (EIA) Regulations, 2014. The SR is hereby accepted by the Department in terms of Regulation 22(a) of the EIA Regulations, 2014.

You may proceed with the EIA process in accordance with the tasks contemplated in the PoSEIA and the requirements of the EIA Regulations, 2014.

All comments and recommendations made by all stakeholders and Interested and Affected Parties (I&APs) in the draft SR and submitted as part of the final SR must be taken into consideration when preparing an Environmental Impact Assessment report (EIAr) in respect of the proposed development. Please ensure that all mitigation measures and recommendations in the specialist studies are addressed and included in the final EIAr and Environmental Management Programme (EMPr).

Please ensure that comments from all relevant stakeholders are submitted to the Department with the final EIAr. This includes but is not limited to the Western Cape Department of Environmental Affairs and Development Planning, the Department of Agriculture, Forestry and Fisheries (DAFF), the provincial Department of Agriculture, the South African Civil Aviation Authority (SACAA), SENTECH, the Department of Transport, the Local Municipality, the District Municipality, the Department of Water and Sanitation (DWS), the South African National Roads Agency Limited (SANRAL), the South African Heritage Resources Agency (SAHRA), the Endangered Wildlife Trust (EWT), BirdLife SA, the Department of Mineral Resources and Heritage Western Cape.

Please ensure that the EIAr and EMPr comply with Appendix 3 and Appendix 4 of Regulation 2014, before submission to the Department. You are also required to address all issues raised by organs of state and I&APs prior to the submission of the EIAr to the Department.

Proof of correspondence with the various stakeholders must be included in the EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.

The EAP must, in order to give effect to Regulation 8, give registered I&APs access to, and an opportunity to comment on the report in writing within 30 days before submitting the final EIAr to the Department.

In addition, the following additional information is required for the EIAr:

i. The draft EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.
ii. The listed activities in the Final Scoping Report and the application form do not correspond. The listed activities represented in the EIAr and the application form must be the same and correct. An amended application form must be submitted to this Department to this effect.
iii. The EAP must specify and list the relevant sub regulations, and tell why they are applicable and link it to the project description.
iv. It is noted that activities under GN R 985 are being applied for. This Department requires confirmation of all the sub items as listed in the activities of GNR 985, as well as the geographical areas. Confirmation from the Western Cape Department of Environmental Affairs and Development Planning must be obtained on the applicability of these activities. Furthermore, a graphical representation of the proposed development within the respective geographical areas and assessment of the significance of impacts on these areas must be provided.
v. The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions. A sample for the minimum information required is listed under point 2 of the EIA information required for gas facilities below.
vi. The EIAr must provide the four corner coordinate points for the proposed development site (note that if the site has numerous bend points, at each bend point coordinates must be provided) as well as the start, middle and end point of all linear activities.
vii. The EIAr must clearly indicate the following:
    - The envisioned area for the proposed facility; i.e. placing of all associated infrastructure should be mapped at an appropriate scale.
    - Areas of the facilities to be utilised during the different phases of the operation.
    - Indicate the power output for all phases of the development.
    - The preferred layout and length of the 132kV power line.
    - Description of all associated infrastructure. This description must include, but is not limited to the following:
        - Power lines;
        - Internal roads infrastructure;
        - Pipelines;
        - All supporting onsite infrastructure such as laydown area, guard house and control room etc. and;
        - All necessary details regarding all possible locations and sizes of the proposed satellite substation and the main substation.
viii. The assessment of impacts on air quality in the EIAr as well as the Air Quality Specialist Study must include the following:
    - Reference to emission concentrations as stipulated in the Minimum Emission Standard.
    - Suitable abatement technology to be used for point source emissions must be considered and detailed in terms of availability and control efficient.
    - A compliance and road map with provincial and national regulations on dust and noise.

- A compliance road map on the design and operation of the Gas-Fired Independent Power Plant with the Minimum Emission Standard.
- Recent (2013 to 2016) Air Quality Emission results of the area.
- The following Section 21 listed activities are triggered by the activity and mitigation measures must be addressed in the EIAr:
  - Subcategory 1.2: Liquid Fuel Combustion Installations;
  - Subcategory 1.4: Gas Combustion Installations;
  - Subcategory 2.4: Storage and Handling of Petroleum products; and,
  - Any additional activity which may arise in the near future.

ix. The Department requires confirmation, based on the botanical assessment conducted, from the specialist and Cape Nature that an offset is not required as part of the project. Should an off-set be required, it must be negotiated with Cape Nature. The offset must investigate the cumulative loss of species from the area, and must be finalised, agreed to and be included within the draft EIAr.

x. The following specialist studies have been identified to be conducted as part of the environmental impact assessment report and will be conducted prior to the submission of the draft EIAr for review and comment:
  - Air Quality;
  - Noise;
  - Flora;
  - Fauna;
  - Heritage;
  - Quantitative Risk Assessment;
  - Climate Change Risk;
  - Socio-Economic;
  - Cumulative impact study; and,
  - Transport impact assessment.

xi. This Department requires comments from the Department of Water and Sanitation (from the Impact Management and Resource Management Directorates); the Department of Environmental Affairs: Air Quality Management as well as the Department of Environmental Affairs: Oceans and Coast Directorate which must be included in the EIAr.

xii. The EIAr must assess the impacts of storing and handling of the preferred fuels for Phase 1 and 2 of the project and must include specialist assessments. This must also include a risk assessment of the storage and handling of the dangerous goods.

xiii. It is noted that water for the operational phase of the development will be sourced from annual precipitation and stored in storage tanks. However, alternative water supply options must be investigated.

xiv. The EIAr must assess the risks associated with the storage of dangerous goods. The risk of the possibility of pollution to surface (hydrological) and groundwater (hydrogeological) systems and flows must also be assessed. The risk assessment must make recommendations into the emergency preparedness and spill response plans.

xv. The EIAr must assess the impacts of use of water on site (sourcing, treating, disposing etc.).

xvi. The EIAr must assess all identified impacts including traffic and geotechnical impacts.

xvii. Should in-house specialists be used for any specialist study, then the specialist study must be peer reviewed by external specialists. The format of the peer-review must address the following:
  - Acceptability of the ToRs
  - Is the methodology clearly explained and acceptable
  - Evaluate the validity of the findings (review data evidence)
  - Discuss the mitigation measures and recommendations
  - Evaluate the appropriateness of the reference literature
  - Is the article well-written and easy to understand?
  - Identify any short comings

xviii. All comments raised by Interested and Affected Parties must be responded to.

xix. The EIAr must also include a comments and response report in accordance with Appendix 2 h (iii) of the EIA Regulations, 2014.

xx. The EIAr must include the detail inclusive of the PPP in accordance with Regulation 41 of the EIA Regulations.

xxi. Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies.

xxii. Information on services required on the site, e.g. sewage, refuse removal, water and electricity. Who will supply these services and has an agreement and confirmation of capacity been obtained? Proof of these agreements must be provided.

xxiii. The EIAr must provide a detailed description of the need and desirability, not only providing motivation on the need for clean energy in South Africa of the proposed activity. The need and desirability must also indicate if the proposed development is needed in the region and if the current proposed location is desirable for the proposed activity compared to other sites.

xxiv. A copy of the final site layout map and alternatives. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following:

- Positions of the gas turbines, waste water treatment and water reclamation plant, fuel storage tanks, water storage reservoir and tanks, water and gas supply pipelines;
- Permanent laydown area footprint;
- Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible);
- Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used;
- The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure;
- Substation(s) and/or transformer(s) sites including their entire footprint;
- Connection routes (including pylon positions) to the distribution/transmission network;
- All existing infrastructure on the site, especially roads;
- Buffer areas;
- Buildings, including accommodation; and
- All "no-go" areas.

xxv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.

xxvi. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.

xxvii. A shapefile of the preferred development layout/footprint must be submitted to this Department. The shapefile must be created using the Hartebeesthoek 94 Datum and the data should be in Decimal Degree Format using the WGS 84 Spheroid. The shapefile must include at a minimum the following extensions i.e. .shp; .shx; .dbf; .prj; and, .xml (Metadata file). If specific symbology was assigned to the file, then the .avl and/or the .lyr file must also be included. Data must be mapped at a scale of 1:10 000 (please specify if an alternative scale was used). The metadata must include a description of the base data used for digitizing. The shapefile must be submitted in a zip file using the EIA application reference number as the title. The shape file must be submitted to:

Postal Address:
Department of Environmental Affairs
Private Bag X447
Pretoria
0001

Physical address:
Environment House
473 Steve Biko Road
Pretoria

For Attention: Muhammad Essop
Integrated Environmental Authorisations
Strategic Infrastructure Developments
Telephone Number: (012) 399 9406
Email Address: MEssop@environment.gov.za

The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following:

i. All recommendations and mitigation measures recorded in the EIAr and the specialist studies conducted.
ii. The final site layout map.
iii. Measures as dictated by the final site layout map and micro-siting.
iv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
v. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.
vi. An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.
vii. A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site and be implemented prior to commencement of the construction phase.
viii. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.
ix. An open space management plan to be implemented during the construction and operation of the facility.
x. A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.
xi. A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.
xii. A fire management plan to be implemented during the construction and operation of the facility.
xiii. An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.
xiv. An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.
xv. Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.
xvi. An air quality management plan.
xvii. Emergency preparedness response plan.

The EAP must provide detailed motivation if any of the above requirements is not required by the proposed development and not included in the EMPr.

The EAP must provide the final detailed Site Layout Plan as well as the final EMPr for approval with the final EIAr as this Department needs to make a decision on the EA, EMPr and Layout Plan.

The EIAr must include a **cumulative impact assessment** of the facility since there are other similar facilities in and around the proposed site as well as in the region. The specialist studies as outlined in the PoSEIA which is incorporated as part of the SR must also assess the facility in terms of potential cumulative impacts.

Please ensure that all the relevant Listing Notice activities are applied for, that the Listing Notice activities applied for are specific and that they can be linked to the development activity or infrastructure in the project description.

You are hereby reminded that should the EIAr fail to comply with the requirements of this acceptance letter, the project will be **refused** in accordance with Regulation 24(1)(b) of the EIA Regulations, 2014.

The applicant is hereby reminded to comply with the requirements of Regulation 45 with regard to the time period allowed for complying with the requirements of the Regulations, and Regulations 43 and 44 with regard to the allowance of a comment period for interested and affected parties on all reports submitted to the competent authority for decision-making. The reports referred to are listed in Regulation 43(1).

Furthermore, it must be reiterated that, should an application for Environmental Authorisation be subject to the provisions of Chapter II, Section 38 of the National Heritage Resources Act, Act 25 of 1999, then this Department will not be able to make nor issue a decision in terms of your application for Environmental Authorisation pending a letter from the pertinent heritage authority categorically stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38(8) of the National Heritage Resources Act, Act 25 of 1999. Comments from SAHRA and/or the provincial department of heritage must be provided in the EIAr.

You are requested to submit two (2) electronic copies (CD/DVD) and two (2) hard copies of the EIAr to the Department as per Regulation 23(1) of the EIA Regulations, 2014.

Please also find attached information that must be used in the preparation of the EIAr. This will enable the Department to speedily review the EIAr and make a decision on the application.

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, which stipulates that no activity may commence prior to an Environmental Authorisation being granted by the Department.

Yours faithfully

Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Environmental Affairs
Letter Signed by: Mr Coenrad Agenbach
Designation: Deputy Director: Strategic Infrastructure Developments
Date: 16/05/2016

cc:	Mr R Holcroft	ArcelorMittal SA	Email: Richard.Holcroft@arcelormittal.com

A. EIA INFORMATION REQUIRED FOR GAS POWER FACILITIES

1. General site information

The following general site information is required:

- Descriptions of all affected farm portions
- 21 digit Surveyor General codes of all affected farm portions
- Copies of deeds of all affected farm portions
- Photos of areas that give a visual perspective of all parts of the site
- Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)
- Gas-fired design specifications including:
  - Type of technology
  - Structure height
  - Surface area to be covered (including associated infrastructure such as roads)
  - Structure orientation
  - Laydown area dimensions (construction period and thereafter)
  - Generation capacity
- Generation capacity of the facility as a whole at delivery points

This information must be indicated on the first page of any Scoping or EIA document. It is also advised that it be double checked as there are too many mistakes in the applications that have been received that take too much time from authorities to correct.

2. Sample of technical details for the proposed facility

Component	Description / dimensions
Height of stacks	
Area of gas facility	
Area occupied by inverter / transformer stations / substations	
Capacity of on-site substation	
Area occupied by both permanent and construction laydown areas	
Area occupied by buildings	
Length of internal roads	
Width of internal roads	
Proximity to grid connection	
Length of pipelines	
Size and number of storage vessels for gas and other fuels	
Height of fencing	
Type of fencing	

3. Site maps and GIS information

Site maps and GIS information should include at least the following:

- All maps/information layers must also be provided in ESRI Shapefile format
- All affected farm portions must be indicated
- The exact site of the application must be indicated (the areas that will be occupied by the application)
- A status quo map/layer must be provided that includes the following:

- Current use of land on the site including:
  - Buildings and other structures
  - Agricultural fields
  - Grazing areas
  - Natural vegetation areas (natural veld not cultivated for the preceding 10 years) with an indication of the vegetation quality as well as fine scale mapping in respect of Critical Biodiversity Areas and Ecological Support Areas
  - Critically endangered and endangered vegetation areas that occur on the site
  - Bare areas which may be susceptible to soil erosion
  - Cultural historical sites and elements
- Rivers, streams and water courses
- Ridgelines and 20m continuous contours with height references in the GIS database
- Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs
- High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries
- Buffer zones (also where it is dictated by elements outside the site):
  - 500m from any irrigated agricultural land
  - 1km from residential areas
- Indicate isolated residential, tourism facilities on or within 1km of the site

- A slope analysis map/layer that include the following slope ranges:
  - Less than 8% slope (preferred areas for facility and infrastructure)
  - between 8% and 12% slope (potentially sensitive to facility and infrastructure)
  - between 12%and 14% slope (highly sensitive to facility and infrastructure)
  - steeper than 18 % slope (unsuitable for facility and infrastructure)
- A site development proposal map(s)/layer(s) that indicate:
  - Foundation footprint
  - Permanent laydown area footprint
  - Construction period laydown footprint
  - Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible)
  - River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used
  - Substation(s) and/or transformer(s) sites including their entire footprint.
  - Cable routes and trench dimensions (where they are not along internal roads)
  - Connection routes to the distribution/transmission network (the connection must form part of the EIA even if the construction and maintenance thereof will be done by another entity such as ESKOM)
  - Cut and fill areas of power tower and heliostats sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill
  - Borrow pits
  - Spoil heaps (temporary for topsoil and subsoil and permanently for excess material)
  - Buildings including accommodation

With the above information authorities will be able to assess the strategic and site impacts of the application.

4. Regional map and GIS information

The regional map and GIS information should include at least the following:

- All maps/information layers must also be provided in ESRI Shapefile format
- The map/layer must cover an area of 20km around the site

- Indicate the following:
  - roads including their types (tarred or gravel) and category (national, provincial, local or private)
  - Railway lines and stations
  - Industrial areas
  - Harbours and airports
  - Electricity transmission and distribution lines and substations
  - Pipelines
  - Waters sources to be utilised during the construction and operational phases
  - A visibility assessment of the areas from where the facility will be visible
  - Critical Biodiversity Areas and Ecological Support Areas
  - Critically Endangered and Endangered vegetation areas
  - Agricultural fields
  - Irrigated areas
  - An indication of new road or changes and upgrades that must be done to existing roads in order to get equipment onto the site including cut and fill areas and crossings of rivers and streams

5. Important stakeholders

Comments must be requested from Eskom regarding grid connectivity and capacity. Request for comment must be submitted to:

Mr John Geeringh
Eskom Transmission
Megawatt Park D1Y38
PO Box 1091
JOHANNESBURG
2000

Tel: 011 516 7233
Fax: 086 661 4064
John.geeringh@eskom.co.za

Notification was distributed to all I&APs on the stakeholder database on 22 July 2016. The notification included an invitation to an Public Meeting to disclose the findings of the EIA in Saldanha Bay . A copy of the notification letter, as well as proof of distribution is provided below.

Figure 8.1 *Notification Letter*

Environmental Resources Management

2nd Floor
Great Westerford
240 Main Road, Rondebosch
7700, Cape Town, South Africa

Postnet Suite 90
Private Bag X12
Tokai, 7966
Cape Town, South Africa

Tel: +27 21 681 5400
Fax: +27 21 686 0736
www.erm.com

21 July 2016

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

This notification serves to inform you that the Draft Environmental Impact Assessment (EIA) Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 22 July to 25 August 2016.

The Draft EIA Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

We invite you to attend a public meeting where the Project Team will present the findings of the impact assessment and you will be able to raise issues and pose questions.

When: 11 August 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

Please submit your comments on the Draft EIA to Tougheeda Aspeling of ERM:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Your comments must reach ERM, in writing, on or before 25 August **2016.**

Thank you for your participation in this process.

Yours sincerely
Tougheeda Aspeling
Stakeholder Engagement Consultant

Figure 8.2 Proof of Email to Stakeholders

From: Tougheeda Aspeling on behalf of saldanhasteel.eia@erm.com
To: Tougheeda Aspeling
Cc: Lindsey Bungartz
Bcc: "nngcaba@environment.gov.za"; "nngoveni@environment.gov.za"; "msolomons@environment.gov.za"; "MEssop@environment.gov.za"; "NBPillay@environment.gov.za"; "taramaru@environment.gov.za"; "tibaloyi@environment.gov.za"; "rmolale@environment.gov.za"; "lmahlangu@environment.gov.za"; "mgordon@environment.gov.za"; "WHector@environment.gov.za"; "vsenene@environment.gov.za"; "lmoja@environment.gov.za"; "Mshubane@environment.gov.za"; "Lmokoena@environment.gov.za"; "Dramalope@environment.gov.za"; "mmayekiso@environment.gov.za"; "lmudau2@environment.gov.za"; "pkhati@environment.gov.za"; "cmangcu@environment.gov.za"; "ajboyd@environment.gov.za"; "AndrewC@daff.gov.za"; "ypeterson@environment.gov.za"; "xmkefe@environment.gov.za"; "LMudau2@environment.gov.za"; "dfischer@environment.gov.za"; "SMalaza@environment.gov.za"; "IAbader@environment.gov.za"; "DG@daff.gov.za"; "SiphokaziN@daff.gov.za"; "fatimaS@daff.gov.za"; "michellePR@daff.gov.za"; "AndreaB@daff.gov.za"; "KimP@daff.gov.za"; "SiphokaziN@daff.gov.za"; "MujahidaH@daff.gov.za"; "CebaM@daff.gov.za"; "FatimaSA@daff.gov.za"; "WadeT@daff.gov.za"; "BelemaneS@daff.gov.za"; "KishanS@daff.gov.za"; "kishansankar@gmail.com"; "AsandaN@daff.gov.za"; "Centralp@dws.gov.za"; "lyonsh@dws.gov.za"; "ncampbell@samsa.org.za"; "djames@samsa.org.za"; "hesterhuizen@samsa.org.za"; "DManley@samsa.org.za"; "mslabber@samsa.org.za"; "paseka.nku@nersa.org.za"; "selepeg@dot.gov.za"; "Wolsey.Barnard@energy.gov.za"; "Fuad.allie@energy.gov.za"; "westernCapeprovince@nda.org.za"; "hydrosan@iafrica.com"; "Ossie.Lamb@dpw.gov.za"; "frederick.johnson@dpw.gov.za"; "online2276859@telkomsa.net"; "saldanhanature@gmail.com"; "marius.venter@westerncape.gov.za"; "khanr@dws.gov.za"; "pieter.vanzyl@westerncape.gov.za"; "Clement.Arendse@westerncape.gov.za"; "zain.jumat@westerncape.gov.za"; "Transport.Publicworks@westerncape.gov.za"; "Lucy.Caplan@westerncape.gov.za"; "Jacqui.Gooch@westerncape.gov.za"; "Danielle.manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "Alvan.gabriel@westerncape.gov.za"; "Joy.Leaner@westerncape.gov.za"; "anthony.barnes@westerncape.gov.za"; "Ayub.mohamed@westerncape.gov.za"; "Caren.George@westerncape.gov.za"; "coastal.enquiries@westerncape.gov.za"; "Zahier.toefy@westerncape.gov.za"; "Marlene.laros@westerncape.gov.za"; "Kobus.Munro@westerncape.gov.za"; "EtienneAlfred.Roux@westerncape.gov.za"; "aduffell-canham@capenature.co.za"; "landuse@capenature.co.za"; "ebaard@capenature.co.za"; "aaturner@capenature.co.za"; "romar@capenature.co.za"; "ceoheritage@westerncape.gov.za"; "sivuyile.mpakane@dmr.gov.za"; "AdriaanC@elsenburg.com"; "franciss@elsenburg.com"; "Landuse.elsenburg@elsenburg.com"; "Lars.Starke@westerncape.gov.za"; "Nigel.Gwynne-Evans@westerncape.gov.za"; "Jim.Petrie@westerncape.gov.za"; "dreyerw@dws.gov.za"; "Rasheeq.Williams@westerncape.gov.za"; "Goodwell.dingaan@westerncape.gov.za"; "Claude.Orgill@westerncape.gov.za"; "Martinus.vanwyk@westerncape.gov.za"; "Ferdie.endemann@gmail.com"; "FerdieE@elsenburg.com"; "MogaleS@elsenburg.com"; "info@elsenburg.com"; "KhanR@DWS.gov.za"; "ClaassenM@DWS.gov.za"; "MafilelaS@DWS.gov.za"; "Petersena@dws.gov.za"; "heneB@dws.gov.za"; "Sokhayaj@dws.gov.za"; "leona.bruiners@drdlr.gov.za"; "Duduzile.Kunene@dmr.gov.za"; "busisiwe.magazi@dmr.gov.za"; "francois.schippers@sbm.gov.za"; "mun@sbm.gov.za"; "benice.rossouw@sbm.gov.za"; "Jacques.Marais@sbm.gov.za"; "quentin.jordaan@sbm.gov.za"; "lindsey.gaffley@sbm.co.za"; "driekas@saldanha.co.za"; "nazeema.duarte@sbm.gov.za"; "Marius.Meiring@sbm.gov.za"; "Gerrit.Smith@sbm.gov.za"; "hfprins@wcdm.co.za"; "smitk@swartland.org.za"; "hhfbester@wcdm.co.za"; "pietf@saldanhabay.co.za"; "pietfab@gmail.com"; "dkotze@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "cjmalherbe@wcdm.co.za"; "wmarkus@wcdm.co.za"; "ndejongh@wcdm.co.za"; "waldo.julius@sbm.gov.za"; "laura@sbidz.co.za"; "kaashifah@sbidz.co.za"; "lelanie@sbidz.co.za"; "moeketsi@sbidz.co.za"; "proactive@mweb.co.za"; "frank.pronk@sbm.gov.za"; "Simon.biko44@gmail.com"; "Stefanus.vries@sbm.gov.za"; "ryan.don@sbm.gov.za"; "andre.kruger@sbm.gov.za"; "info@wowlangebaan.co.za"; "ldpwes@mweb.co.za"; "metsal@imaginet.co.za"; "jillcarnegie@gmail.com"; "info@langebaanratepayers.co.za"; "proactiv@mweb.co.za"; "info@langebaanratepayers.co.za"; "info@villaverano.co.za"; "jbrachairman@gmail.com"; "goosenwp@yahoo.com"; "mikero@vodamail.co.za"; "info@langebaanratepayers.co.za"; "johnselby@worldonline.co.za"; "mikero@vodamail.co.za"; "langebaan@sbto.co.za"; "info@weskussakekamer.co.za"; "vredenburg@sbto.co.za"; "jhwicht@cis.co.za"; "cloetegerald@yahoo.com"; "andile.kushman@labour.gov.za"; "tabsom2202@yahoo.co.uk"; "wct@mweb.co.za"; "stereosteyn@gmail.com"; "Neliswa.sihawu@sanparks.org"; "Pat.bopape@sanparks.org"; "Pierre.Nel@sanparks.org"; "william.brink@sanparks.org"; "chairman@sbto.co.za"; "ppdleroux@wcdm.co.za"; "tourism@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "tourism@wcdm.co.za"; "johann@sadstia.co.za"; "chairman@sadstia.co.za"; "dave@sbto.co.za"; "langebaanweg@telkomsa.net"; "andre@blouwaterbaai.com"; "ivorlee@intekom.co.za"; "ivvorlee@intekom.co.za"; "mikero@vodamail.co.za"; "mary-jean@capechamber.co.za"; "mj@capechamber.co.za"; "mjjssj@gmail.com"; "luna@capeglobal.co.za"; "mjjssj@gmail.com"; "susandean@tiag.co.za"; "sharon@wessa.co.za"; "marketing@wessa.co.za"; "spetersen@wwf.org.za"; "andy@wessa.co.za"; "postmaster@wessa.wcape.school.za"; "k.sink@sanbi.org.za"; "yolanf@ewt.org.za"; "b.adams@webmail.co.za"; "abicshop@gmail.com"; "AHein@westcoastcollege.co.za"; "reddaisy@telkomsa.net"; "amsterdam@new.co.za"; "info@capebirdclub.org.za"; "Coldek@icon.co.za"; "keithhbharrison@lando.co.za"; "advocacy@birdlife.org.za"; "info@capebiosphere.co.za"; "jthorpe@capebiosphere.co.za"; "info@capebiosphere.co.za"; "Rynop@capebiosphere.co.za"; "sharonfebs@gmail.com"; "darlingwines@telkomsa.net"; "saligna2030@gmail.com"; "slabigh@gmail.com"; "wpvv@telkomsa.net"; "info@fossilpark.org.za"; "pjh@fossilpark.org.za"; "eco@fossilpark.org.za"; "patrick@sbidz.co.za"; "barry@anchorenvironmental.co.za"; "shandre@wcbdc.co.za"; "morgandebeer11@gmail.com"; "sbbwa.secretary@gmail.com"; "laura@sbidz.co.za"; "clairpengelly@greencape.co.za"; "gclemitson@gmail.com"; "Raphaell@salfreight.co.za"; "petroswartz@yahoo.com"; "tcebisa@seda.org.za"; "tourismmanager@sbto.co.za"; "mario.davey@angloamerican.com"; "nacawc@gmail.com"; "myburgh@caa.co.za"; "reynolds@caa.co.za"; "dekockr@nra.co.za"; "wisemans@sentech.co.za"; "vbaduza@sahra.org.za"; "lmalgas@sahra.org.za"; "dsibayi@sahra.org.za"; "bbmussel@mweb.co.za"; "alet.fabricius@bidports.co.za"; "Gert@wcbdc.co.za"; "maxwell.malan@exxaro.com"; "freyneke@harsco.com"; "nellg@idc.co.za"; "gerte@ob.co.za";

"NevilleE@cefgroup.co.za"; "gerhard.naude@petrosa.co.za"; "elsas@cefgroup.co.za"; "stephenr@cefgroup.co.za"; "elsas@cefgroup.co.za"; "stephen.ross@petrosa.co.za"; "paulc@seaharvest.co.za"; "carint@seaharvest.co.za"; "frankh@seaharvest.co.za"; "carint@seaharvest.co.za"; "nicov@seaharvest.co.za"; "Otto.Scribante@arcelormittal.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanZyl@arcelormittal.com"; "Richard.Holcroft@arcelormittal.com"; "badisaweskus@telkomsa.net"; "toni@saldanhabayoysters.co.za"; "sue@saldanhabayoysters.co.za"; "wherbst@mussels.co.za"; "bbmussel@mweb.co.za"; "info@weskussakekamer.co.za"; "franzvm@mweb.co.za"; "schalk@blueoceanmussels.com"; "kevin@ruck.co.za"; "melinda@mussels.co.za"; "nparker@xpandit.co.za"; "nick@vikingaquaculture.co.za"; "sj@vikingaquaculture.co.za"; "lbnlib@webmail.co.za"; "joan.maart@gmail.com"; "mun@saldanhabay.co.za"; "antjiev@gmail.com"; "Mun@Saldanhabay.co.za"; "BarnarJM.BFN.FS_Bloemfontein@eskom.co.za"; "segomoco.scheppers@eskom.co.za"; "KloppeJM@eskom.co.za"; "OctobeA@eskom.co.za"; "FranciA@eskom.co.za"; "KailasA@eskom.co.za"; "Quinton.Brink@transnet.net"; "willem.roux@transnet.net"; "gail.williams@transnet.net"; "dorian.bilse@transnet.net"; "theo.sethosa@transnet.net"; "Quentin.Kordom@transnet.net"; "Abigail.Links@transnet.net"; "nimi.ramchand@transnet.net"; "quentin.kordom@transnet.net"; "nelson.mbatha@transnet.net"; "Jeanette.Smit@transnet.net"; "Nicole.Abrahams@transnet.net"; "gavstig@mweb.co.za"; "laura@sbidz.co.za"; "doug@sbidz.co.za"; "carol@sbidz.co.za"; "duncan.bosch@za.afrisam.com"; "cofrili@mweb.co.za"; "pamela.magwa@engenoil.com"; "thys@thalithali.co.za"; "wolfiesfontein@gmail.com"; "susandean@tiag.co.za"; "tct@petrostruct.co.za"; "L.tiet@smit.com"; "david.dean@mainstreamrp.com"; "helen.bamford@inl.co.za"; "russells@gcs-sa.biz"; "darryl.hunt@dynamicenergy.co.za"; "mike@green-cape.co.za"; "KStroebel@csir.co.za"; "jillcarnegie@gmail.com"; "robert.loseth@blystadenergy.com"; "andre@bluebaylodge.co.za"; "NevilleE@cefgroup.co.za"; "dominic.goncalves@abengoa.com"; "johanlewin@hotmail.com"; "vortumenergy@gmail.com"; "planwize@telkomsa.net"; "vortumenergy@gmail.com"; "development@vidigenix.co.za"; "nooitgedacht@sandveld.net"; "Adri.LaMeyer@westerncape.gov.za"; "cassi@icon.co.za"; "hvonwell@ages-group.com"; "egrobler@ages-group.com"; "helene@media24.com"; "conservationoffice@capebiosphere.co.za"; "johnselby@worldonline.co.za"; "peter.stowe@gmail.com"; "nigel.rossouw@shell.com"; "n_champion@yahoo.com"; "haf@Vitol.com"; "sbbwa.secretary@gmail.com"; "Esca.coetzee@sasol.com"; "Amitha.Maharaj@sasol.com"; "gsweto@encorex.co.za"; "daniel@ftcsaldanha.co.za"; "GertE@luckystar.co.za"; "sw@atlantiscorp.co.za"; "CARLO.Matthysen@petrosa.co.za"; "joewengrowe@afrihost.co.za"; "s.mtshali@smit.com"; "dkotze@wcdm.co.za"; "ezekiel@semona.co.za"; "zayed.brown@westerncape.gov.za"; "Wilna.Kloppers@westerncape.gov.za"; "Quentin.Jordaan@sbm.gov.za"; "jordaanquentin@gmail.com"; "keithhbharrison@lando.co.za"; "angil@westcoastmail.co.za"; "michellePR@daff.gov.za"; "bertus@mulilo.com"; "johan@westarcor.co.za"; "carol@sfgengineering.co.za"; "KristanCallaghan@hillintl.com"; "Lizette@erakis.co.za"; "s.pillay@capitalenergyresources.co.uk"; "alessandro.sessa@enel.com"; "gonzalo.ramirez@excelerateenergy.com"; "ajoubert@slrconsulting.com"; "vivcrone@vjcz.com"; "jonathan.hoffman@globeleq.co.za"; "jon.frick@globeleq.co.za"; "leila.mahomed-weideman@globeleq.co.za"; "johs@rs-africa-diving.com"; "ecostandius@slrconsulting.com"; "eloise@ccaenvironmental.co.za"; "lrathanya@acwapower.com"; "Vjmabunda@acwapower.com"; "asingh@acwapower.com"; "inc431@mweb.co.za"; "Akhona.Mbenyana@westerncape.gov.za"; "Danielle.Manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "karen@mulilo.com"; "danielalkaster@yahoo.com"; "Zharon.lady@gmail.com"; "glenmarinus1@gmail.com"; "russell@gvj.co.za"; "ftacademy1@gmail.com"; "khulatrans@telkomsa.net"; "samueladams.sa95@gmail.com"; "matroos.ian@gmail.com"; "eaglesrest2012@gmail.com"; "dawood@vusanigroup.com"; "segopotsotong@hotmail.co.za"; "altaleroux20@gmail.com"; "dicky.koekemoer@arcelormittal.com"; "jsnyders66@gmail.com"; "sauldelia2@gmail.com"; "mtalmarkes@yahoo.com"; "rsmurray66@gmail.com"; "welmariec@seaharvest.co.za"; "jackielouw4@gmail.com"; "albert.bossart@za.abb.com"; "nosipho@shinoanosolutions.co.za"; "westcoast@harcourts.co.za"; "helena.koch@absa.co.za"; "portiar@absa.co.za"; "murchelk@absa.co.za"; "Talana.Hanekom@absa.co.za"; "gaustig@mweb.co.za"; "billeloff@vodamail.co.za"; "Sophia.steynberg@ppc.co.za"; "anthonymlata@gmail.com"; "nmbirch26@gmail.com"; "zain@bevline.co.za"; "Evy@bevline.co.za"; "bventer@ppc.co.za"; "gerritn@seaharvest.co.za"; "jackielouw4@gmail.com"; "mwjudyd@mweb.co.za"; "jeromevraagom@gmail.com"; "glenmarinus1@gmail.com"; "sarel.schoeman@bidports.co.za"; "info@saldanhaaccommodation.co.za"; "friestkj.kf@gmail.com"; "2boy.arthur@webmail.com"; "mathehy47@outlook.com"; "titania@luckystar.co.za"; "anitabrooks1965@gmail.com"; "mtalmarkes@yahoo.com"; "joosteashwin@gmail.com"; "zelda.williams05@gmail.com"; "joseph.julies57@gmail.com"; "gnomma.khoi1673@gmail.com"; "natasha@mogwe.com"; "rustin@mogwe.com"; "reginald.abrahams@ppc.co.za"; "morgandebeer@gmail.com"; "dutoit12@gmail.com"; "paulinamali60@gmail.com"; "brainwavelaaiplek@telkomsa.net"; "brainwavelaaiplek@telkomsa.net"; "gasank@sisworks.co.za"; "shabier@sisworks.co.za"; "dominic@seabreezecomdev.co.za"; "Zharon@seabreezecomdev.co.za"; "barthlo@sunrise-energy.co.za"; "lvanderwalt@telkomsa.net"; "franciosvanderbank@arcelormittal.com"; "elmondo.paulse@transnet.net"; "jeff.longley@arcelormittal.com"; "colleen.daniels@arcelormittal.com"; "janh@dsp.co.za"; "sabelo.tabata@transnet.net"; "jo@vkc.co.za"; "wajdia@vkc.co.za"; "debbie@shirdanovsolutions.co.za"; "xolisa@gmail.com"; "william.mugal01@gmail.com"; "mwestld@mweb.co.za"; "btvraagom@gmail.com"; "Ettiene.s@sirollon.co.za"; "sandelmi@telkomsa.net"; "christo.vdm@vodamail.co.za"; "deon@cad-supplies.co.za"; "lours.dewet10@gmail.com"; "wyngaajo@eskom.co.za"; "PetersOw@eskom.co.za"; "michelle.herbert@advisian.com"; "MRamakulukusha@environment.gov.za"; "johan@thebe.co.za"; "LanaI@L2B.co.za"; "david.joubert@sbm.gov.za"; "John.geeringh@eskom.co.za"; "iijima@itochu.co.za"; "takahashi-e@itochu.co.jp"; "tebogo.more@gdfsuez.com"; "david@atlanticep.com"; "sonia@atlanticep.com"; "giovanni.serra@enel.com"; "taf@tirisanopartners.com"; "mluleki@mogs.co.za"; "vi-externe.truong-dinh@edf.fr"; "mike.fitzpatrick@ipp-projects.co.za"; "werner.pieterse@ipp-projects.co.za"; "ghojem@prdw.com"; "christo.vdm@vodamail.co.za"; "francois.vanderbank@arcelormittal.com"; "setho@ipcsafrica.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanzyl@arcelormittal.com"; "Keithharrison@lando.co.za"; "otto.scribante@arcelormittal.com"; "helena.koch@absa.co.za"; "helene@media24.com"; "bertus@mulilo.com"; "charlene@aan.co.za"; "riaan.r@harcourts.co.za"; "louis.dewet10@gmail.com"; "sue@saldanhabayoysters.co.za"; "dirk.coetzee@dufero.co.za"; "accounts@turnerland.co.za"; "gerrit.reinentz@pamgolding.co.za"; "info@gvj.co.za"; "portiare@absa.co.za"; "chrisleroux@webmail.com"; "gberndsen@infrastream.co.za";

	"piet.swanepoel@harcourts.co.za"; "his@yebo.co.za"; "billeloff@vodamail.co.za"; "mick@gvj.co.za"; "dennis.britz@arcelormittal.com"; "moliv@global.co.za"; "elmiendb@dsp.co.za"; "rsmurray@gmail.com"; "nevillee@cefgroup.co.za"; "richard.holcolt@arcelormittal.com"; "darryl.hunt@telkomsa.net"; "sw@atlantiscorp.co.za"; "sw@atlantiscorp.co.za"; "doug@sbidz.co.za"; "jannie@mutilo.com"; "ayoung@infrastream.co.za"; "primaplumb@gmail.com"; "sandelmi@telkomsa.net"; "btvroogom@gmail.com"; "ftacademy1@gmail.com"; "segopotsotong@hotmail.co.za"
Subject:	Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	22 July 2016 04:28:00 PM
Attachments:	image001.png

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

This notification serves to inform you that the Draft Environmental Impact Assessment (EIA) Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 22 July to 25 August 2016.

The Draft EIA Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

We invite you to attend a public meeting where the Project Team will present the findings of the impact assessment and you will be able to raise issues and pose questions.

When: 11 August 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

Please submit your comments on the Draft EIA to Tougheeda Aspeling of ERM:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Your comments must reach ERM, in writing, on or before 25 August 2016.

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

Figure.8.3 Proof of Distribution of Reminder of Comment Period Closure

A email was sent to I&AP's on the stakeholder database to inform them that the presentation from the public meeting was available on the project website and remind them of the closing date of the comment period for the draft EIA. A copy of the email and proof of distribution is provided below.

From: Tougheeda Aspeling on behalf of ERM South Africa EIA Mailbox

To: Tougheeda Aspeling

Bcc: "nngcaba@environment.gov.za"; "nngoveni@environment.gov.za"; "msolomons@environment.gov.za"; "MEssop@environment.gov.za"; "NBPillay@environment.gov.za"; "taramaru@environment.gov.za"; "tibaloyi@environment.gov.za"; "rmolale@environment.gov.za"; "lmahlangu@environment.gov.za"; "mgordon@environment.gov.za"; "WHector@environment.gov.za"; "vsenene@environment.gov.za"; "lmoja@environment.gov.za"; "Mshubane@environment.gov.za"; "Lmokoena@environment.gov.za"; "Dramalope@environment.gov.za"; "mmayekiso@environment.gov.za"; "lmudau2@environment.gov.za"; "pkhati@environment.gov.za"; "cmangcu@environment.gov.za"; "ajboyd@environment.gov.za"; "AndrewC@daff.gov.za"; "ypeterson@environment.gov.za"; "xmkefe@environment.gov.za"; "LMudau2@environment.gov.za"; "dfischer@environment.gov.za"; "SMalaza@environment.gov.za"; "IAbader@environment.gov.za"; "DG@daff.gov.za"; "SiphokaziN@daff.gov.za"; "fatimaS@daff.gov.za"; "michellePR@daff.gov.za"; "AndreaB@daff.gov.za"; "KimP@daff.gov.za"; "SiphokaziN@daff.gov.za"; "MujahidaH@daff.gov.za"; "CebaM@daff.gov.za"; "FatimaSA@daff.gov.za"; "WadeT@daff.gov.za"; "BelemaneS@daff.gov.za"; "KishanS@daff.gov.za"; "kishansankar@gmail.com"; "AsandaN@daff.gov.za"; "Centralp@dws.gov.za"; "lyonsh@dws.gov.za"; "ncampbell@samsa.org.za"; "djames@samsa.org.za"; "hesterhuizen@samsa.org.za"; "dmanley@samsa.org.za"; "mslabber@samsa.org.za"; "paseka.nku@nersa.org.za"; "selepeg@dot.gov.za"; "Wolsey.Barnard@energy.gov.za"; "Fuad.allie@energy.gov.za"; "westernCapeprovince@nda.org.za"; "hydrosan@iafrica.com"; "Ossie.Lamb@dpw.gov.za"; "frederick.johnson@dpw.gov.za"; "online2276859@telkomsa.net"; "saldanhanature@gmail.com"; "marius.venter@westerncape.gov.za"; "khanr@dws.gov.za"; "pieter.vanzyl@westerncape.gov.za"; "Clement.Arendse@westerncape.gov.za"; "zain.jumat@westerncape.gov.za"; "Transport.Publicworks@westerncape.gov.za"; "Lucy.Caplan@westerncape.gov.za"; "Jacqui.Gooch@westerncape.gov.za"; "Danielle.manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "Alvan.gabriel@westerncape.gov.za"; "Joy.Leaner@westerncape.gov.za"; "anthony.barnes@westerncape.gov.za"; "Ayub.mohamed@westerncape.gov.za"; "Caren.George@westerncape.gov.za"; "coastal.enquiries@westerncape.gov.za"; "Zahier.toefy@westerncape.gov.za"; "Marlene.laros@westerncape.gov.za"; "Kobus.Munro@westerncape.gov.za"; "EtienneAlfred.Roux@westerncape.gov.za"; "aduffell-canham@capenature.co.za"; "landuse@capenature.co.za"; "ebaard@capenature.co.za"; "aaturner@capenature.co.za"; "romar@capenature.co.za"; "ceoheritage@westerncape.gov.za"; "duduzile.kunene@dmr.gov.za"; "AdriaanC@elsenburg.com"; "franciss@elsenburg.com"; "Landuse.elsenburg@elsenburg.com"; "Lars.Starke@westerncape.gov.za"; "Nigel.Gwynne-Evans@westerncape.gov.za"; "Jim.Petrie@westerncape.gov.za"; "dreyerw@dws.gov.za"; "Rasheeq.Williams@westerncape.gov.za"; "Goodwell.dingaan@westerncape.gov.za"; "Claude.Orgill@westerncape.gov.za"; "Martinus.vanwyk@westerncape.gov.za"; "Ferdie.endemann@gmail.com"; "FerdieE@elsenburg.com"; "MogaleS@elsenburg.com"; "info@elsenburg.com"; "KhanR@DWS.gov.za"; "ClaassenM@DWS.gov.za"; "Mafilelat@dws.gov.za"; "Petersena@dws.gov.za"; "heneB@dws.gov.za"; "Sokhayaj@dws.gov.za"; "leona.bruiners@drdlr.gov.za"; "Duduzile.Kunene@dmr.gov.za"; "busisiwe.magazi@dmr.gov.za"; "francois.schippers@sbm.gov.za"; "mun@sbm.gov.za"; "benice.rossouw@sbm.gov.za"; "Jacques.Marais@sbm.gov.za"; "quentin.jordaan@sbm.gov.za"; "lindsey.gaffley@sbm.gov.za"; "drieka.smit@sbm.gov.za"; "nazeema.duarte@sbm.gov.za"; "Marius.Meiring@sbm.gov.za"; "Gerrit.Smith@sbm.gov.za"; "hfprins@wcdm.co.za"; "smitk@swartland.org.za"; "hhfbester@wcdm.co.za"; "pietf@wcdm.co.za"; "pietfab@gmail.com"; "dkotze@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "cjmalherbe@wcdm.co.za"; "wmarkus@wcdm.co.za"; "ndejongh@wcdm.co.za"; "waldo.julius@sbm.gov.za"; "laura@sbidz.co.za"; "kaashifah@sbidz.co.za"; "lelanie@sbidz.co.za"; "moeketsi@sbidz.co.za"; "frank.pronk@sbm.gov.za"; "Simon.biko44@gmail.com"; "Stefanus.vries@sbm.gov.za"; "ryan.don@sbm.gov.za"; "andre.kruger@sbm.gov.za"; "info@wowlangebaan.co.za"; "ldpwes@mweb.co.za"; "metsal@imaginet.co.za"; "jillcarnegie@gmail.com"; "info@langebaanratepayers.co.za"; "proactiv@mweb.co.za"; "info@langebaanratepayers.co.za"; "info@villaverano.co.za"; "jbrachairman@gmail.com"; "goosenwp@yahoo.com"; "mikero@vodamail.co.za"; "info@langebaanratepayers.co.za"; "johnselby@worldonline.co.za"; "mikero@vodamail.co.za"; "langebaan@sbto.co.za"; "info@weskussakekamer.co.za"; "vredenburg@sbto.co.za"; "jhwicht@cis.co.za"; "cloetegerald@yahoo.com"; "andile.kushman@labour.gov.za"; "tabsom2202@yahoo.co.uk"; "wct@mweb.co.za"; "stereosteyn@gmail.com"; "Pat.bopape@sanparks.org"; "Pierre.Nel@sanparks.org"; "william.brink@sanparks.org"; "chairman@sbto.co.za"; "tourism@wcdm.co.za"; "hvanrooyen@wcdm.co.za"; "tourism@wcdm.co.za"; "johann@sadstia.co.za"; "chairman@sadstia.co.za"; "langebaanweg@telkomsa.net"; "andre@blouwaterbaai.com"; "ivorlee@intekom.co.za"; "mikero@vodamail.co.za"; "mary-jean@capechamber.co.za"; "mj@capechamber.co.za"; "mjjssj@gmail.com"; "luna@capeglobal.co.za"; "mjjssj@gmail.com"; "susandean@tiag.co.za"; "sharon@wessa.co.za"; "marketing@wessa.co.za"; "spetersen@wwf.org.za"; "andy@wessa.co.za"; "k.sink@sanbi.org.za"; "volanf@ewt.org.za"; "b.adams@webmail.co.za"; "abicshop@gmail.com"; "AHein@westcoastcollege.co.za"; "reddaisy@telkomsa.net"; "amsterdam@new.co.za"; "info@capebirdclub.org.za"; "Coldek@icon.co.za"; "keithhbharrison@lando.co.za"; "advocacy@birdlife.org.za"; "info@capebiosphere.co.za"; "jthorpe@capebiosphere.co.za"; "info@capebiosphere.co.za"; "Rynop@capebiosphere.co.za"; "sharonfebs@gmail.com"; "darlingwines@telkomsa.net"; "saligna2030@gmail.com"; "slabigh@gmail.com"; "wpvv@telkomsa.net"; "info@fossilpark.org.za"; "pjh@fossilpark.org.za"; "eco@fossilpark.org.za"; "patrick@sbidz.co.za"; "barry@anchorenvironmental.co.za"; "shandre@wcbdc.co.za"; "morgandebeer11@gmail.com"; "sbbwa.secretary@gmail.com"; "laura@sbidz.co.za"; "clairpengelly@greencape.co.za"; "gclemitson@gmail.com"; "Raphaell@salfreight.co.za"; "petroswartz@yahoo.com"; "tcebisa@seda.org.za"; "tourismmanager@sbto.co.za"; "mario.davey@angloamerican.com"; "nacawc@gmail.com"; "myburghr@caa.co.za"; "reynoldsl@caa.co.za"; "dekockr@nra.co.za"; "wisemans@sentech.co.za"; "vbaduza@sahra.org.za"; "lmalgas@sahra.org.za"; "dsibayi@sahra.org.za"; "proactive@mweb.co.za"; "bbmussel@mweb.co.za"; "alet.fabricius@bidports.co.za"; "Gert@wcbdc.co.za"; "maxwell.malan@exxaro.com"; "freyneke@harsco.com"; "nellg@idc.co.za"; "gerte@ob.co.za"; "NevilleE@cefgroup.co.za"; "gerhard.naude@petrosa.co.za"; "elsas@cefgroup.co.za"; "stephenr@cefgroup.co.za"; "elsas@cefgroup.co.za"; "stephen.ross@petrosa.co.za";

"paulc@seaharvest.co.za"; "carint@seaharvest.co.za"; "frankh@seaharvest.co.za"; "carint@seaharvest.co.za"; "nicov@seaharvest.co.za"; "Otto.Scribante@arcelormittal.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanZyl@arcelormittal.com"; "Richard.Holcroft@arcelormittal.com"; "badisaweskus@telkomsa.net"; "toni@saldanhabayoysters.co.za"; "sue@saldanhabayoysters.co.za"; "wherbst@mussels.co.za"; "bbmussel@mweb.co.za"; "info@weskussakekamer.co.za"; "franzvm@mweb.co.za"; "schalk@blueoceanmussels.com"; "kevin@ruck.co.za"; "melinda@mussels.co.za"; "nparker@xpandit.co.za"; "nick@vikingaquaculture.co.za"; "sj@vikingaquaculture.co.za"; "lbnlib@webmail.co.za"; "joan.maart@gmail.com"; "mun@saldanhabay.co.za"; "antjiev@gmail.com"; "Mun@Saldanhabay.Co.Za"; "Barnardk@eskom.co.za"; "segomoco.scheppers@eskom.co.za"; "KloppeJM@eskom.co.za"; "OctobeA@eskom.co.za"; "FranciA@eskom.co.za"; "KailasA@eskom.co.za"; "Quenton.brink@transnet.net"; "willem.roux@transnet.net"; "gail.williams@transnet.net"; "dorian.bilse@transnet.net"; 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"Adri.LaMeyer@westerncape.gov.za"; "cassi@icon.co.za"; "hvonwell@ages-group.com"; "egrobler@ages-group.com"; "helene@media24.com"; "conservationoffice@capebiosphere.co.za"; "johnselby@worldonline.co.za"; "peter.stowe@gmail.com"; "nigel.rossouw@shell.com"; "n_champion@yahoo.com"; "haf@Vitol.com"; "sbbwa.secretary@gmail.com"; "Esca.coetzee@sasol.com"; "Amitha.Maharaj@sasol.com"; "gsweto@encorex.co.za"; "daniel@ftcsaldanha.co.za"; "GertE@luckystar.co.za"; "sw@atlantiscorp.co.za"; "CARLO.Matthysen@petrosa.co.za"; "joewengrowe@afrihost.co.za"; "s.mtshali@smit.com"; "dkotze@wcdm.co.za"; "ezekiel@semona.co.za"; "zayed.brown@westerncape.gov.za"; "Wilna.Kloppers@westerncape.gov.za"; "Quentin.Jordaan@sbm.gov.za"; "jordaanquentin@gmail.com"; "keithhbharrison@lando.co.za"; "angil@westcoastmail.co.za"; "michellePR@daff.gov.za"; "bertus@mulilo.com"; "johan@westarcor.co.za"; "carol@sfgengineering.co.za"; "KristanCallaghan@hillintl.com"; "Lizette@erakis.co.za"; "s.pillay@capitalenergyresources.co.uk"; "alessandro.sessa@enel.com"; "gonzalo.ramirez@excelerateenergy.com"; "ajoubert@slrconsulting.com"; "vivcrone@vjcz.com"; "jonathan.hoffman@globeleq.co.za"; "jon.frick@globeleq.co.za"; "leila.mahomed-weideman@globeleq.co.za"; "johs@rs-africa-diving.com"; "ecostandius@slrconsulting.com"; "eloise@ccaenvironmental.co.za"; "lrathanya@acwapower.com"; "Vjmabunda@acwapower.com"; "asingh@acwapower.com"; "inc431@mweb.co.za"; "Akhona.Mbenyana@westerncape.gov.za"; "Danielle.Manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "karen@mulilo.com"; "danielalkaster@yahoo.com"; "Zharon.lady@gmail.com"; "glenmarinus1@gmail.com"; "russell@gvj.co.za"; "ftacademy1@gmail.com"; "khulatrans@telkomsa.net"; "samueladams.sa95@gmail.com"; "matroos.ian@gmail.com"; "eaglesrest2012@gmail.com"; "dawood@vusanigroup.com"; "segopotsotong@hotmail.co.za"; "altaleroux20@gmail.com"; "dicky.koekemoer@arcelormittal.com"; "jsnyders66@gmail.com"; "sauldelia2@gmail.com"; "mtalmarkes@yahoo.com"; "rsmurray66@gmail.com"; "welmariec@seaharvest.co.za"; "jackielouw4@gmail.com"; "albert.bossart@za.abb.com"; "nosipho@shindanovsolutions.co.za"; "westcoast@harcourts.co.za"; "helena.koch@absa.co.za"; "portiar@absa.co.za"; "murchelk@absa.co.za"; "Talana.Hanekom@absa.co.za"; "gavstig@mweb.co.za"; "charlene@anyskop.co.za"; "billeloff@vodamail.co.za"; "Sophia.steynberg@ppc.co.za"; "anthonymlata@gmail.com"; "nmbirch26@gmail.com"; "zain@bevline.co.za"; "Evy@bevline.co.za"; "bventer@ppc.co.za"; "gerritn@seaharvest.co.za"; "jackielouw4@gmail.com"; "mwjudyd@mweb.co.za"; "jeromevraagom@gmail.com"; "glenmarinus1@gmail.com"; "sarel.schoeman@bidports.co.za"; "info@saldanhaaccommodation.co.za"; "info@saldanhaaccommodation.co.za"; "info@saldanhaaccommodation.co.za"; "friestkj.kf@gmail.com"; "2boy.arthur@webmail.co.za"; "mathebv47@outlook.com"; "titanias@luckystar.co.za"; "anitabrooks1965@gmail.com"; "mtalmarkes@yahoo.com"; "joosteashwin@gmail.com"; "zelda.williams05@gmail.com"; "joseph.julies57@gmail.com"; "gnomma.khoi1673@gmail.com"; "natasha@mogwe.com"; "rustin@mogwe.com"; "reginald.abrahams@ppc.co.za"; "morgandebeer@gmail.com"; "dutoit12@gmail.com"; "paulinamali60@gmail.com"; "brainwavelaaiplek@telkomsa.net"; "brainwavelaaiplek@telkomsa.net"; "gasank@sisworks.co.za"; "shabier@sisworks.co.za"; "dominic@seabreezecomdev.co.za"; "Zharon@seabreezecomdev.co.za"; "barthlo@sunrise-energy.co.za"; "lvanderwalt@telkomsa.net"; "francois.vanderbank@arcelormittal.com"; "elmondo.paulse@transnet.net"; "jeff.longley@arcelormittal.com"; "colleen.daniels@arcelormittal.com"; "janh@dsp.co.za"; "sabelo.tabata@transnet.net"; "jo@vkc.co.za"; "wajdia@vkc.co.za"; "debbie@shirdanovsolutions.co.za"; "xolisa@gmail.com"; "william.mugal01@gmail.com"; "mwestld@mweb.co.za"; "btvraagom@gmail.com"; "Ettiene.s@sirollon.co.za"; "sandelmi@telkomsa.net"; "christo.vdm@vodamail.co.za"; "deon@cad-supplies.co.za"; "lours.dewet10@gmail.com"; "wyngaajo@eskom.co.za"; "PetersOw@eskom.co.za"; "michelle.herbert@advisian.com"; "MRamakulukusha@environment.gov.za"; "johan@thebe.co.za"; "LanaI@L2B.co.za"; "david.joubert@sbm.gov.za"; "John.geeringh@eskom.co.za"; "iijima@itochu.co.za"; "takahashi-e@itochu.co.jp"; "tebogo.more@gdfsuez.com"; "david@atlanticep.com"; "sonia@atlanticep.com"; "giovanni.serra@enel.com"; "taf@tirisanopartners.com"; "mluleki@mogs.co.za"; "vi-externe.truong-dinh@edf.fr"; "mike.fitzpatrick@ipp-projects.co.za"; "werner.pieterse@ipp-projects.co.za"; "ghojem@prdw.com"; "christo.vdm@vodamail.co.za"; "francois.vanderbank@arcelormittal.com"; "setho@ipcsafrica.com"; "gesie.theron@arcelormittal.com"; "Reinet.vanzyl@arcelormittal.com"; "Keithharrison@lando.co.za"; "otto.scribante@arcelormittal.com"; "helena.koch@absa.co.za"; "helene@media24.com"; "bertus@mulilo.com"; "charlene@aan.co.za"; "riaan.r@harcourts.co.za"; "louis.dewet10@gmail.com"; "sue@saldanhabayoysters.co.za"; "dirk.coetzee@duferco.co.za"; "accounts@turnerland.co.za"; "gerrit.reinertz@pamgolding.co.za"; "info@gvj.co.za"; "portiar@absa.co.za"; "chrisleroux@webmail.co.za"; "gberndsen@infrastream.co.za"; "piet.swanepoel@harcourts.co.za"; "his@yebo.co.za"; "billeloff@vodamail.co.za"; "mick@gvj.co.za";

"dennis.britz@arcelormittal.com"; "moliv@global.co.za"; "elmiendb@dsp.co.za"; "rsmurray@gmail.com"; "nevillee@cefgroup.co.za"; "richard.holcolt@arcelormittal.com"; "darryl.hunt@telkomsa.net"; "sw@atlantiscorp.co.za"; "sw@atlantiscorp.co.za"; "doug@sbidz.co.za"; "jannie@mulilo.com"; "ayoung@infrastream.co.za"; "primaplumb@gmail.com"; "sandelmi@telkomsa.net"; "btvraagom@gmail.com"; "ftacademy1@gmail.com"; "segopotsotong@hotmail.co.za"; "atmorerodgersa@gmail.com"; "khanya661@gmail.com"; "keithbharrison@landon.co.za"; "harold.schaaf@huiper.energy.co.za"; "setho@ipcsafrica.com"; "richard.holcroft@arcelormittal.com"; "jannie@mulilo.com"; "a.venzo@power-consult.com"; "louis@sandelmi.co.za"; "welmariec@seaharvest.co.za"; "dutoit12@gmail.com"; "morgandebeer@gmail.com"; "colleen.daniels@arcelormittal.com"; Lindsey Bungartz

Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Date: 15 August 2016 12:16:00 PM

Attachments: image001.png

Dear Stakeholder,

We would like to remind you that the Draft Environmental Impact Assessment Report for the proposed gas-fired power plant to support Saldanha Steel and other industries in Saldanha Bay was made available for a day 30 comment period on 22 July 2016. A public meeting was held in Saldanha to present the findings of the assessment undertaken by ERM and independent specialists . The presentation from the public meeting is now available on the project website: www.erm.com/saldanhasteel.

If you wish to comment on the report please submit your comments to us on or before 25 August 2016 using the contact details below.

Thank you for your participation.

Kind Regards

Tougheeda Aspeling
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax: 086 5404072

Tougheeda Aspeling

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2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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From: Tougheeda Aspeling **On Behalf Of** saldanhasteel.eia@erm.com
Sent: Friday, July 22, 2016 4:29 PM
To: Tougheeda Aspeling
Cc: Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support

Saldanha Steel and Other Industries in Saldanha Bay

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

This notification serves to inform you that the Draft Environmental Impact Assessment (EIA) Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 22 July to 25 August 2016.

The Draft EIA Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

We invite you to attend a public meeting where the Project Team will present the findings of the impact assessment and you will be able to raise issues and pose questions.

When: 11 August 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

Please submit your comments on the Draft EIA to Tougheeda Aspeling of ERM:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Your comments must reach ERM, in writing, on or before 25 August 2016.

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
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B9 PUBLIC MEETING

A public meeting were held at Hoedjiesbaai Hotel, Saldanha Bay 11 August 2016 to present the proposed Project.

B9.1 MEETING RECORDS

Meeting Notes

Environmental Resources Management

2nd Floor
Great Westerford
240 Main Road
Rondebosch, 7700
Cape Town

Subject/Ref	Public meeting for the Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Venue	Hoedjiesbaai Hotel, Saldanha Bay
Date of Meeting	11 August 2016
Present	See attached attendance register
Distribution	Inclusion in Final EIA
Date	15 August 2016

A public meeting was held at the Hoedjiesbaai Hotel during which the following was presented:

- Welcome and Introduction
- EIA Process and Public Participation
- Project Motivation
- Project Description
- Key Impacts and Management Measures
    - Footprint impacts
    - Process impacts
    - Safety impacts
    - Socio-economic impacts
- Discussion (Question and Answers)
- Way forward

The following representatives from the Project team were present at the meeting:

Name	**Organisation**
Gesie Theron	Saldanha Steel
Richard Holcroft	Saldanha Steel
Seth Olivier	IPCSA
Adrian Venzo	IPCSA
David Shandler	ERM
Stephan van den Berg	ERM
Nadia Mol	ERM
Lindsey Bungartz	ERM
Siya Dukashe	ERM

Meeting Notes

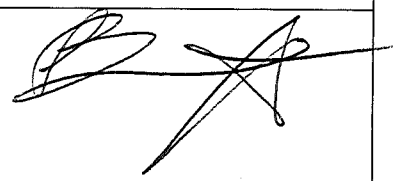
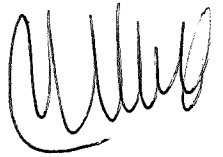
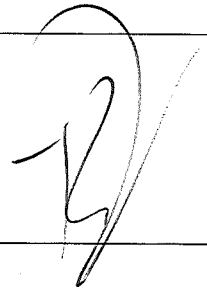
Questions	Reponses
Eugene Du Toit: • The Municipality has developed a database for upskilling people in the area and has all unemployed people registered. This database should be sought from them as it is also current.	Adrian Venzo • It is the intention of the IPSCA to have a dual function academy of technicians and employers for the power plant. • The project will source this database.
Morgan Siwisa: • How will the project address in-migration to the area and the social evils that may be linked to this.	Lindsey Bungartz: • Unfortunately the Project cannot control people that are not associated with the project (ie those who enter the area looking for work), however, awareness campaigns and school programmes will be developed to assist in mitigating this impact along with the assistance of NGOs, the Local Municipality and Civic Organisations.
Eugene Du Toit: • What is the definition of "locals" in the context of employment.	Seth Olivier: We have engaged with private groups and have discussed that construction will only start in a year after the EIA approval. Training of Saldanha locals is thus a possibility in the interim.
Keith Harrison (Avifauna) • The bird experts objective was to identify "flyways" but there seems to be no mention of that in the report. The new 400 kV line to Aurora substation was not discussed tonight. Eskom are wanting to put two new lines in. Will this be one of them?	Adrian Venzo: • The transmission line forms the scope of a separate EIA. • Consideration is been given to upgrading the conductor on the existing line rather than developing a new line.
Keith Harrison • Dust deposition and build up in the area is a serious problem. The dust is getting transported all the way to Vredenburg.	Seth Olivier: • Dust emissions are due to mainly occur during the construction phase but mitigation measures are being put in place to reduce this impact. Stephan van der Berg: • The contractor will make use of dust suppression as stipulated in the EMP, however it is likely that some level of dust will still be generated during the construction phase.
Morgan Siwisa: • Dust shouldn't be taken lightly in the area. There is currently an activist group challenging Transnet. Transnet has been around since 1973 and 43 yes later they're still struggling will the dust.	

B9.2 ATTENDANCE REGISTERS

A record of attendance from the public meeting is provided in the following Pages

Public Meeting
11 August 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Email Address	Signature
Lindsey Bungartz	ERM	Consultant	0216815400	-	lindsey.bungartz@erm.com	
Nadia Nol	ERM	Principal Consultant	"		nadia.nol@erm.com	
Atmore Rodgers	CPH - Projects CEO		0837587157		atmorerodgers99@gmail.com	
Gesie Theron	AMSA.					
Reinet v. Zyl.	AMSA.					

Public Meeting
11 August 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Email Address	Signature
MR KHANYA MANANGA	CEDERBERG GOLFERS ASSOCIATION (PTY) LTD	COMPANY ENGINEER	0719182781	0865951589	Khanya661@gmail.com	K. Mananga
MR & MRS. K.H.B HARRISON	WEST COAST BIRD CLUB	CONSERVATION	022-7133026	022-7133026	KEITHHB HARRISON @LANDX.CO.ZA.	KHHarrison
Mr. & Mrs Harald Schaaf	Linpro Energy	CEO	063 1554494		Harald.Schaaf@linpro.eng	Schaaf
Seth Olivier	IPCSA	Director	0729768462		seth@ipcsa.com	
Richard Holcroft	AMSA	GM	0834648449		richard.holcroft@arcelormittal.com	

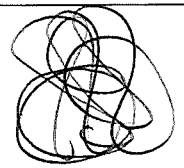
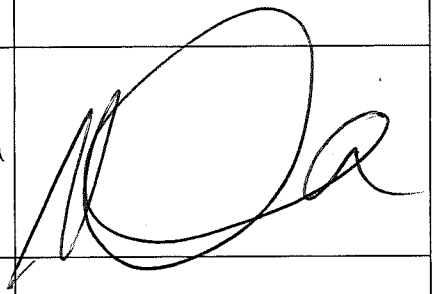
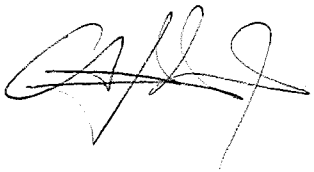
Public Meeting
11 August 2016

ATTENDANCE REGISTER

Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Email Address	Signature
Jannie Mueller	Mulilo Thermal	GM			jannie@mulilo.com	
Adrian Venzo	IPCSA P.C.		0799471152	—	a.venzo@power-consult.com	
Louis de Waal	Sandelmi		0825780594		louis@sandelmi.co.za	
Welmarié Cortez	Sea Harvest		0820790107		welmariec@seaharvest.co.za	

Public Meeting
11 August 2016

ATTENDANCE REGISTER

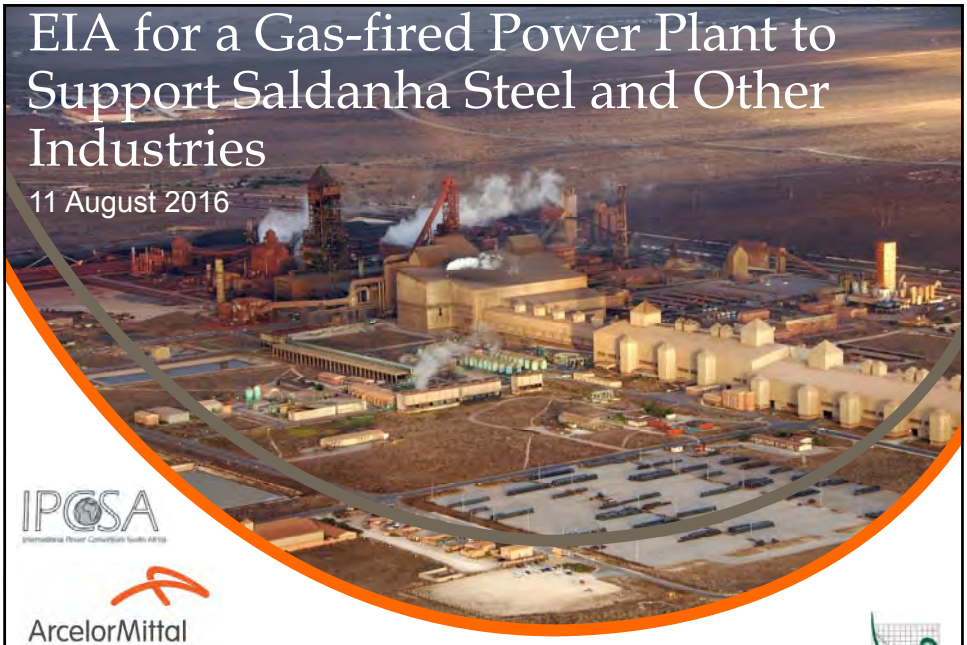
Title, First name & Surname	Organisation Name	Position in Organisation	Telephone / Cellphone Numbers	Fax Number	Email Address	Signature
Mr. E. Du Toit Engre.	Saldanha Bay Black Business Chamber.	Treasurer General	079 808 460	/	dutoitr@gmail.com	
Mr. Nganca Morgan Sinisa	Saldanha Bay Black Business Chamber	Chair Person	083 698 4980	086 515 2571	morgandebeer11@gmail.com	
Colleen Daniels	Arcelormittal Saldanha Works	Finance Manager	083 458 9367		colleen.daniels@arcelormittal.com	

B9.3 EIA PHASE PRESENTATION

A copy of the presentation given at the public meeting held on the 11 August 2016 is provided in the following pages.

EIA for a Gas-fired Power Plant to Support Saldanha Steel and Other Industries

11 August 2016



IPCSA

ArcelorMittal

ERM

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Agenda

- Welcome and Introduction
- EIA Process and Public Participation
- Project Motivation
- Project Description
- Key Impacts and Management Measures
  - Footprint impacts
  - Process impacts
  - Safety impacts
  - Socio-economic impacts
- Discussion (Question and Answers)
- Way forward

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Introduction

- Richard Holcroft (AMSA)
- Reinet van Zyl (AMSA)
- Gesie Theron (AMSA)
- Seth Olivier (IPCSA)
- Adrian Venzo (IPCSA)
- David Shandler (ERM)
- Stephan vd Berg (ERM)
- Lindsey Bungartz (ERM)
- Nadia Mol (ERM)
- Siya Dukashe (ERM)

EIA Objective

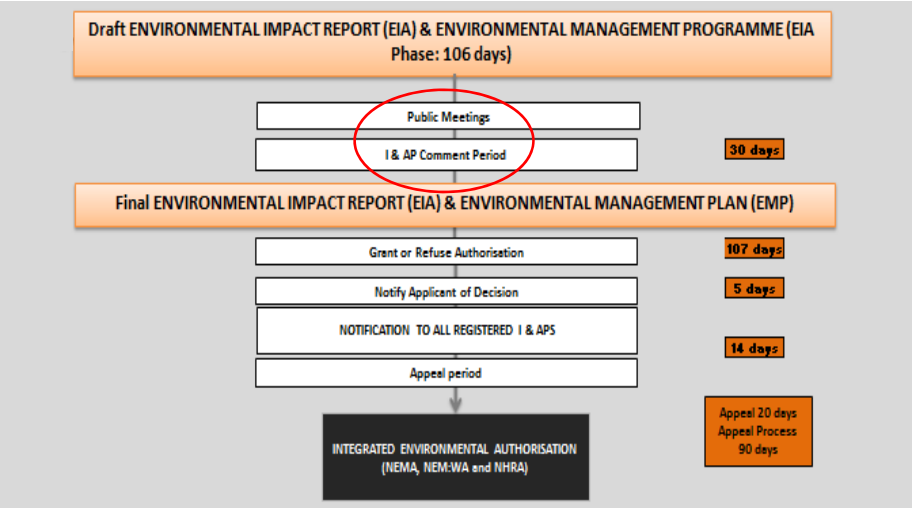
Full Scoping and EIA processes in terms of:

- National Environmental Management Act and EIA Regulations

EIA Objectives

- Assess possible positive and negative impacts identified
- Rate significance of the impacts
- Develop mitigation measures to manage negative impacts and enhance project benefits
- Enable informed decision making by DEA

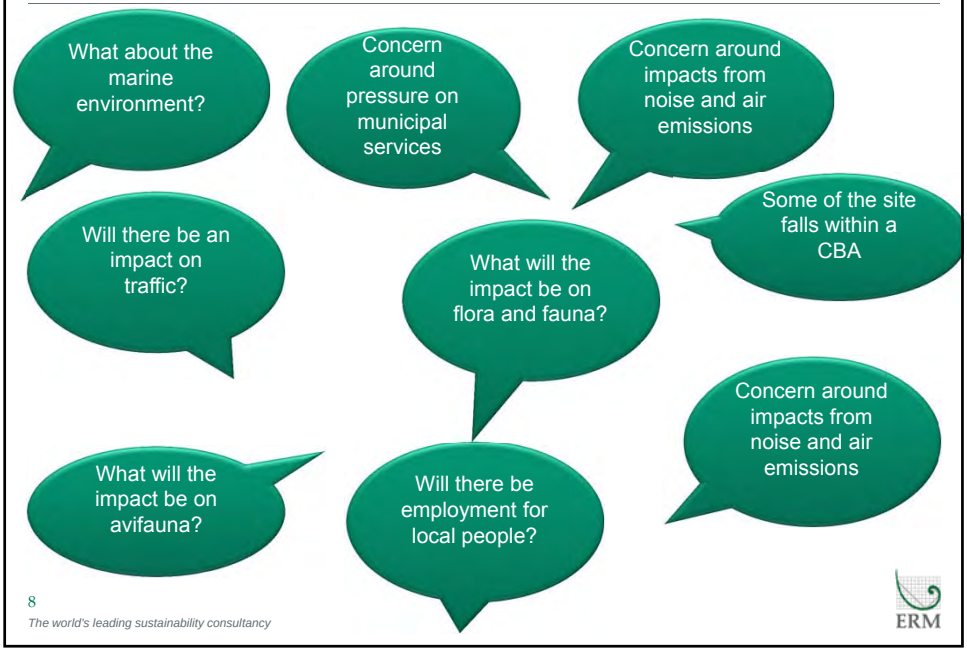
EIA Process



Specialist Studies Undertaken

- Air Quality
- Greenhouse Gas Emissions / Climate Change Risk
- Noise
- Terrestrial Ecology (Fauna and Flora)
- Traffic
- Cultural Heritage and Palaeontology
- Socio-economic
- Quantitative Risk Assessment

Public Participation



8

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Further Comment

Tougheeda Aspeling

Tel: 021 681 5400

Fax: 086 540 4072

Email: saldanhasteel.eia@erm.com

Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966

Project website: www.erm.com/saldanhasteel

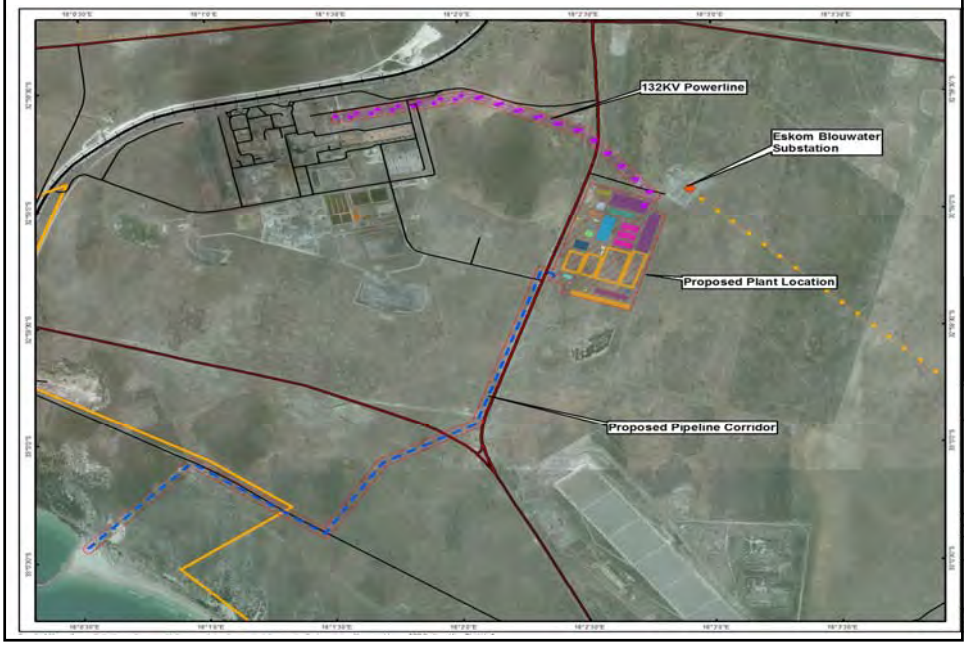
Project Motivation

- Saldanha Works is primarily export focused (East & West Africa) and faces tough competition from China, Japan and India
- Energy efficiency controlled cost through 2015, but is not enough for long term sustainability
- Secure, affordable, electricity through an independent gas fired power station would provide a solution
- ArcelorMittal South Africa & Saldanha Works has to be profitable to ensure sustainability, and maintain jobs and economic activity

Key Project Components

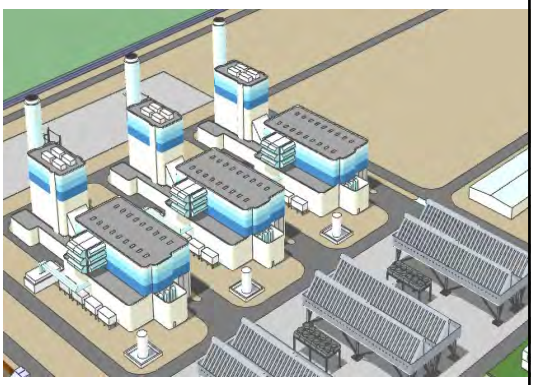
- Gas-fired power plant (~ 45 hectares)
- Natural gas pipeline (from port to site ~ 4.6 km)
- 132 kV transmission line to Saldanha Steel

Project Location



Power Plant

1 507MW installed capacity

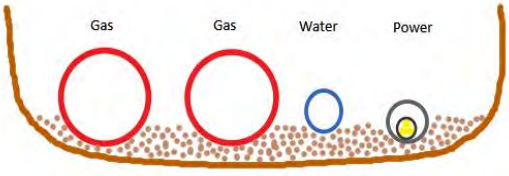


- PHASE 1
  - 6 x Trent 60 DLE (low NOx) gas turbines
  - Open cycle and dedicated to supply ArcelorMittal
- PHASE 2
  - 3 x 435 MW SCC5 4000 F single shaft generating trains in combined cycle
  - To supply other users and feed onto the national grid

Gas Pipeline and Power Transmission

Gas Pipeline

- Buried underground (3 to 4 m deep)
- Approximately 4.6 km in length
- Servitude width between 30 and 36 m

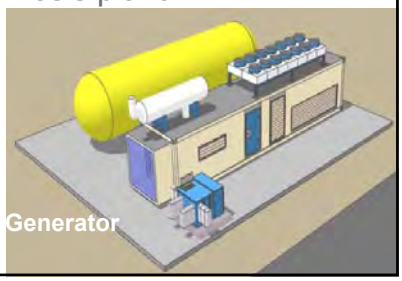


Power Transmission

- Use existing132kV line and servitude
- 200m interconnector
- 18m servitude

Other Project Components

- Initial electricity to be provided by 3 internal combustion generators running on liquid petroleum gas (LPG or propane) (stand-by emergency generators during operation)
- 500 kW solar panels on building roofs
- Access road and on-site concrete paved roads (8-12 m wide)
- Sea-water desalination / reverse osmosis plant
- 132kV & 400kV switchyard
- Rainwater treatment plant
- Fire suppression system


Generator

Other Project Components

- Sewage treatment plant
- Closed circuit air-cooling system
- Treated and untreated water tanks
- Other tanks for storage of concentrated and dilute sulphuric acid, ethylene glycol, ammonia
- Site security, fencing, surveillance and communications


Water treatment plant

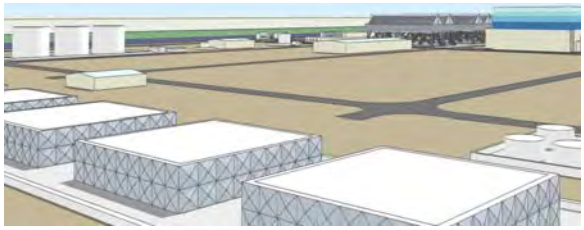

Entrance and admin building

Water Provision and Management

Project Stage	Y1	Y2	Y3	Y4	Y5
Construction (m^3)	20,000	20,500	16,500	0	16,500
Operation (m^3)	3,000	3,000	5,000	12,000	12,000

Rain and storm water stored in 5 x 2000m³ interconnected water tanks

- Fresh water brought onto site via a road tanker
- Sea-water to be used in the zero liquid discharge desalination
- Reclaimed water from the site sewage plant



Employment

Construction Phase

- 450 employment positions at the peak of construction
  - Skilled labour: 58 %
  - Semi-skilled labour: 20 %
  - Unskilled labour: 22 %

Operation Phase

- 95 employment positions
  - Skilled labour: 65 - 70 %
  - Semi-skilled labour: 15 - 20 %
  - Unskilled labour: 10 - 15 %

Similar Example: Ankerlig Power Station

Impact Assessment and Management Measures

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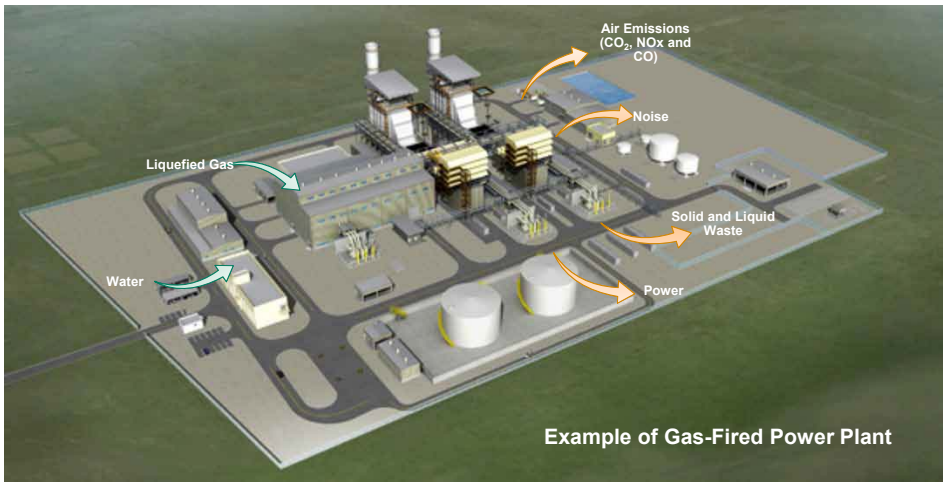
Specialist Studies Undertaken

- Air Quality
- Greenhouse Gas Emissions / Climate Change Risk
- Noise
- Terrestrial Ecology (Fauna and Flora)
- Traffic
- Cultural Heritage and Palaeontology
- Socio-economic
- Quantitative Risk Assessment

Identifying an Impact: Inputs and Outputs



Key Impacts and Management Measures

Process:

Step 1: Impact Prediction

Step 2: Evaluation of Significance

Evaluation of significance		Sensitivity/Vulnerability/Importance of Resource/ Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major
	Positive	Minor	Moderate	Major

Step 3: Mitigation

Step 4: Residual Impacts

Key Impacts and Management Measures: Project Footprint

Impact on Flora

Impact	Residual Impact
Destruction/disturbance of flora during Construction	MINOR
Destruction/disturbance of flora during Operation	NEGLIGIBLE

Key Management Measures

- Pipeline construction corridor in High and Medium – High sensitivity areas to be minimised - less than 25m wide or 30m at most
- The approved development footprint in this area must be surveyed and clearly demarcated prior to any construction
- Search and rescue programme from the Medium – High and High sensitivity areas prior to construction - use of these plants in rehabilitation of disturbed corridor
- Rehabilitation of pipeline corridor with rescued material and additional species brought in
- Ongoing alien invasive plant removal within all corridors and on site

Baseline Conditions and Impact Description

- Saldanha Limestone Strandveld habitat surrounds the pipeline footprint which has been specifically aligned to avoid these areas
- Spreeuwal dune area - pipeline

Key Impacts and Management Measures: Project Footprint

Impact on Fauna

Impact	Residual Impact
Loss of faunal habitat	MINOR
Direct faunal impacts	NEGLIGIBLE
Habitat degradation for fauna	NEGLIGIBLE

Key Management Measures

- Personnel should not be allowed to roam into the veld
- Waste and hazardous materials management
- All vehicles at the site to adhere to a low speed limit
- Environmental induction training
- Any dangerous fauna (snakes, scorpions etc) found must not be handled by the construction staff - ECO or other suitably qualified persons to remove the animals to safety
- Holes and trenches not to be left open for extended periods of time - only dug when needed for immediate construction
- Night lighting should be with low-UV emitting types which do not attract insects
- No fuelwood collection on site

Baseline Conditions and Impact Description

- Some habitat will no longer be available for use as a result of transformation or the presence of permanent infrastructure. This potentially includes the habitat for:
  - five red-listed reptiles
  - two red data-listed mammals
  - one listed amphibian

Key Impacts and Management Measures: Project Footprint

Impact on Avifauna

Impact	Residual Impact
Avifauna habitat loss	MINOR
Disturbance to avifauna	MINOR

Key Management Measures

- Measures to discourage nesting on power infrastructure if problematic
- No shooting, poisoning or harming of birds to control
- Birds already with eggs and chicks allowed to fledge chicks before nests removed
- Restricted site access
- Use of existing roads and enforcement of speed limits
- ECO to be notified of roosting, nesting or breeding sites to inform further action which may include avoiding the nests of there are eggs or chicks present
- Laydown areas to be as close to the site as possible
- Disturbance footprint to be restricted
- Existing roads to be utilised
- Briefing of site personnel

Baseline Conditions and Impact Description

- Avifauna not considered unique, but expected occurrence of numerous priority species in the study area is expected and the nearby proximity of two IBAs the site is sensitive
- The habitat unit around the site is homogenous, and does not support a high diversity and abundance of bird species
- One bird SCC – the Black Harrier *Circus maurus* – was recorded in and is known to favour this habitat unit
- There are bird migrations on both sides of the coastline of SA, but the footprint of the plant is relatively small and will not impact on bird migration patterns as a result
- The study area has been subject to varying degrees of disturbance and degradation caused by agriculture and industry, due to its close proximity to the town of Saldanha

Key Impacts and Management Measures: Process

Impact on Traffic

Impact	Residual Impact
Traffic impacts during construction	NEGLIGIBLE
Traffic impacts during operation	MINOR

Key Management Measures

- Signage and marshalling at the delivery yard and at the site entrance during construction
- A road condition survey prior to construction to gauge the damage to the road as a result of the intensive heavy traffic
- Planned turning lanes on the OP7644 are proposed for the development must be approved by the Road Authority
- Minibus taxi embayment should be provided on either side of the OP7644

Baseline Conditions and Impact Description

- Two proposed access points to the site: the northern access which is proposed on the west of the power plant off the OP7644 and the southern access (and main access) into the development via a new access road off OP7644
- Traffic levels to increase in the area of the site during the construction phase of the project
- Additional vehicle movements during peak periods are anticipated to be 450 person trips during the peak hour, or 206 cars, 14 minibus taxis and two buses
- Anticipated truck traffic is likely to be in the order of 246 trucks per day or 20 trucks per hour which equates to one every three minutes
- During operation 177 person trips during the peak hour or 80 cars, the equivalent of five minibus taxis and one bus
- The LOS of the three intersections for both phases of the project will remain categorised as Level A

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Key Impacts and Management Measures: Process

Impact on Air Quality

Impact	Residual Impact
Decreased ambient air quality during Construction and Decommissioning	NEGLIGIBLE
Decreased ambient air quality during Operation	MINOR

Key Management Measures

- Covering of vehicle loads
- Loading and unloading materials in wind-sheltered areas
- Speed restrictions on site
- Revegetation as soon as possible
- Spraying of roads to minimise dust
- Maintenance of vehicles and equipment
- Development and implementation of servicing programmes for all operational components of the facility
- Stocking of critical components to ensure the availability of spares in the event of mechanical faults

Baseline Conditions and Impact Description

Construction

- Sources of emissions are: vehicle dust entrainment, demolition, excavation, ground levelling and exhaust emissions from construction vehicles and equipment
- The construction and decommissioning activities are short lived and the pollutants are released close to ground level - - limited dispersion
- SO_2, NO_2, PM10, CO and benzene - no exceedances of the NAAQS are expected

Operation

- Combustion of LNG resulting in NO_X, CO and CO_2 emissions and some methane (CH4)
- For all pollutants the predicted ambient concentrations are well below the respective NAAQS

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Key Impacts and Management Measures: Process

Impact on Air Quality (cumulative)

Future projects may include but not be limited to:

- 1 500MW LNG power plant in the vicinity of the IDZ
- a chlorine, caustic soda and hydrochloric acid in Saldanha Bay
- a cement manufacturing plant to the east of the IDZ

Unlikely that cumulative effect will exceed the NAAQS for CO and NO2 in Saldanha Bay

Key Impacts and Management Measures: Process

Impact on Greenhouse Gas

Impact significance

- The magnitude of the Project's GHG emissions, estimated to be 4 597 761 t CO2e annually
- Phase 2 uses combined cycle technologies and has a high thermal efficiency (and low emissions intensity both in terms of what is achievable for gas-fired power plants, and also when compared to coal-fired power plants
- The emissions intensity of electricity generated by the power plant is a significant improvement on the average emissions intensity of Eskom's plants
- The Project is being developed in line with South Africa's energy policy, which (through the IRP 2010-2030) seeks to increase installed capacity to meet increasing demands on the grid, and initiate the development of South Africa's gas economy

Key Management Measures

- Identify specific measures that can be implemented in order to maximise thermal efficiency and minimise GHG intensity over time
- Potential conversion of Phase 1 gas turbines to combined cycle in the future
- Development and implementation of a combined thermal efficiency and GHG management plan
- Use of solar PV and maximise future opportunities

Key Impacts and Management Measures: Process

Impact on Noise

Impact	Residual Impact
Increase in ambient noise levels during Construction	NEGLIGIBLE
Increase in ambient noise levels during Operation	MINOR

Impact Description

Construction Phase

Operational Phase

- No exceedance of ambient guideline level (35 dBA) at any of the sensitive receptors during construction
- Noise impact will be 2500m from the development
- Change in ambient noise levels will be negligible during Phase 1 and low during Phase 2, with the 35 dBA ambient guideline being slightly exceeded (by less than 3 dBA) at two sensitive receptors
- Operational phase may impact on the ambient noise levels for an area of 3 000m from the Project site

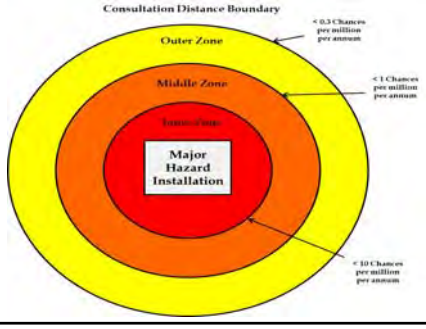
Key Management Measures

- Implement embedded noise management design requirements
- Monitoring is proposed if there are noise complaints or if people settle closer than 2,000m from the site

Key Impacts and Management Measures: Safety & Risk

Quantitative Risk Assessment

Impact	Residual Impact
Land use planning risk of propane generator during construction	NEGLIGIBLE
Individual risk as a result of propane generator during construction	MODERATE
Land use planning risk of pipeline during operation	NEGLIGIBLE
Land use planning risk of propane generator during operation	NEGLIGIBLE
Individual risk during operation	MODERATE

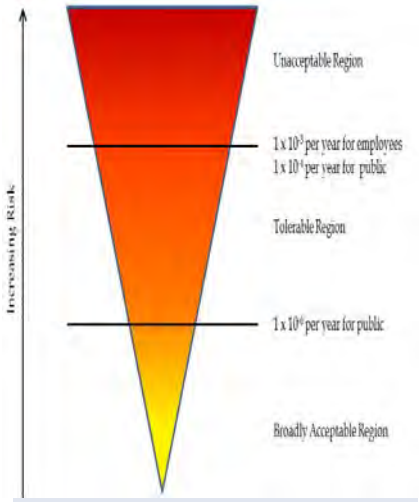


Baseline Conditions and Impact Description

Level of Sensitivity	Inner Zone	Middle Zone	Outer Zone
1. The normal working public	DAA	DAA	DAA
2. The general public at home	AA	DAA	DAA
3. Vulnerable members of the public (schools, hospitals, etc.)	AA	AA	DAA
4. Large examples of No 3 & large outdoor examples of No 2 (i.e. recreational areas)	AA	AA	AA

Key Impacts and Management Measures: Safety & Risk

Quantitative Risk Assessment



Individual Risk – Construction Phase – Outdoors and Indoors

Key Impacts and Management Measures: Safety & Risk

Land Use Planning - Operation

Key Impacts and Management Measures: Safety & Risk

Individual Risk - Operation

Key Impacts and Management Measures: Safety & Risk

Quantitative Risk Assessment

Key Management Measures

- Emergency response plan for the pipeline to be developed together with Local Authority
- All Natural Gas processing areas to be equipped with gas detectors that can initiate emergency shutdown of Natural Gas operations and even the pipelines if necessary
- All of the automatic safety systems shall be designed so that they can also be manually activated
- A Major Hazard Installation (MHI) risk assessment will be carried out after detailed designs have been completed, in accordance with the Major Hazard Installation regulations
- The pipelines will be designed to an international standard and South African standards
- Isolation valves to be located at least at either end of the pipelines but ideally at intervals such that in the event of a leak only small amounts of Natural Gas would be released
- Leak prevention systems will be installed, including leak detection systems

Baseline Conditions and Impact Description

- The pipelines to include an emergency shutdown system that will shut emergency isolation valves and depressurise the pipelines safely
- Areas of road crossing shall include specific protection measures to account for the weight from road traffic
- Off-loading of Propane shall be done on a fully-automated system to prevent overfilling and safety systems will be in place
- All installations to comply with the appropriate SANS Standard
- Recognised processes of hazard analysis processes to be completed (HAZOP, FMEA, SIL, LOPA etc.) prior to construction to ensure design and operational hazards have been identified and adequate mitigation has been considered
- Any amendments to the current design specifications are captured in amendments to the EIA and relevant specialist studies

Key Impacts and Management Measures: Socio-economic

Socio-economic Impact

Impact	Residual Impact
Employment Creation, Skills Enhancement and Local Business Opportunities - Construction	MODERATE
Employment Creation, Skills Enhancement and Local Business Opportunities - Operation	MINOR

Key Management Measures

- Recruitment policy to prioritise the employment of South African and local residents (from the Local Municipality) and promote gender equity
- All contractors will be required to recruit in terms of the Project's recruitment policy
- Meet with Local Municipality to access available skills/employment-seekers database for the area
- Advertise job opportunities and criteria for skills and experience through local media ahead of recruitment
- No employment to place at the entrance to the site

Key Management Measures

Local Procurement

- A local procurement policy will be implemented to ensure that local procurement is maximised, the policy will include:
  - Reasonable targets for using local suppliers
  - Criteria for monitoring local procurement and reporting on supplier performance management
  - Steps to communicate the criteria

Skills Development and On-the-job Training

- On-the-job performance and training monitored through performance reviews
- Training needs identified and provided by the Project
- Develop internal training 'certification' or reference letter for internal training
- Training plans for permanent employees

Key Impacts and Management Measures: Socio-economic

Socio-economic Impact

Impact	Residual Impact
Impacts Associated with the Presence of a Workforce and Jobseekers - Construction	MINOR - MODERATE
Impacts Associated with Pressure on Social Infrastructure and Services- Construction	MODERATE
Impact on Human Health due to Air Emissions and Dust Generation - Construction and Operation	NEGLIGIBLE
Increased Nuisance Factors and Change in Sense of Place - Construction	MINOR
Increased Nuisance Factors and Change in Sense of Place - Operation	MODERATE
Risk to Workers' H&S due to Hazardous Activities- Construction and Operation	MINOR

Key Management Measures

- Develop a workforce Code of Conduct for all workers directly related to the Project
- Develop and implement SEP with Grievance Mechanism, including a grievance register to be updated and maintained
- Develop and implement an HIV/AIDS policy and information document for all workers directly related to the Project

Key Management Measures

- The ability to which visual impacts can be managed is limited by the size of the facility and the industry standards
- Minimise the impact of lighting at night by:
  - Lighting should be limited to areas where it is required
  - Lights should be directional and avoid light spillage
  - Low-level lights should be used over flood lights along walkways
- Comply with applicable South African legislation in terms of health and safety, and worker rights, including workman's compensation for loss of income from an onsite incident
- Workers provided with primary health care and basic first aid at construction camps /worksites
- Provision of Personal Protective Equipment (PPE), training and monitoring as well as ongoing safety checks and safety audits

Key Impacts and Management Measures: Socio-economic

Cultural Heritage Impact

Impact	Residual Impact
Impacts to Pre-colonial & Colonial Archaeology	NEGLIGIBLE
Impacts to buried Palaeontology	NEGLIGIBLE

Key Management Measures

- Training in the nature and value of palaeontological and archaeological finds to be provided to project staff and equipment operators
- Develop and implement a chance find procedure
- Sub-surface excavations to be monitored by a palaeontologist or archaeologist with appropriate palaeontological knowledge
- If human burials, archaeological or palaeontological materials are uncovered, work must be stopped and it must be reported to the ECO and Heritage Western Cape and the Saldanha Bay Local Municipality

Key Management Measures

- An appointed specialist must access the find to determine if further study is required
- Appropriate a permits must be obtained from the SAHRA or HWC to remove any remains or fossils
- Any material recovered will be lodged in the Cenozoic collections of Iziko South African Museum

Key Impacts and Management Measures: Socio-economic

Socio-economic Impact (cumulative)

- The development of large scale industrial projects will result in increased direct and indirect employment during the construction and operation of each of the projects
- Uplift local employment directly and indirectly through the procurement of goods and services
- Expectations regarding economic development, employment and skills development will be high in the local community - if one developer does not meet expectations, there is the potential for all developers to be the target of this negative feedback

- Project alone is not expected to attract vast numbers of jobseekers, but multiple project may do so:
  - Pressure on infrastructure and services
  - Implications for community health and safety
  - Increased traffic
  - Sense of place
- Mitigation includes:
  - collaborative approach to training, employment and skills development for the local population
  - integrated traffic management plan
  - education and awareness campaigns in relation to health, safety and security

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EIA Process: Way Forward

- Draft EIA Report has been released for comment
  - **Comment can be submitted until 25 August**
- ERM will incorporate and respond to comments
- ERM will submit final EIA Report to the DEA

Registered I&APs will be notified when:

- the report has been submitted to DEA
- environmental authorisation decision is received

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Further Comment

CONTACT DETAILS: ERM CAPE TOWN OFFICE

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Thank you for your participation

Questions?

From:	Tougheeda Aspeling on behalf of ERM South Africa EIA Mailbox
To:	Tougheeda Aspeling
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Subject:	Final Reminder: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	23 August 2016 04:02:00 PM
Attachments:	image001.png

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Sir/ Madam,

We would like to remind you that the Draft Environmental Impact Assessment (EIA) Report for the proposed gas-fired power plant to support Saldanha Steel and other industries in Saldanha Bay was made available for a day 30 comment period on 22 July 2016. Your Department / Directorate has been identified as key commenting authority to provide input into the Draft EIA Report. We kindly request that your comments be sent to us on / before 25 August 2016 using the contact details below.

Kind regards,

Tougheeda Aspeling
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B11 PROOF OF DISTRIBUTION OF DRAFT EIA PHASE 2

An email was sent to I&AP's on the stakeholder database on the 16 September 2016 to inform them that the Draft EIA report was released for a further 30 days based on comments we received on the Draft EIA Report. The comment period ended on the 18 October 2016. A copy of the notification letter, as well as proof of its distribution is provided below.

Environmental Resources Management

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16 September 2016

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

The Draft Environmental Impact Assessment (EIA) Report for the Proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay was released for a 30 day comment period in July 2016. Based on comments received on the Draft EIA Report, the report has been revised and is now available for comment for a further 30 days, from 16 September to 18 October 2016, in terms of regulation 23(2) of GN No. R. 982 of 4 December 2014.

The Draft EIA Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

Please submit your comments on the Draft EIA to Tougheeda Aspeling of ERM:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Your comments must reach ERM, in writing, on or before **18 October 2016.**

Thank you for your participation in this process.

Yours sincerely
Tougheeda Aspeling
Stakeholder Engagement Consultant

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Linda Kumbemba
Tania Swanepoel
Marinda van der Merwe

A member of the Environmental Resources Management Group

From: Tougheeda Aspeling on behalf of saldanhasteel.eia@erm.com

To: Tougheeda Aspeling

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"WadeT@daff.gov.za"; "BelemaneS@daff.gov.za"; "KishanS@daff.gov.za"; "kishansankar@gmail.com"; "AsandaN@daff.gov.za"; "Centralp@dws.gov.za"; "lyonsh@dws.gov.za"; "ncampbell@samsa.org.za"; "djames@samsa.org.za"; "hesterhuizen@samsa.org.za"; "dmanley@samsa.org.za"; "mslabber@samsa.org.za"; "paseka.nku@nersa.org.za"; "selepeg@dot.gov.za"; "Wolsey.Barnard@energy.gov.za"; "Fuad.allie@energy.gov.za"; "westerncapeprovince@nda.org.za"; "hydrosan@iafrica.com"; "Ossie.Lamb@dpw.gov.za"; "frederick.johnson@dpw.gov.za"; "online2276859@telkomsa.net"; "saldanhanature@gmail.com"; "marius.venter@westerncape.gov.za"; "pieter.vanzyl@westerncape.gov.za"; "Clement.Arendse@westerncape.gov.za"; "zain.jumat@westerncape.gov.za"; "Transport.Publicworks@westerncape.gov.za"; "Lucy.Caplan@westerncape.gov.za"; "Jacqui.Gooch@westerncape.gov.za"; "Danielle.manuel@westerncape.gov.za"; "Rivaaj.Mahabeer@westerncape.gov.za"; "Alvan.gabriel@westerncape.gov.za"; "Joy.Leaner@westerncape.gov.za"; "anthony.barnes@westerncape.gov.za"; 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Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	16 September 2016 04:27:00 PM
Attachments:	image001.png

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

The Draft Environmental Impact Assessment (EIA) Report for the Proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay was released for a 30 day comment period between 22 July and 25 August 2016. Comments received have been included in the Comments and Response Report in Annex B.

The Draft EIA Report was revised, based on comments received, and is now available again for comment for a further 30 days. You are hereby requested to submit your comments to ERM, in writing, on or before 18 October 2016 on the revised Draft EIA Report. The document is available at the following locations, or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

New text added to this revised Draft EIA Report has been underlined. No other changes have been made to the document.

Comments can be submitted to Tougheeda Aspeling of ERM using the contact detail below:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Kindly note that your comments must reach ERM, in writing, on or before **18 October 2016.**

Thank you for your participation in this process.

Regards

Tougheeda Aspeling

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The world's leading sustainability consultancy

All comments received to date have been captured in a Comments and Responses Report, presented below.

West Coast
POWER SOLUTIONS

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Wierda Valley
Sandton, 2146
Tel 011 783 4815
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Attention: Gesie Theron
Project Planner: Energy & Land Development
ArcelorMittal South Africa
Saldanha Works
Private Bag X11,
Saldanha,
7395

15th September 2016

Dear Gesie

Following our numerous discussions I provide herewith our letter of intent in respect of the organic waste material from the proposed the IPCSA project.

West Coast Power Solutions (Pty) Limited ("WCPS") is a business that was established in 2009 to develop, operate and manage biogas facilities for commercial clients in South Africa. The business seeks to participate in the development of the Renewable Energy ("RE") sector or the Green Economy, as it has widely become known as, in South Africa. The business aims to provide corporate clients with a more environmentally and sustainable energy source and also a viable alternative to traditional fossil fuel energy and electricity generation.

As you will no doubt be aware we signed a long term off take agreement with ArcelorMittal South Africa Limited ("AMSA") for the development, management and ultimate supply of a Biogas Plant to its Saldanha Steel plant. The biogas production serves as an alternative to LPG currently used in the steel furnace at the Saldanha Steel Plant. The benefit to AMSA of this development is the use of a more environmentally friendly gas, more price stability and ultimately a cost benefit to AMSA.

Saldanha Bay Municipality (SBM) has been approached to provide the organic feedstock (municipal solid wet waste) for the proposed Saldanha Biogas Plant to be erected at AMSA's Saldanha Plant.

It is our firm intent to supplement the SBM feedstock with additional feedstock streams from the surrounding Saldanha area. In this regard we would be interested to receive all the organic waste including all municipal solid waste and sewerage waste as part of your disposal plans for the proposed IPCSA project. We hope to be able to finalise with you in due course the volumes of such organic waste streams.

I look forward to concluding our discussions and being able to finalise our agreement in respect of the above.

Kind regards,

Niezaam Davids

Director

	Saldanha Steel Gas Fired Power Plant					
	Comments and Responses Report: Initial Notification Phase					
	Name	Organisation	Date	Comment Type	Comment	Response 1
	Comments Received during Initial Notification Period					
	Benice Rossouw	Saldanha Bay Municipality	22.01.2016	Register	Hope you are well, best wishes for 2016. Please be informed that Dr Louis Scheepers will be attending.	Thank you for your email. Looking forward to seeing Louis Scheepers on the 16 February 2016.
	Mlu Majola	MOGS	22.01.2016	Register	I would like to RSVP for this hearing.	Thank you for email. You have been added to our I&AP Database. We look forward to seeing him on the 16 February 2016.
	Daniel Alkaster	Sea Breeze Community Development	22.01.2016	Register	Please register Z. Damonse	Thank you for your email. You and Zharon have been added to our I&AP Database.
	Piet Fabricius	West Coast District Municipality,	22.01.2016	Register	Please register West Coast District Municipality, PO Box 242, Moorreesburg, 7310. email: westcoastdm@wcdm.co.za as commenting authority.	Thank you for your email. You have been added to our I&AP Database.
	Karen Low	Mulilo Renewable Project Developments	22.01.2016	Register	Please can you register me as an I&AP for the abovementioned project.	Thank you for your email. You have been added to our I&AP Database.
	John Selby		22.01.2016	Register	Please keep me on the list of I&AP's for this project.	Thank you for your email. You have been added to our I&AP Database.
	Frank Pronk	Ward Councillor	22.01.2016	Register	Thank you for the notification of the EIA relating to the Gas fired power station. As Ward Councillor and Portfolio chair for strategic planning I register as an I& AP .	Thank you for your email. You have been added to our I&AP Database.
	Andre Steyn	VFX Guy	22.01.2016	Socio-Economic Impacts	Sounds good. How many skilled and unskilled jobs will this project create? and when do the intend to start building the gas power plant?	Early estimates show that the development phase will employ 45 people (35 Skilled and 10 unskilled). During the construction phase we expect a total of 600 employees (250 Skilled) and during operational phase 170 total employees (107 Skilled and semi-skilled. 63 unskilled).
	Sandile Mtshali	Smit Amandla	22.01.2016	Register	Thank you for your e-mail. I am not sure whether we need to register again seeing that we are already receiving notifications from your side. Nonetheless, kindly receive attached our completed registration form for your records.	Thank you for your email. You have been added to our I&AP Database.
	Andre Wicht	Blue Bay Lodge	22.01.2016	Register	Attached please find the registration form for Mr A Wicht from Blue Bay Lodge. He would like to attend the public meeting on the 16th of February 2016.	Thank you for your email. Andre have been added to our I&AP Database. We look forward to seeing him on the 16 February 2016.
	Akhona Mbenyana	Department of Transport and Public Works	22.01.2016	Register	As per our telephonic conversation earlier on , the Department would like be registered as an I&AP for Saldanha Steel EIA process. Please add us to your stakeholder database and provide updates, information during the process.	Thank you for your email. You have been added to our I&AP Database.
	Adri La Meyer	Department of Environmental Affairs and Development Planning	22.01.2016	Register	Thank you for your e-mail. Please register the Department of Environmental Affairs and Development Planning as a state Department having an interest in the application.	Thank you for your email. You have been added to our I&AP Database.
				Register	Could you please provide us with 1 hard copy and 2 electronic copies of the Draft Scoping Report (DSR) once it is available for public comment? Please address the DSR to the Directorate: Development Facilitation, who will collate the comments from all relevant directorates in the Department.	Noted
				Air Emission	It is further noted that an AEL and/or WML authorisation may be required. In this regard, your attention is drawn to Section 36(5)(d) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) which states that the National Minister of Environmental Affairs is the licensing authority if "the listed activity relates to the activities listed in terms of section 24(2) of the National Environmental Management Act, 1998, or in terms of section 19(1) of the National Environmental Management: Waste Act, 2008, or the Minister has been identified as the competent authority."	Thank you for your comment. In terms of the South African regulations, there are a number of relevant laws that have environmental authorization implications for the Project. The present process addresses the authorization requirements in terms of the National Environmental Management Act (No. 107 of 1998) and EIA Regulations (GNR R982/2014). At present the waste generated by the project will not require a permit in terms of the National Environmental Management: Waste Act of 2008. Further permitting may be required in terms of, amongst other, the National Environmental Management: Biodiversity Act (No. 10 of 2004); National Environmental Management: Air Quality Act (2004) and National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008). These permits and licenses will be applied for at a later stage.
	Donald Matjuda	Eskom Holdings SOC LTD: Distribution Division	22.01.2016	Register	Eskom would like to register as interested and affected party for this project.	Thank you for your email. You have been added to our I&AP Database.
				Project Layout	The proposed activity should not compromise Eskom's asset integrity - both the line and the substation.	Thank you we take note of your concern. The project will not compromise the asset integrity for either the lines or substation.

				Project Layout	The proposed activity should meet the minimum restrictions - not within 100metres (rough estimate) of the line and sub.	The final design is still not completed and this will be taken into consideration
				Project Layout	Its buffer should not encroach on Eskom's operational and maintenance activities.	Agreed and noted
				Project Layout	Eskom should be able to have full access to its infrastructure without any hindrances or hurdles.	Agreed and noted
				IPP	Could I ask if this project is an IPP or not?	This project is an IPP, however is a private power project
	Willem Roux	Transnet National Ports Authority	22.01.2016	Technical	The LNG import and re-gasification terminal, as well as pipelines, will be located within the Port of Saldanha. A Terminal Operator licence/agreement to operate the terminal must be issued in accordance with Section 56 of the National Ports Act. The location of the LNG Terminal and pipelines must be aligned to the Port Development Framework Plan.	Thank your for your response and participation. We take note of your comment and are aware of the South African regulations and we will comply.
	K.H.B. Harrison	West Coast Bird Club	24.01.2016	Register	Please register the West Coast Bird Club as an Interested and Affected Party (IAP) to the above project.	Thank you for your email. You have been added to our I&AP Database.
	Kaashifah Beukes	SBIDZ	25.01.2016	Register	Please accept my reply as confirmation of attendance at the public meeting scheduled for the 16th February in Saldanha Bay. Representatives from the SBIDZ will be myself and my CEO, Mr Doug Southgate (cc'd herein).	Thank you for your email. You have been added to our I&AP Database. We look forward to seeing him on the 16 February 2016.
	Ryno Pienaar	Cape West Coast Biosphere	25.01.2016	Register	Thank you for the information. Please see that we are registered and receive documents as the process follows suite.	Thank you for your email. You have been added to our I&AP Database.
	E. Eloff	All Billboards Solutions. Trans African Murals	25.01.2016	Register	Please find attached registration for Mr Bill Eloff.	Thank you for your email. You have been added to our I&AP Database.
	Dorian Bilse	Transnet National Ports Authority	25.01.2016	Register	Please register me as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	Gerhard Bekker	Sarens	25.01.2016	Register	The attached Registration and Comment Sheet for the EIA – Gas Fired Power Plant, Saldanha, refers. Please find attached the completed form for your kind attention. Please indicate whether you require further information in this regard.	Thank you for your email. You have been added to our I&AP Database.
	Elmien de Bruyn	Duferco Steel Processing	25.01.2016	Register	Could you please formally register me as an Interested and Affected Party for the EIA process regarding the gas-fired Independent Power Plant at Saldanha Steel – see attached form for details.	Thank you for your email. You have been added to our I&AP Database.
	Anita Brooks	Elmada Clothing (Pty) Ltd	25.01.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Andre Dart		25.01.2016	Register	Could you please be so kind to forward the contact details of IPCSA to me so that I can obtain some more detailed information from them concerning the proposed CCGT plants they are proposing to erect and operate at Saldanha Steel. This is required in preparation for 16 Feb'16 public meeting.	Thank you for your email. You have been added to our I&AP Database.
	Glenville Marinus	West Coast Project Management and Investment	26.01.2016	Register	Please register as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	Marlan Mouton	Hybrid Capital Investments	26.01.2016	Register	I am interested in registering for this. Please can someone assist or indicate what is required.	Thank you for your email. You have been added to our I&AP Database.
	Sofia Wagner	Ferro Marine Africa Pty Ltd	26.01.2016	Register	Ferro Marine Africa Pty Ltd (FMA) is the lease holder of TNPA property being 220 000m² of Portion 12 of Pienaarspoort 197. This lease runs until 2022 +15 years. As this Gas-fired Power Plant is proposed for the port of Saldanha, it is in close proximity of FMA's facility and thus we would like to register as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	André Pieters		26.01.2016	Register	I would like to be registered as an I&AP in the above project. Kindly add me to your database	Thank you for your email. You have been added to our I&AP Database.
	Wayne Glossop	Wärtsilä South Africa	26.01.2016	Register	Please find attached Wartsila's intent to be registered as an 'interested and affected party' for the EIA for Saldanha Steel.	Thank you for your email. You have been added to our I&AP Database.
	Neville Ephraim	CEF Group	26.01.2016	Register	Please register me as an I&AP for this project.	Thank you for your email. You have been added to our I&AP Database.
	Kristan Callaghan		27.01.2016	Register	Thank you for the update. Please may you reserve a seat for my colleague, Chris Klement (copied herein) and myself for the public participation process on 16 February 2016.	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.

	Alana Duffell-Canham	Cape Nature	28.01.2016		The site has been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine-scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by Cape Nature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat). A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be endangered, is considered to have a high negative impact. A biodiversity offset may need to be considered for this project.	Thank you for your comment. Vegetation which is considered to be endangered has been identified during a field survey undertaken by a botanical specialist. These areas will be marked as No Go for development.
					A detailed botanical study must be conducted on site in the appropriate season (late winter - early spring) especially as there are known localities of Species of Conservation Concern (SCC) close to the site.	A botanical assessment was undertaken of the proposes power plant site during August 2015.
					Cumulative loss of habitat in the Saldanha area as a result of all industries and associated infrastructure such as roads and powerlines are of very high concern and must be considered in depth.	Your comment is noted. A botanical constraints map of the area was prepared by the botanical specialist subsequent to the field survey. This map will be used when undertaking route planning and selection for linear infrastructure such as pipelines, roads and powerlines.
					Water use and disposal of waste water is also of high concern and should be discussed in detail.	Please refer to Section 3.6 of this draft Scoping Report which deals with water demand for the project. Waste management and disposal will be discussed in more detail during the EIA phase.
	Alet Fabricius	Environserv	28.01.2016	Register	Kindly register me as an I&AP for the EIA for a Gas-fired Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay.	Thank you for your email. You have been added to our I&AP Database.
	Helene Meissenheimer (Uys)	Weslander	29.01.2016	Register	I am the editor of Weslander, the local newspaper for the Saldanha Bay area, and I want to register as an interested and affected party for proposed gas-fired power plant at ArcelorMittal Saldanha Works.	Thank you for your email. You have been added to our I&AP Database.
	Chrizelle Kriel	Department of Environmental Affairs and Development Planning	29.01.2016	Register	Me, Chrizelle Kriel and Kobus Munro as Director from the Spatial Planning Directorate would like to attend the public meeting on 16 February.	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Michael Madangatya	Khula-Khula Transport Services	31.01.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	S.J. Poggenpoel	West Coast Aquaculture	01.02.2016	Register	Please register as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Faith Filtane	Filtane Training Academy (Pty/Ltd)	04.02.2016	Register	I trust my email finds you well. My name is Faith Filtane, 25 owner at Filtane Training Academy (Pty/Ltd). I would like to attend the public meeting of the Gas power plant that will be held at Saldanha Bay Hoedjiesbaai Hotel. I, Faith Filtane will be attending with Joe Maswanganye and Lathiswa Vato.	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Russell Sabor	GVJ Electrical & Instrumentation Contractors (Pty) Ltd	04.02.2016	Register	I would like to RSVP for the Public Meeting being held on the 16 February at Hoedjiesbaai Hotel.	Thank you for email. You have been added to our I&AP Database. I have also attached the Background Information Document for your attention.
	Samuel Adams		04.02.2016	Register	I am interest in the Massive gas-fired power plant Saldanha	Thank you for your email. You have been added to our I&AP Database.
	Marilyn Matroos	M and IM Contracting	04.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Graeme Clemitson		04.02.2016	Register	Please register Saldanha Bay Trading on this email address.	Thank you for your email. You have been added to our I&AP Database.
					What is the status of the marine EIA.	The Department of Energy LNG Import Facility EIA has been delayed, all I&APs will be kept informed throughout the EIA, and you will be notified will further information is available.
	Dawood Shabudin	Vusani Engineering	05.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Segopotso Elvis Tong	SE Tong (Pty) Ltd	05.02.2016	Register	I see this project as a good business opportunity for us local entrepreneur. It will bring long term employment for our local community	Thank you for your email. You have been added to our I&AP Database.
	Alta Le Roux	Constansia Engineering	05.02.2016	Register	As per our telephonic discussion today we would like to RSVP and register for gas-fired power plant for Saldanha.	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Kaashifah Beukes	Saldanha Bay IDZ	05.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Glenville Marinus	West Coast Project Management and Investment	05.02.2016	Register	The meeting of 28th January 2016 at Arcelor Mittal science centre at Vredenburg were the most promising and positive	Thank you for your email. You have been added to our I&AP Database.
	Dicky Koekemoer	ArcelorMittal South Africa	05.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.

	J Snyders		07.02.2016		What is the process to apply for a job for this upcoming project? It you can just let me know please.	Thank you for interest, we will be in contact with you.
	Amos Saul		08.02.2016	Register	I will please register me for the public meeting coming up on 16 February I'm please to hear from u for confirmation	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Mikne Talmarkes	Made for Made Cleaning Services	08.02.2016	Register	Please register me as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	Richard Murray		08.02.2016	Register	Hi I would like too book a place for 2 people Saldanha Hoedjiesbaai Hotel for 16Feb 17h30.	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Mrs W. Coetzee	Sea Harvest Corporation	08.02.2016	Register	Please register me as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	Jackie Louw	West Coast Maintenance and Civils: Vendor NO. 11618899	08.02.2016	Register	Please register me as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	Albert Bossart	PP-PPVA-Sub-Sahara-Region	09.02.2016		Please let me have as discussed a minute ago the background information for the project so I can better assess the status and timeline of the power plant. If you have an agenda for the public hearing I would appreciate. I could then ask a colleague from our Cape Town office to attend. The question from my side at this stage of the announcement – is this a project for the upcoming RFI for Gas Plants in South Africa or will this be a private initiative?	Thank you for your email. You have been added to our I&AP database. Please find attached as you requested the Background Information Document and also the invitation to the public meeting taking place on the 16 February 2016.
	Nosipho Ndzakane	Shinoanov Solutions (Pty) Ltd	05.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Doretha Kotze	West Coast District Municipality,	11.02.2016	Register	Please register the West Coast District Municipality as and I&AP. Documentation to be sent to Municipal Manager: Mr HF Prins - hfprins@wcdm.co.za. West Coast DM: Westcoastdm@wcdm.co.za	Thank you for your email. You have been added to our I&AP Database.
	Beatrice Landsberg	Harcourts	11.02.2016	Register	We would like to attend this public meeting. Is there any forms that we need to complete or cost involved?	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Helena Koch	Absa	11.02.2016	Register	Please note that Helena Koch, Portia Reinertz and Talana Loots from Absa as well as Gerrit Reinertz from Pam Golding will attend the Public meeting on the 16th of February 2016. I trust you will find the above in order.	Thank you for your email. You have been added to our I&AP Database. Looking forward to seeing you on the 16 February 2016.
	Michelle Pretorius	Department of Agriculture and Fisheries	12.02.2016	Register	Please register me as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	Gavin Stigling	Advanced Projects	12.02.2016	Register	Please register me as an I&AP.	Thank you for your email. You have been added to our I&AP Database.
	E.H Eloff	All Billboard Solutions Trans African Murals Newco Ltd	12.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Stefano Papale	FATA EPC – Division of FATA S.p.A.	12.02.2016		My name is Stefano Papale from FATA EPC, EPC company involved in the 2 peaking power plants AVON&DEDISA. We would like know more about this project and in case how to be considered as potential EPC	Thank you for interest, the developer will be in contact with you.
			15.02.2016		Can we have more info about this project and how to be considered as EPC for this Project.	Thank you for interest, the developer will be in contact with you.
	Jaco Joubert	PPC Ltd	17.02.2016	Register	Please register me as an I&AP	Thank you for your email. You have been added to our I&AP Database.
	Comments and Questions from Public Meeting					
	Faith Faltane	Faltane Training Academy	16.02.2016	Public Meeting	Does the Project Description include the job creation specifications, will the skills required be sourced from local municipalities (Vredenburg, Saldanha, Paternoster, Langebaan, etc.)	There will be local recruitment and skills required will have a factor in recruitment, suggestions can be made as to how the local community can be trained in due time to acquire the skills needed.
	Dirk Coetzee	Duferco Steel Processing	16.02.2016	Public Meeting	Licensing with regards to Transnet to get the gas onshore (DOE & Transnet contracts	The DOE & Transnet are not sure as to the timeline for licensing/contracts, this is because a RFP and PPP process needs to be followed by respective companies. Transnet has an operating license which has different options within it.
	Sue Jackson	Mussel & Oyster Farming	16.02.2016	Public Meeting	With regards to another Floating Power Plant being proposed, how does that integrate with this one and are there direct links?	In as much as there is synergy in the two projects in due course, this project is specifically for the onshore Gas to Power for Saldanha Steel and other industries
	Darrel Hunt	Oil and Gas Consultant	16.02.2016	Public Meeting	Has there been engagement with Eskom with regards to the grid capacity, will an upgrade be needed and / or is there a connection?	Engagement with Eskom is ongoing
	Frank	iGas	16.02.2016	Public Meeting	Has a legal and regulatory review been done by a specialist	A administrative framework for the project will form part of the EIA which focuses of the legal requirements of the Project. A separate specialist legal review will not be undertaken
	Keith	to check register	16.02.16	Public Meeting	Has ERM appointed a specialist study on avifauna as the area above the Arcelor Mittal site is a important flight path for birds. More specifically, there is a need to understand flight paths at night using radar.	A avifauna specialist study will be undertaken as part of the fauna specialist study

	Nicky (to check register	Weslander	16.02.16	Public Meeting	The timeline is critical, therefore is it realistic w.r.t EIA because EIA's can take up to a year to complete	Work on the Project began in September. This is a scoping process and the work done by ERM is typically not linear but rather parallel, therefore work on EIA will continue. ERM is confident that they can undertake the EIA process within the regulatory and project specific timelines.
	Justine Wyngaardt	Eskom: Western Cape Operating Unit	23.02.2016	Register	Kindly register Eskom Distribution: Land Development & Environmental Management, Western Cape Operating Unit as I&AP on the EIA for Gas-Fired IPP to support Saldanha Steel and other industries in Saldanha Bay project, represented Justine Wyngaardt (Environmental Management) and Owen Peters (Land & Rights).	Thank you for your email. You and Owen have been added to our I&AP Database.
	Michelle Herbert	Advisian	24.02.2016	Register	Please register me as an IAP	Thank you for your email. You have been added to our I&AP Database.
	Ramakulukusha Moses	Department of Environmental Affairs: Coastal Conseravation Strategies	01.03.2016	Register	Can I please be emailed the Draft EIA Report.	The Draft Scoping Report is not available for comment yet. I have added you to our database so that when the report is available for comment you will receive a notification from me.
	Comments Received on Draft Scoping Report					
	Sagar Sharma	Daewoo International Corp.	03.03.2016	Register	As you mentioned on the 3 upcoming projects, we are interested on each of the below projects: - Richards bay Gas to power, - Saldanha Gas to Power , - AMSA Gas- Fired. We are interest to participate in these project where we can see a viable opportunity for cooperation. We have specialised companies within our group, namely Daewoo International, Posco energy and Posco E&C for power project organisation, EPC construction and O & M maintenance. Please can you send us more information on the 3 project you mentioned. Thereafter if you can refer us to the right people per project so we can engage in further discussions.	Thank you for your email. You have been added to our I&AP Database for all three Projects. Further information will be provided in the EIA. Your service offerings have been passed on to the Project Team.
	Adri La Meyer	Department of Environmental Affairs and Development Planning: Noise and Dust Management	04.03.2016	Air and Noise Emissions	It is expected that dust and exhaust emissions will be generated during the construction phase of the proposed development, which could be a potentially significant impact. The National Department of Environmental Affairs (DEA) gazetted the National Dust Control Regulations on 1 November 2013 (GN No. R. 827) in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA), which must be adhered to. These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fall, may have a detrimental effect on the environment, including health.	The EMPr contains dust management measures and all contractors will be obligated to comply with the EMPr during construction, operation and decommissioning.
				Air and Noise Emissions	Noise generated during the construction and operational phases of the development must comply with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013.	The EMPr contains noise management measures which will comply with local by laws and legislation.
				Air and Noise Emissions	Contractors must implement noise reduction measures, which must be addressed as part of the Environmental Management Programme.	The EMPr contains noise management measures and all contractors will be obligated to comply with the EMPr during construction, operation and decommissioning.
		Department of Environmental Affairs and Development Planning: Odour emission impact management	04.03.2016	Air and Noise Emissions	In terms of Section 35(2) of the NEM:AQA, the applicant must take all reasonable steps to prevent the emission of any offensive odour caused by any activity on the premises.	Noted, it is not anticipated that the Project will cause offensive odours.
		Department of Environmental Affairs and Development Planning: Air emission listed activity	04.03.2016	Air and Noise Emissions	The proposed operation triggers the following atmospheric emission listed activities identified in GN No. 893, promulgated in terms of Section 21 of NEM:AQA, being Category 1 (Combustion Installations), Subcategory 1.4 (Gas Combustion Installations) which is described as "Gas combustion (including gas turbines burning natural gas) used primarily for steam raising or electricity generation" and is applicable to "All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used." The proposed installation must comply with the Minimum Emission Standard as listed under the above-mentioned subcategory.	Noted, the facility will comply with Minimum Emission Standard as listed under Subcategory 1.4 of NEM:AQA.
	Ramakulukusha Moses	Department of Environment Affairs	07.03.2016	EIA Process	Could you please kindly email me a copy of the available report.	A copy of the Draft Scoping Report was supplied as requested.

	Sagar Sharma	Daewoo International Corp.	09.03.2016	Register	Further to my mail below, please could you furnish us with the 3 contact points of the individual project owners, so we may propose mutual cooperation for investment or development.	Thank you for your email. You have been added to our I&AP Database. Your service offerings have been passed on to the Project Team.
	Christo van Wyk	SBWQFT	09.03.2016	EIA Process	In Chapter 5 – Environmental and Social Baseline chapter, it is mentioned that an Area of Impact (AOI) will be the Port of Saldanha. Although mentioned as an area of Impact, the marine environment is excluded from your scoping report in total. It is suggested that in chapter 7 under heading Impacts and risks the following is addressed. This proposed project will increase shipping traffic in the Saldanha Bay marine environment, currently alien species infestation is a huge problem in the marine environment. The increased shipping due to gas transportation for the power station would potentially contribute to the alien impact in the bay and should be included in your EIA report.	The inclusion of the Port of Saldanha in the Area of Influence was done in error and has been amended. This EIA is for the Power Plant, Pipeline and Transmission line only and does not include the marine component. The marine component will be dealt with in a separate EIA (either by the developer or the DoE LNG import EIA).
				Port Related Issues	It is recommended that the DEADP proposed generic Environmental Management Plan – Construction and Operational Phase (EMP) that is due for any project that would trigger increased shipping in Saldanha Bay should be applicable in this case and it is suggested that the EIA addresses this environmental risk.	Please see above response.
	Keith Harrison	West Coast Bird Club	14.03.2016	Impact on Avifauna	Site selection The preferred site B lies across one of the main flyways for water birds and migrant waders, travelling between St. Helena Bay/Lower Berg River and Langebaan Lagoon. For periods of the year thousands of Kelp Gulls commute daily through the site. The route is Western end of the SFF Oil Tanks, East of Orex, Vredenburg landfill site and the switching yard (gravel road) at the corner where the St. Helena Bay road joins the R399 approximately longitude 18.03 east. In order to accurately determine this narrow route, a Radar survey would be necessary because migrant waders and water birds fly at night. A simple mitigation would be to move the Western boundary towards the Eastern boundary to miss the flyway, possibly about 100 metres.	Thank you for your input. A faunal specialist undertook a study as part of the EIA, the findings of which are presented in Chapter 10 of the EIA, and the Specialist Report has been included in Annex D.
					Power evacuation and connection to the Grid An avian impact analysis should be carried out into the effect of an increased number of power lines in the area, especially the proposed 400kV line to the Aurora Switching Station. There are currently 5 large power lines using the servitude, also the effect at Aurora with additional lines going in and out.	A faunal specialist undertook a study as part of the EIA, the findings of which are presented in Chapter 10 of the EIA, and the Specialist Report has been included in Annex D.
				Waste Management	Excavated material from levelling of site and foundations, where is it proposed to dispose of this material?	Spoils from excavations will be used as backfill as far as possible. Excess spoils will remain on Saldanha Steel land.
				Traffic Impacts	Site Traffic How many traffic movements are expected, in and out of the site during construction, and the effect upon local road infrastructure? The vehicles used by the developer, contractors and sub-contractors should be registered with the Vredenburg Traffic Department so that some of the licence fee may be used to defray costs of damage to road infrastructure.	Further detail around vehicle movements are included in Chapter 3 EIA and a Traffic Impact Assessment has been included in Annex D. This suggestion is noted.
				Socio-Economic Impacts	Labour employed There is no breakdown of the labour to be sourced during construction and production into:- Skilled – to be brought in by contractors. Semi-skilled – to be sourced locally. Unskilled – to be sourced locally.	A breakdown of the labour requirements is provided in Chapter 3 of the EIA.
				Socio-Economic Impacts	Contractors and Sub-contractors should target employing 90% semi-skilled and unskilled labour that has 5 years proven residence in the Saldanha Bay Municipal Area.	Saldanha Steel are committed to local employment and in 2014 and 2015, 73 % of new recruits were employed from local community. An employment and procurement plan will be developed for the Project which will promote the recruitment of local residence. Further information in terms of local employment will be provided in the EIA.

	Dave Watson	Enermech	14.03.2016	Register	Services - Valve supply and service. Industrial services, rope access, Cranes and lifting, LTI Inspections and lead test. Hydraulics, Instrumentation Supply and Install,	Thank you for your email. You have been added to our I&AP Database. Your service offerings have been passed on to the Project Team.
	Adri La Meyer	Department of Environmental Affairs and Development Planning	14.03.2016	EIA Process	It is not clear whether the Application Form for S&EIR has been submitted to the National Department of Environmental Affairs. Kindly indicate whether the Application Form has been submitted and provide the Department with the DEA reference number.	The Application Form was submitted to the DEA. They received the Application on 22 February 2016 and had assigned the following reference number: DEA Ref: 14/12/16/3/3/2/910
				EIA Process	It is noted that the commenting period on the Scoping Report (unsure whether this is a pre-application or Draft Scoping Report) is for 30 days from 4 March 2016 to 6 April 2016. Kindly confirm whether the public holidays have been excluded from the commenting period as per the 2014 EIA Regulations. Regulation 3(1): Subject to sub regulations (2) and (3), when a period of days must in terms of these Regulations be reckoned from or after a particular day, that period must be reckoned as from the start of the day following that particular day to the end of the last day of the period, but if the last day of the period falls on a Saturday, Sunday or public holiday, that period must be extended to the end of the next day which is not a Saturday, Sunday or public holiday. Regulation 3(5): Where a prescribed timeframe is affected by one or more public holidays, the timeframe must be extended by the number of public holiday days falling within that timeframe.	We confirm that the calculation of the 30 day comment period did take into account the 3 public holidays that fall within the period.
	Al Hardwick	ConocoPhillips Europe	14.03.2016	Register	Please register our interest as an Interested and Affected Party and provide us with further information during the EIA process (application form attached).	Thank you for your email. You have been added to our I&AP Database.
					In short, ConocoPhillips is one of the world's largest producers of LNG and we've been recently studying the potential gas demand growth in South Africa. I'd be very grateful if you could offer me further information or put me in touch with the project manager for the IPCSA project at Saldanha Bay. Our main interest is in the potential provision of a Gas Supply Agreement and integrated FSRU solution.	Thank you for your email. You have been added to our I&AP Database. Your service offerings have been passed on to the Project Team.
	Craig Vaughn	ConocoPhillips Europe	21.03.2016	Register	ConocoPhillips is the world's largest independent exploration & production company that is headquartered in Houston, Texas. Part of our value proposition includes the participation in numerous LNG projects across the globe (please see attached pdf). Our company has a long history of supplying LNG to the marketplace and we are interested in learning more about your future LNG needs in Saldanha Bay. Can you please consider sharing the contact of the individual whom I may discuss ideas F133 concerning future LNG supply arrangements?	Thank you for your email. You have been added to our I&AP Database. Your service offerings have been passed on to the Project Team.
	Anthony V Mlata	Cederberg Golfers Association	22.03.2016		Saldanha Bay Municipality has over the years transformed from an Agriculture and Fishing community to an Industrial and Manufacturing community. Yes, many benefits came but thousands of workers on farms and at sea lost their work, therefore increasing poverty and unemployment levels in historically disadvantaged towns. The building of Saldanha brought a new rush to the economy but also an influx of people from other provinces. This meant new phenomena erupted called competition. Workers from provinces with mines and industries were more successful as they complied with the minimum skills thrust. Yes, some individuals were sent on training but this didn't have a strong enough impact to the pressure the towns found itself in Three informal settlements grow and one came about as a direct result of Saldanha Steel. Immediately there was a shortage of housing and tremendous pressure on municipal infrastructure.	Noted.
				Climate Change	Considering the above IPCSA must also consider climate change and its impact.	Noted. Climate change is discussed in Chapter 10 of the EIA.
				Cumulative Impacts	Water is a severe scarcity in the country. Alternative water supplies to the plant must be considered. A Think tank between IPCSA and Saldanha Bay municipality must be established to consider alternative solutions.	Noted. Water supply is discussed further in Chapter 3 of the EIA.

				Socio-Economic Impacts	During the EIA stages, applicable skills needs must be identified throughout the different stages of construction and must a training development campaign be launched for individuals and SMME's within the area of jurisdiction.	Labour requirements are provided in Chapter 4 of the EIA, and management measures to enhance local employment are included in Chapter 10.
				Socio-Economic Impacts	Plans with the municipality should be considered to address possible pressure on the municipal infrastructure, especially basic services. Consideration should be given to the current IDZ developments and its impact on the environment.	Pressure on social infrastructure and services is discussed in Chapter 10 of the EIA, and management measures are included.
	Sagar Sharma	Daewoo International Corp.	23.03.2016	Register	Please can you send me the contact details of the different PIC's involved in the project stated below. We are interested and need assistance with the contact details?	Thank you for your email. You have been added to our I&AP Database. Your details have been passed on to the Project Team.
	Johann Bester	Thebe Investment Corporation	23.03.2016	Register	Please note the attached registration of interest from Thebe Investment Corporation.	Thank you for your email. You have been added to our I&AP Database.
	Alana Duffell-Canham	Cape Nature	24.03.2016	Impacts on Flora	The preferred as well as alternative sites have been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by Cape Nature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat). A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be endangered, is considered to have a high negative impact.	Thank you for your comment, a botanical specialist undertook an impact assessment as part of the EIA, the findings of which are presented in Chapter 10 of the EIA, and the Specialist Report has been included in Annex D.
				Impacts on Flora	Site alternative A (which we note is not preferred due to limitations on possible future expansion) is also not preferred by Cape Nature as development on this site would have a greater impact on ecological connectivity as it is directly south of an outcrop of Saldanha Limestone Strandveld which is of high conservation importance (which the botanical specialist has noted).	Noted.
				Impacts on Flora	We would like more detailed information on the impact of the powerline to Aurora substation. Several other power generation projects are proposing connection to Aurora substation and cumulative impacts on habitat, especially the Hopefield Sand Fynbos near the substation is of high concern. The main impact arising out of any new power line application is the need to create a servitude and access roads not only for construction of the power line but also for maintenance purposes. Power line routes should aim to use existing servitudes and access roads.	The transmission line from the Project Site to the Aurora Substation is now out of the scope of this EIA. Detailed information and impacts related to the powerline between the Project Site and Saldanha Steel are provided in Chapters 4 and 10 of the EIA.
				Impacts on Flora	Poor vegetation management under and in close proximity to power lines is one of the main causes of loss of biodiversity associated with power lines. Vegetation is often brush cut or mowed unnecessarily resulting in a loss of diversity over time. Long term management of access roads and servitudes must be addressed in the Environmental Management Programme.	Noted.
				Impacts on Flora	A substantial amount of the Critical Biodiversity Areas has already undergone or will be undergoing transformation as a result of development in the Saldanha Bay Municipality and it has become increasing important to conserve the more intact areas of natural vegetation. The applicants land has been impacted on by their own development and that of lease-holders. The applicant does still own some intact areas which are of high conservation importance and a trade-off for existing and future development should be made by conserving certain areas. A strategic, proactive approach to conservation will allow other areas to be made available for development. This should be further investigated as part of this application, especially as it seems that the applicant intends to expand the power plant in the future. Formal conservation (including having a management plan) of the two areas that were required to be conserved as part of the original authorisation for Saldanha Steel processing plant should also be encouraged.	Thank you for this suggestion. Saldanha Steel is aware of the transformation in the area due to development pressure and support the idea of a formal conservation management plant which will not only secure the conservation of natural areas but also assist (give guidance) in the planning of future development.
	Doretha Kotze	West Coast District Municipality	01.04.2016	Cumulative Impacts	The West Coast District Municipality takes not of the information contained in the Draft Scoping Report for the proposal. However, it is recommended that more information be provided on the following: - Cumulative impact on water resources taking into account all existing and proposed industrial developments at the Saldanha Port. - Disaster Risk Management	Further information around the cumulative impacts and disaster risk management has been provided in Chapter 10 of the EIA.
	Eugene Mmbadi	Saldanha Bay Municipality	05.04.2016	Impacts on Flora	The negative cumulative impact on the Critical Biodiversity Area within the Saldanha Bay area due to development of industries and associated infrastructures is Saldanha Bay Municipality's priority concern. A detailed botanical study is required for further comments.	A Botanical study was undertaken as per the Terms of Reference in the Draft Scoping Report and the findings thereof are presented in Chapter 10 of the EIA, and the Specialist Report has been included in Annex D.

				Waste Management	Storm water management and waste water discharge are of serious concern and should be discussed in detail.	Noted. More detail around storm water management and waste water discharge will be provided in the EIA and associated Environmental Management Plan.
				Cultural Heritage	Please inform the Environmental and Heritage Section of the Saldanha Bay Municipality on any Paleontological and Archaeological findings for our records.	Noted, this action will be included in the Environmental Management Plan.
	Adri La Meyer	Department of Environmental Affairs and Development Planning	06.04.2016	EIA Process	The EIA Report must provide an adequate activity description of the following components of the proposed development: The coordinates of the proposed submersible pipeline (which will transport liquefied natural gas (LNG) or compressed natural gas (CNG) from the Port of Saldanha to the proposed facility). This must include the starting point, middle point and end point of the pipeline. 1.1 The EIA Report must provide an adequate activity description of the following components of the proposed development: 1.1.1 The coordinates of the proposed submersible pipeline (which will transport liquefied natural gas (LNG) or compressed natural gas (CNG) from the Port of Saldanha to the proposed facility). This must include the starting point, middle point and end point of the pipeline. 1.1.2 The coordinates of the proposed combined cycle gas turbine (CCGT) power plant. 1.1.3 The coordinates of the proposed transmission lines that will be developed from the proposed CCGT power plant to the Aurora and Blouwater substations. This must include the starting point. middle point and end point of the transmission lines. 1.1.4 The route of the proposed pipeline and the property details of the affected farms. 1.1.5 The property details of the affected farms in relation to the proposed transmission lines. 1.1.6 The width of the road reserve of the proposed access road(s)." 1.1.7 The estimated capacities of the fuel storage tanks and the chemical storage facilities. 1.1.8 The total development footprint of the proposed CCGT power plant and associated infrastructure.	Noted. The requested information has been included in Chapter 3 of EIA.
				EIA Process	2.2 Applicable Listed Activities: 2.2.1 GN No. R. 983 of 4 December 2014 2.2.1.1 Given that the proposed development entails the clearance of approximately 45ha of indigenous vegetation and that Activity 15 of GN No. R. 984 of 4 December 2014 has been applied for; this Directorate is of the opinion that Activity 27 of Listing Notice 1 is not triggered by the proposed development.	Refer to Chapter 5 of the EIA.
				EIA Process	2.2.1.2 It is noted that the proposed site has been previously used for agricultural activities. An indication of whether the proposed site has been used for agriculture on or after 1 April 1998 must be provided to determine whether Activity 28 of Listing Notice 1 is applicable.	Removed
				EIA Process	2.2.2 GN No. R. 984 of 4 December 2014 This Directorate is of the opinion that Activity 6 of GN No. R. 984 of 4 December 2014 is triggered by the proposed development and should be applied for. This is based on the fact that the proposed development requires an Atmospheric Emissions Licence (AEL) in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA).	This Activity has been included in Table 4.1 of the Final Scoping Report.

				EIA Process	2.2.3 GN No R. 985 of 4 December 2014 It is noted that Activity 12 of this listing notice has been included in the DSR. However. please note that the proposed development is not mapped as having any critically endangered or endangered ecosystem listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): National List of Ecosystems that are threatened and in need of protection (Government Gazette No. 34809 of 9 December 2011). As such. Activity 12 is not triggered by the proposed development.	Removed
				Air Emission	2.3 Legislative requirements: 2.3.1 It is noted that an AEL will be required in terms of NEM:AQA. Proof of submission of the AEL application to the licensing authority must be included in the EIA Report.	Noted.
				Heritage	2.3.2 Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is applicable to the proposed development. It is uncertain whether Heritage Western Cape or the South African Heritage Resources Agency is the competent heritage resources authority. A Notice of Intent to Develop (NID) should have been submitted to the competent heritage resources authority when the DSR was released for comment and a NID should at least be submitted prior to the submission of the Scoping Report to the Department of Environmental Affairs (DEA). In terms of section 38(8) of the NHRA DEA must ensure that the relevant heritage authority's requirements in terms of a heritage assessment are fulfilled. The NID together with the DSR will enable the competent heritage resources authority to provide an indication of their heritage requirements and to determine whether the Terms of Reference for the Heritage Impact Assessment is sufficient.	Noted. The Scoping Report, together with a NID was submitted to Heritage Western Cape. Comment on the NID is included in the Comments and Responses Report.
				Technical	2.4 Services: 2.4.1 Confirmation that the Local Authority has sufficient, spare and unallocated capacity to provide solid waste removal and disposal and any other services required for the proposed development, must be provided in the EIA Report.	The Project will not require the services of the Local Authority, as described in Chapter 3 of the EIA.
				Technical	2.4.2 It is noted that water for the operational phase of the proposed development will be sourced f rom annual precipitation and stored in water storage tanks. Given the existing drought in the West Coast Region, it is recommended that alternative water supply options be investigated.	Noted. Water supply is discussed further in Chapter 3 of the EIA.
				EIA Process	2.5 Impact assessment: 2.5.1 It is noted that a pipeline will be developed from the Port of Saldanha to the proposed CCGT power plant and that possible mooring or berthing facilities may be required. The following potential impacts must therefore be included in the list of impacts to be assessed in the EIA Report: 2.5.1.1 The potential impacts related to marine traffic; 2.5.1.2 The potential impacts related to marine flora and fauna; 2.5.1.3 The potential impacts related to the offloading of products; and 2.5.1.4 The potential impacts related to the development of the submersible pipeline.	The battery limits of this specific EIA focusses on the on-land (terrestrial) infrastructure. Proposed infrastructure related to mooring and berthing, and the impacts associated with these, will be the subject of a separate EIA.
				EIA Process	2.5.2 The potential risks associated with the proposed development must be identified and assessed.	The health and safety risks, and consequences associated with an unplanned event are discussed in Chapter 10 of the EIA.
				EIA Process	2.5.3 Given that there are at least two other EIA processes being undertaken for gas turbine power plants within close proximity to the proposed site (i.e. on Portion 1 of Farm Uyekraal No. 189, Saldanha and on Portion of the Remainder of Farm Langeberg No. 188, Saldanha Bay), the potential cumulative impacts of the proposed development in relation to other electricity generation projects must be identified and assessed.	The cumulative impacts associated with the Project are discussed in Chapter 10 of the EIA.
				Technical	2.6 General: 2.6.1 Given that the Aurora substation is anticipated to receive the additional electricity, confirmation must be provided by ESKOM whether the Aurora substation would require any upgrades. This must be included in the EIA Report.	Permission to tie into or upgrade existing Eskom infrastructure will be the subject of specific agreements between the relevant parties. These agreements have not been finalised and are not included in this EIA.

	Thorsten Aab	Directorate: Waste Management	06.04.2016	Waste Management	The DSR indicates that very little waste is expected to be generated through the use of CNG and LNG as fuel source for the gas turbines. Although the volume of general and hazardous waste that will be generated and stored at the CCGT facility would not require a waste management licence, the applicant's attention is drawn to his "general duty of care" as prescribed in Section 28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) to ensure that storage of waste does not impact on the environment.	Noted, a waste management plan will be developed for the Project and will be included in the EMPr. The disposal of waste will be carried out in accordance with the relevant legislation. All solid wastes generated will be disposed of at licensed landfill sites, for general and/ or hazardous waste streams.
				Waste Management	As per comment 2.4.2 above, alternative water sources (e.g. the desalination of sea water) for use during the power generation process must be considered and assessed during the EIA phase.	Noted. Water supply is discussed further in Chapter 3 of the EIA.
				Waste Management	The DSR indicates that a wastewater treatment and water reclamation plant will be constructed during phase 1 of the proposed development. The EIA Report must provide further details on the treatment and reclamation plant (e.g. development footprint, location and coordinates, design capacity, effluent disposal, etc.).	Noted, this is described further in Chapter 3 of the EIA.
	Peter Harmse	Directorate: Air Quality Management	06.04.2016	Air and Noise Emissions	Noise and dust management: It is anticipated that dust and exhaust emissions will be generated during the construction and operational phase of the proposed development. which could potentially result in significant icant biophysical impacts. DEA gazetted the National Dust Control Regulations on 1 November 2013 (GN No. R. 827) in terms of NEM:AQA. which must be complied with. These regulations prohibit a person f rom conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust. or dust fall, may have a detrimental effect on the environment. including health.	The EMPr contains dust management measures and all contractors will be obligated to comply with the EMPr during construction, operation and decommissioning.
				Air and Noise Emissions	Noise generated from the construction and operation of the proposed development must comply with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013.	The EMPr contains noise management measures which will comply with local by laws and legislation.
				Air and Noise Emissions	Odour emission impact management: In terms of Section 35(2) of NEM:AQA. the applicant must take all reasonable steps to prevent the emission of any offensive odour caused by any activity at the CCGT plant.	Noted, it is not anticipated that the Project will cause offensive odours.
				Air and Noise Emissions	Air emission impact management: It is expected that possible emissions to air from a gas turbine facility would include carbon dioxide, water vapour. carbon monoxide, oxides of nitrogen, and minor emissions of metals and metal compounds and organics. Other emissions of air pollutants are expected from gas venting during commissioning. maintenance shutdowns and from process vents. The Air Quality Management Study must identify appropriate management and mitigation measures to address the emission sources from the proposed CCGT plant. The Air Quality Management Study must further address impacts associated with engine emissions from construction and operational traffic.	Noted, an Air Quality Study was undertaken as part of the EIA. The findings thereof are presented in Chapter 10 of the EIA and the Specialist Report is included in Annex D.
				Air and Noise Emissions	Atmospheric emission listed activities: The proposed development triggers the following atmospheric emission listed activity identified in GN No. 893. promulgated in terms of Section 21 of NEM:AQA. being Category 1 (Combustion Installations). Subcategory 1.4 (Gas Combustion Installations) which is described as "Gas combustion (including gas turbines burning natural gas) used primarily for steam raising or electricity generation" and is applicable to "A// installations with design capacity equal to or greater than 50MW heat input per unit, based on the lower calorific value of the fuel used".	Noted.

				Air and Noise Emissions	The proposed development may also include the storage of petroleum products. It should be noted that Subcategory 2.4 (Storage and Handling of Petroleum Products) is applicable to "A// permanent immobile liquid storage facilities at a single site with a combined storage capacity of greater than 1 000 cubic meters". The EIA Report must indicate the petroleum storage capacity of the CCGT plant to determine whether Subcategory 2.4 of GN No. 893 is triggered by the proposed development.	Noted. This is described further in Chapter 3 of the EIA.
				Air and Noise Emissions	The design and operation of the CCGT plant must comply with the Minimum Emission Standard as listed under the above-mentioned subcategories.	Noted.
		Department of Environmental Affairs and Development Planning	06.04.2016	Technical	General: Section 3.8.3 of the DSR (technology alternatives) states that there are two types of gas fired power plants, being open-cycle and combined cycle gas turbine plants. The heading however refers to "Open-cycle vs Closed-cycle Gas Turbines". Although it is understood to be a typographical error and should read " Open-cycle vs Combined cycle Gas Turbines", it should be noted that all three turbine types (i.e. open, closed and combined cycle) exist and should be comparatively assessed.	Noted. The typographical error has been corrected. Closed-cycle technology is not generally used for this kind of Gas-fired Power Plant (it is usually used in conjunction with an external heat source, such as a nuclear reactor) and has not been included in the assessment. This assessment was undertaken by ArcelorMittal and IPCSA when selecting the technology alternative.
				Technical	It is noted that dry/air cooling is the preferred alternative for the cooling system of the gas turbine plant. However. dry/air cooling is less efficient than the once-through and wet cooling systems, thus resulting in greater atmospheric emissions. The EIA Report should comparatively assess all identified cooling system alternatives and also investigate other cooling system alternat ives, e.g. hybrid cooling.	Your comment is noted. The use of dry-cooling has been selected as the preferred alternative due to the significant concerns relating to water use and discharge of water/brine into the sensitive marine environmental in Saldanha Bay. Further investigation into the hybrid cooling option will be undertaken.
	Zayed Brown	Directorate: Pollution and Chemicals Management	06.04.2016	EIA Process	This Directorate has no comments on the DSR and awaits the EIA Report to provide detailed comment.	Noted.
	Coenrad Agenbach	Directorate of Environmental Affairs : Integrated Environmental Authorisation	05.04.2016	Scoping Report	This Department has the following comments on the application: i. Please ensure that all relevant listed activities are applied for, are specific and it can be linked to the development activity or infrastructure as described in the project description.	Please see included in Table 4.1 of the Final Scoping Report.
				EIA Process	ii. With regards to GN R.985 Activities 2, 4 and 12, written comments from relevant authorities must be obtained and submitted to this Department confirming their applicability to the proposed development. In addition, a graphical representation of the proposed development within the respective geographical areas must be provided.	Written comments will be requested from the relevant Departments as required and submitted with the EIA. See above comments from DEA&DP.
				EIA Process	iii. If the activities applied for in the application form differ from those mentioned in the final SR, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.enviroment.gov.za/documents/forms.	Please see the updated application form pages 8 - 10 attached to the cover letter.
				EIA Process	iv. Please ensure that all issues raised and comments received during the circulation of the SR from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the Final SR. Proof of correspondence with the various stakeholders must be included in the Final SR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments. The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014.	Please see all comments made on the Scoping Report included in Annex B.

				EIA Process	v. Further to the above, this Department requires comments from this Department's Biodiversity and Conservation Directorate, the Climate Change Directorate as well as the Air Quality Directorate, and the Department of Energy.	The following individuals from each of these Departments have been included on the Stakeholder Database: Xola Mkefe - Coastal Biodiversity Conservations - Director Department of Environmental Affairs : Oceans and Coasts Debra Ramalope - Climate Change - Department of Environmental Affairs Vumile Senene - Air Quality Management - Department of Environmental Affairs Lerato Moja - Air Quality Management - Department of Environmental Affairs Dr. Wolsey Barnard - Acting Director General - Department of Energy Fuad Allie - Regional Director - Department of Energy
				EIA Process	vi. In accordance with Appendix 2 of the EIA Regulations 2014, the details of - (i) the EAP who prepared the report; and (ii) the expertise of the EAP to carry out Scoping and Environmental Impact assessment procedures; must be submitted.	Please see included in Box 1.2 and Annex A of the Scoping Report.
				EIA Process	vii. This Department recommends that a specialist study investigates and assesses the climate change risks associated with the proposed development.	Please see the Terms of Reference included in Table 8.1.
				EIA Process	viii. This Department recommends that a transport impact study be done.	Please see the Terms of Reference included in Table 8.1.
				EIA Process	ix. The SR must include an assessment of the risk of transporting, storing and processing of dangerous goods on site, including gas, petroleum, etc.	Please see the Terms of Reference included in Table 8.1.
				EIA Process	x. The SR must assess the impacts of use of water on site (sourcing, treating, disposing etc.)	Noted.
				EIA Process	xi. The SR must assess the impacts on Air Quality in the area.	As per the Plan of Study for EIA we have identified Air Quality and a specialist study (see Table 8.1 for the Scope of Work).
				EIA Process	xii. Based on the above, and in accordance with Appendix 2 of the EIA Regulations 2014, the final SR must include a detailed assessment of the various alternatives investigated to determine the preferred alternatives that will be further assessed in the EIAr.	Please see Location Alternatives Environmental Impact Identification and Preliminary Assessment in Table 3.1
				EIA Process	xiii. All comments raised by Interested and Affected Parties must be responded to.	See Comments and Responses Report included in Annex B.
				EIA Process	xiv. You are further reminded that the final SR to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of scoping reports in accordance with Appendix 2 and Regulation 21(1) of the EIA Regulations, 2014.	Noted. See attached in Table 1.2.
				EIA Process	xv. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).	Noted.
	Comments Received on Final Scoping Report					
	M. Ramakulukusha	Department of Environmental Affairs: Oceans and Coasts	27.05.2016	Alternatives	The Department acknowledges that total independence on renewable energy is not feasible to meet all the energy demands due to the base load power generation capacity. However, the Department encourages an energy mix of gas powered and renewable sources to support the proposed power plant.	Refer to Chapter 4 of the EIA for more information around Project Alternatives.
				Alternatives	The preferred dry/air cooling technology uses less water as compared to wet cooling but requires high amounts of Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) and that has implications on transportation trips, air emissions and time spent by the vessel/ship on the marine environment. The applicant must therefore consider an energy mix of renewable energy and natural gas since that will reduce negative impacts associated with the dry/air cooling technology while meeting the base load energy capacity requirements.	Buildings will be designed such that the roofs can be populated by solar PV panels. Available land area is limited for renewable power generation, as such the only viable option is a small capacity PV array. The advantages and disadvantages of wet and dry cooling are described in Table 4.4 in Chapter 4 (Cooling Technology Options).
				Alternatives	An investigation of the viability of renewable and gas energy generation mix for supporting the proposed power plant must be undertake and incorporated in the report. The levelised cost must be taken into consideration when assessing the energy mix alternative.	Refer to Chapter 4 of the EIA for more information around Project Alternatives. The need and desirability of the project is driven by the need for baseload energy to support AMSS. Renewable energy cannot offer a baseload option that is required without being outside of the cost parameters that make the project viable.

				Marine Ecology	Potential impacts on the marine environmental must be considered if the vessel/ship carrying imported CNG and LNG will be used to supply the required amount natural gas to the proposed power station. The anticipated frequency of supplying imported natural gas and potential risks related to spills must also be included.	This EIA is for the CCGT gas-fired power plant and gas pipeline only and does not include the marine component. It is anticipated that potential impact on the marine environment will be considered as part of the Department of Energy gas to power project. The Department of Energy (DoE) has developed a 20-year energy plan for South Africa, the Integrated Resources Plan 2010-2030 (IRP 2010), which encourages the participation of independent power producers (IPPs) in electricity generation in South Africa. The Independent Power Producers (IPP) Office was established by the DoE, the National Treasury and the Development Bank of Southern Africa (DBSA) to facilitate the involvement of IPPs in the generation of electricity. It is currently intended that 3126 MW of new generation capacity will be generated from natural gas. For the Gas IPP Procurement Programme, the DoE through the IPP Office has, in collaboration with Transnet, developed an approach to facilitate the import of LNG to allow for the development of medium- to long-term gas power plants outside of the port boundaries. This EIA therefore forms a separate application by a private company for gas power plants and related infrastructure near the Port.
				Impact on Flora	A map showing proposed structures overlying areas of high and low environmental sensitivities must be included as part of the report.	An orthophoto showing the proposed site and the area of high conservation concern is included in Figure 6.5 and Figure 6.6 shows the Critical Biodiversity Areas close to the Project
				EIA Process	The proposed development has a potential to impact on coastal users access to costal public property. The applicant must therefore consider Section 13 of the ICM at all stages of the proposed development.	Noted.
					There are Regulations governing the use of a vehicle in the coastal zone. For further clarity, please contact Mr. S Mbethe: smbethe@environment.gov.za , Tel. (021) 819 2508	Noted.
	Mr Mxolisi Dlamuka	Heritage Western Cape	06.05.2016	Cultural Heritage	You are hereby notified that, since there is reason to believe that the proposed gas turbines and associated electrical infrastructure will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following : - Impacts to archaeological heritage resources - Impacts to palaeontological heritage resources	ACO has been appointed to complete an HIA.
				Cultural Heritage	This required HIA must have an integrated set of recommendations	Noted
				Cultural Heritage	The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied.	Noted, theses will be included in the HIA.
	Lana Ignjatović	Leads to Business	19.07.2016	Cultural Heritage	Please would you register me as an interested party in the above mentioned EIA process. We are interested in the project once the EA has been issued, and would like to follow the process. We will not be making any comments for or against the proposed project.	Thank you for your email. You have been added to our I&AP Database.
	Thabile Sangweni	Department of Environmental Affairs	16.05.2016	Scoping Acceptance	The draft EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	Impacts and mitigation measures for the listed activities can be seen in Chapters 10 and 11 of the draft EIR.
				Listed Activities	The listed activities in the Final Scoping Report and the application form do not correspond. The listed activities represented in the EIAr and the appli cation form must be the same and correct. An amended application form must be submitted to this Department to this effect.	An updated application form will be submitted to the Department with the Final EIA Report.
				Listed Activities	The EAP must specify and list the relevant sub regulations, and tell why they are applicable and link it to the project description.	The relevant regulations and sub regulations applicable to the project are provided in Chapter 5 of the EIA.
				Listed Activities	It is noted that activities under GN R 985 are being applied for. This Department requires confirmation of all the sub items as listed in the activities of GNR 985, as well as the geographical areas. Confirmation from the Western Cape Department of Environmental Affairs and Development Planning must be obtained on the applicability of these activities. Furthermore, a graphical representation of the proposed development within the respective geographi cal areas and assessment of the significance of impacts on these areas must be provided.	Activities 2 and 4 are relevant under GN 985. These activities have been presented in the Project Description and layout plan and are assessed as part of the Impact Assessment.
				Technical Details table	The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions. A sample for the minimum information required is listed under point 2 of the EIA information required for gas facilities below.	Included at the start of the revised EIA Report.

				Coordinates	The EIAr must provide the four corner coordinate points for the proposed development site (note that if the site has numerous bend points, at each bend point coordinates must be provided) as well as the start, middle and end point of all linear activities .	Provided in Chapter 3.
				Site Layout Plan	vii. The EIAr must clearly indicate the following: The envisioned area for the proposed facility; i.e. placing of all associated infrastructure should be mapped at an appropriate scale. Areas of the facilities to be utilised during the different phases of the operation. Indicate the power output for all phases of the development. The preferred layout and length of the 132kV power line. Description of all associated infrastructure. This description must include, but is not limited to the following: };- Power lines; };- Internal roads infrastructure; };- Pipelines; };- All supporting onsite infrastructure such as laydown area, guard house and control room etc. and; };- All necessary details regarding all possible locations and sizes of the proposed satellite substation and the main substation .	The EIAr includes of this information in Chapter 3 of the report.
				Air Quality	The assessment of impacts on air quality in the EIAr as well as the Air Quality Specialist Study must include the following: Reference to emission concentrations as stipulated in the Minimum Emission Standard. Suitable abatement technology to be used for point source emissions must be considered and detailed in terms of availability and control efficient. A compliance and road map with provincial and national regulations on dust and noise. A compliance road map on the design and operation of the Gas-Fired Independent Power Plant with the Minimum Emission Standard. Recent (2013 to 2016) Air Quality Emission results of the area. The following Section 21 listed activities are triggered by the activity and mitigation measures must be addressed in the EIAr: }-> Subcategory 1.2: Liquid Fuel Combustion Installations; }-> Subcategory 1.4: Gas Combustion Installations; }-> Subcategory 2.4: Storage and Handling of Petroleum products; and, }-> Any additional activity which may arise in the near future .	The Air Quality Specialist Study can be found in Annex D and the impact assessment in Chapter 10. Mitigation measures are included in Section 11 of the report.
				Offset	The Department requires confirmation , based on the botanical assessment conducted, from the specialist and Cape Nature that an offset is not required as part of the project. Should an off-set be required, it must be negotiated with Cape Nature. The offset must investigate the cumulative loss of species from the area, and must be finalised, agreed to and be included within the draft EIAr.	No biodiversity offset is required as per the botanical assessment undertaken which can be found in Annex D of the EIAr. Comment in this regard has been received from Cape Nature during the Draft EIA Report comment period and in included in Annex B.

				Specialist Input	The following specialist studies have been identified to be conducted as part of the environmental impact assessment report and will be conducted prior to the submission of the draft EIAr for review and comment: }-> Air Quality; }-> Noise; }-> Flora; }-> Fauna; }-> Heritage; }-> Quantitative Risk Assessment; }-> Climate Change Risk; }-> Socio-Economic; }-> Cumulative impact study; and, }-> Transport impact assessment.	These specialist studies have been undertaken and are detailed in Annex D of the EIAr. Where applicable, cumulative impacts have been addressed by the specialists and are included in Chapter 10 of the report.
				Commenting Authorities	This Department requires comments from the Department of Water and Sanitation (from the Impact Management and Resource Management Directorates) ; the Department of Environmental Affairs: Air Quality Management as well as the Department of Environmental Affairs: Oceans and Coast Directorate which must be included in the EIAr.	These authorities are included on our database and will be notified of the availability of the Draft EIA report for comment. Comments were received during the Scoping Phase from the DEA: Oceans and Coast Directorate.
				Dangerous Goods	The EIAr must assess the impacts of storing and handling of the preferred fuels for Phase 1 and 2 of the project and must include specialist assessments. This must also include a risk assessment of the storage and handling of the dangerous goods.	A Quantitative Risk Assessment on the pipeline and the storage of LPG was undertaken and is included in Annex D. The impact assessment is included in Chapter 10 of the EIA Report.
				Water Requirements	It is noted that water for the operational phase of the development will be sourced from annual precipitation and stored in storage tanks. However, alternative water supply options must be investigated.	Please see Chapter 4 for a discussion on alternative water sources. The Project has relooked at the water requirements and it was determined that additional water may be required, particularly in dry years. In order to address this an additional small sea water pipeline has been included in the pipeline servitude. This water would be desalinated in a Reverse Osmosis plant and will be done using a zero liquid discharge process. The only discharge required will be solid waste.
				Storage of Dangerous Goods	The EIAr must assess the risks associated with the storage of dangerous goods. The risk of the possibility of pollution to surface (hydrological) and groundwater (hydrogeological) systems and flows must also be assessed. The risk assessment must make recommendations into the emergency preparedness and spill response plans.	Standard mitigations measures for the management of storm water on site have been detailed in Section 11. A risk assessment has been undertaken as included in Annex D and the Client's emergency response plan will be updated to incorporate the gas-fired power plant.
				Water Use	The EIAr must assess the impacts of use of water on site (sourcing, treating, disposing etc.).	Chapter 4 addresses water sourcing. No impacts are anticipated as a result of water treatment and no water disposal to the environment is envisaged.
				Specialist Input	The EIAr must assess all identified impacts including traffic and geotechnical impacts.	A traffic impact assessment has been undertaken and the specialist report is attached in Annex D .
				Peer reviews	Should in-house specialists be used for any specialist study, then the specialist study must be peer reviewed by external specialists. The format of the peer-review must address the following: }-> Acceptability of the ToRs }-> Is the methodology clearly explained and acceptable }-> Evaluate the validity of the findings (review data evidence) }-> Discuss the mitigation measures and recommendations }-> Evaluate the appropriateness of the reference literature }-> Is the article well-written and easy to understand? }-> Identify any short comings	A peer review has been undertaken for the socio-economic, climate change and risk assessment studies in order to meet the objectives as detailed here. The peer review reports have been included with the relevant specialist studies in Annex D.
				CRR	All comments raised by Interested and Affected Parties must be responded to.	All comments received from stakeholders are included in the Comments and Response Report and have been responded to.
				CRR	The EIAr must also include a comments and response report in accordance with Appendix 2 h (iii) of the EIA Regulations, 2014.	This is included in Annex B of the Draft EIA Report.

				EIA Process	The EIAr must include the detail inclusive of the PPP in accordance with Regulation 41 of the EIA Regulations.	The PPP has been undertaken in accordance with Regulation 41 and is detailed in Chapter 8 of the Draft EIR.
				Decommissioning	Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies.	Decommissioning activities are detailed in Chapter 3 of the report.
				Services	Information on services required on the site, e.g. sewage, refuse removal, water and electricity. Who will supply these services and has an agreement and confirmation of capacity been obtained? Proof of these agreements must be provided.	Service provision to the site is detailed in Chapter 3 of the EIAr. No water or electricity will be required from service providers or the municipality. A sewage treatment plant will be developed on site and sludge generated as a solid waste stream. Domestic and hazardous waste will need to be removed from the site. A registered contractor will disposed of waste at a licenced waste site. Agreements will need to be put in place with the waste service providers on approval of the project and prior to construction.
				Need and Desirability	The EIAr must provide a detailed description of the need and desirability, not only providing motivation on the need for clean energy in South Africa of the proposed activity. The need and desirability must also indicate if the proposed development is needed in the region and if the current proposed l ocation is desirable for the proposed activity compared to other sites.	Need and desirability for the project are addressed in Chapter 2 of the report.
				Site Layout Plan	A copy of the final site layout map and alternatives. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following : • Positions of the gas turbines, waste water treatment and water reclamation plant, fuel storage tanks, water storage reservoir and tanks, water and gas supply pipelines; • Permanent laydown area footprint; • Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible); • Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used; • The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure ; • Substation(s) and/or transformer(s) sites including their entire footprint; • Connection routes (including pylon positions) to the distribution/transmission network; • All existing infrastructure on the site, especially roads; • Buffer areas; • Buildings, including accommodation; and • All "no-go" areas.	A Site Layout is included in Chapter 3 of this report and in Annex C. All biodiversity information was used in the finalisation of the pipeline routing and the location of the power plant on the site.
				Sensitivity Map	xxv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	The biodiversity sensitivity maps are provided in Section 10 of the EIAr
				Site Layout Plan	xxvi. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Maps included in Chapter 3 and Annex C of the Report.

				Shapefile	xxvii. A shapefile of the preferred development layout footprint must be submitted to this Department. The shapefile must be created using the Hartebeesthoek 94 Datum and the data should be in Decimal Degree Format using the WGS 84 Spheroid. The shapefile must include at a minimum the following extensions i.e. .shp; .shx; .dbf; .prj; and, .xml (Metadata file) . If specific symbology was assigned to the file, then the .avl and/or the .lyr file must also be included. Data must be mapped at a scale of 1:10 000 (please specify if an alternative scale was used). The metadata must include a description of the base data used for digitizing. The shapefile must be submitted in a zip file using the EIA application reference number as the title. The shape file must be submitted to: Postal Address: Department of Environmental Affairs Private Bag X447 Pretoria 0001 Physical address: Environment House 473 Steve Biko Road Pretoria For Attention: Muhammad Essop Integrated Environmental Authorisations Strategic Infrastructure Developments Telephone Number: (012) 399 9406 Email Address: MEssop@environment.gov.za	A shapefile will be generated and submitted with the Final EIAr.
					The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following :	
				Recommendations	All recommendations and mitigation measures recorded in the EIAr and the specialist studies conducted.	These are detailed in Chapter 12 of the report.
				Final Layout Map	The final site layout map.	Included in Chapter 12.
				Final Layout Map	Measures as dictated by the final site layout map and micro-siting.	Included in Chapter 12.
				Sensitivity Map	An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	The biodiversity sensitivity maps are provided in Chapter 10 of the EIAr and in Annex C.
				Final Layout Map	A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Maps included in Annex C.
				Alien Invasive Management Plan	An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	These are detailed in Chapter 12 of the report.
				Plant Rescue and Protection Plan	A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site and be implemented prior to commencement of the construction phase.	These are detailed in Chapter 12 of the report.
				Re-vegetation and Rehabilitation Plan	A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.	These are detailed in Chapter 12 of the report.
				Open Space Management	An open space management plan to be implemented during the construction and operation of the facility.	These are detailed in Chapter 12 of the report.
				Traffic Management	A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	These are detailed in Chapter 12 of the report.

				Stormwater Management	A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.	These are detailed in Chapter 12 of the report.
				Erosion Management	An erosion management plan for monitoring and rehabilitating erosion events associated with the facility . Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	These are detailed in Chapter 12 of the report.
				Monitoring	An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.	There are detailed in Chapter 12 of the report and in the Risk Assessment in Annex D.
				Impact	Measures to protect hydrological features such as streams, rivers, pans, wetlands , dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	These are detailed in Chapter 12 of the report.
				Air Quality	An air quality management plan.	Air Quality management measures are detailed in Chapter 12 of the report.
				Emergency	Emergency preparedness response plan.	ArcelorMittal Saldanha Steel has an existing Emergency Response Procedure. This will be utilised and updated to be relevant to the proposed power plant. Measures identified in the EMPr related to emergency procedures will be incorporated.
				Site Layout Plan	The EAP must provide the final detailed Site Layout Plan as well as the final EMPr for approval with the final EIAr as this Department needs to make a decision on the EA, EMPr and Layout Plan.	These are detailed in Chapters 3 and 12 of the report.
				Cumulative Impacts	The EIAr must include a cumulative impact assessment of the facility since there are other similar facilities in and around the proposed site as well as in the region. The specialist studies as outlined in the PoSEIA which is incorporated as part of the SR must also assess the facility in terms of potential cumulative impacts.	Cumulative impacts have been assessed in Chapter 10 of the EIAr where relevant to the project influence.
				Listed Activities	Please ensure that all the relevant Listing Notice activities are applied for, that the Listing Notice activities applied for are specific and that they can be linked to the development activity or infrastructure in the project description.	This is addressed in Chapter 5 of the EIAr.
				Scoping Acceptance	You are hereby reminded that should the EIAr fail to comply with the requirements of this acceptance letter, the project will be refused in accordance with Regulation 24(1)(b) of the EIA Regulations, 2014 .	Noted
				EIA Process	The applicant is hereby reminded to comply with the requirements of Regulation 45 with regard to the time period allowed for complying with the requirements of the Regulations, and Regulations 43 and 44 with regard to the allowance of a comment period for interested and affected parties on all reports submitted to the competent authority for decision-making. The reports referred to are listed in Regulation 43(1).	Noted
				Heritage	Furthermore, it must be reiterated that, should an application for Environmental Authorisation be subject to the provisions of Chapter 11, Section 38 of the National Heritage Resources Act, Act 25 of 1999,then this Department will not be able to make nor issue a decision in terms of your application for Environmental Authorisation pending a letter from the pertinent heritage authority categorically stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38(8) of the National Heritage Resources Act, Act 25 of 1999. Comments from SAHRA and/or the provincial department of heritage must be provided in the EIAr.	A response from the Heritage Authority has been received and is included in Annex B.
				Final EIAr Submission	You are requested to submit two (2) electronic copies (CD/DVD) and two (2) hard copies of the EIAr to the Department as per Regulation 23(1) of the EIA Regulations, 2014.	Two electronic and two hard copies of the Final EIA Report will be submitted to the Department.

Saldanha Steel Gas Fired Power Plant					
Comments and Responses Report: EIA Phase					
Name	**Organisation**	**Date**	**Comment Type**	**Comment**	**Response 1**
Comments Received during Draft EIA Phase					
Alana Duffell-Canham	Cape Nature	08.08.2016	Power Plant	As stated in our previous letter on the Draft Scoping Report, the preferred as well as alternative sites have been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine-scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by CapeNature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat) as less than 35% of the original extent of this vegetation type is now remaining. A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be Endangered, is considered to have a high negative impact and should require a biodiversity offset if development is approved. The botanical specialist confirmed the presence of Saldanha Flats Strandveld on the power plant site. He did however, also confirm that the vegetation on site has become very degraded and only approximately 25 percent of the species that would have originally occurred on site are still present. The impact of the proposed power plant on loss of Endangered habitat is therefore considered to be less than if the vegetation had been in better condition and CapeNature is of the opinion that a biodiversity offset is not required for the power plant site. We trust however, that Saldanha Steel will be willing to participate in a strategic offset project in future if other more intact areas of vegetation will be impacted.	Thanks for your comments. We note that a biodiversity offset is not required. AMSA have indicated a willingness to participate in future discussions regarding strategic offsets.
			Pipeline route	The pipelines will pass through more intact vegetation which contains at least nine plant Species of Conservation Concern. However, it appears that the planned route for the pipeline will avoid the main areas considered to be of high sensitivity. The pipeline servitude is fairly wide (36m) and will require active rehabilitation. The success of rehabilitation must be monitored throughout the lifetime of the project.	The rehabilitation of the pipeline servitude is included as a condition in the EMPr and further detail pertaining to rehabilitation is included in the EMPr. The success of the rehabilitation will be monitored throughout the lifetime of the project.
				CapeNature must be informed of any deviations to the pipeline route if changes are made to what is indicated in this report.	Noted. CapeNature will be informed.
			Transmission Line	We note that Comments and Response Report states that the powerline to Aurora substation is now out of the scope of this application. CapeNature is of the opinion that this is not acceptable. The powerline has the potential to have the highest impact of all the proposed infrastructure related to this project and the potential impacts of the powerline should be assessed as part of this application. The Environmental Management Programme (EMPr) should address long-term management of servitudes and access roads. Cumulative impacts of existing and planned power production projects and associated powerlines are of extremely high concern and further loss of Hopefield Sand Fynbos in the vicinity of Aurora substation will be considered to have a high negative impact. Further loss of Critical Biodiversity Areas east of the proposed power plant and close to the substation will have a high negative impact and compromise being able to reach biodiversity targets. Impacts on avifauna are also of concern. If sharing of a powerline is an option this should be explored and put forward as an alternative for this application.	ERM recognises that the potential impacts associated with the transmission line should be assessed and appropriate mitigation measures developed to manage the impacts. However, the transmission line has been excluded from this EIA as further detailed feasibility assessments must be undertaken regarding the evacuation of power from the proposed power plant. A transmission line route cannot be confirmed at this stage. A grid network study must be carried out by Eskom to assess which substation is best suited to receive the power. Once the preferred substation has been selected, an appropriate transmission line route will be developed. Eskom will decide on the mode and routing. At this stage, consideration is being given to evacuating the power to the Blouwater or Aurora substations. The construction of a new transmission line will require Environmental Authorisation and be subject to a separate EIA. The loss of vegetation and Critical Biodiversity Areas, and potential impact on avifauna associated with the proposed transmission line would be considered as part of that EIA. It is further noted that since this transmission line will be operated by Eskom, they are required to be the holder of the Environmental Authorisation for the transmission line.
			Air Quality	It is outside of CapeNature's current expertise to comment on specific air quality impacts. We would like to note however, that we are concerned about the decreasing air quality in the Saldanha Bay region and trust that the applicant will fulfil all the requirements that are laid out by other departments and the municipality which will issue the air emissions licence.	Noted. The Project will comply with the necessary requirements of NEM: AQA and local bylaws. In addition, an application for an Air Emissions License will be made with the relevant authority.
			Water use and waste water disposal	We note that a seawater desalination plant is proposed in conjunction with rainwater harvesting. If this is the case, more details on the potential impacts of the desalination plant need to be included in the Final Environmental Impact Report.	Further details regarding the desalination plant are now provided in Chapter 3.
				Please provide clarity on the volumes of waste water (non-sewage related) the project is likely to produce and how this will be disposed of.	Further details on water and waste water are provided in Chapter 3. Waste water will be treated on site and recycled.
			Additional comments	The "Open Space Management Plan" for the power plant site which has been included as part of the EMPr does not appear to be particularly useful for biodiversity conservation, particularly as the power plant site will be fenced and highly fragmented due to the amount of infrastructure that will be on the site.	The site will be fenced and the majority of the site will be cleared for the project. The impact on fauna and flora are assessed in Chapter 10.6, 10.7 and 10.8 .

Andrew September	Heritage Western Cape	15.08.2016	Heritage Impacts	The Committee noted that the matter taken out /ACOM agenda by HOMs as they have delegation to deal with items where there are no objection and where the recommendations in the HIA are fully agreed with. HOMS supports the development proposal. However, should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately and Heritage Western Cape must be notified without delay.	Heritage Western Cape's support for the development is noted. All works will be stopped if any evidence of graves, human burials or archaeological material and paleontological material is found during the construction. This is stipulated in the EMPr in the section dealing with Cultural Heritage.
Khanya Mananga	Cederburg Golfers Association	15.08.2016	Procurement and Employment	• The new gas turbine power plant leadership should identify locally based companies on the AMSA database and immediately commence with a quality, environment and health and safety readiness audit. • Qualifying and AMSA audited SMME's should be involved in the process improvement during construction and operational phase. Furthermore, all local listed companies to be incorporated in the process must be BEE compliant between level 3 and 1. Even Joint ventures should be carefully scrutinized to meet the quality assurance and standards and BEE specification as mentioned above. • Designated SMME's should be provided with relevant procedures and / or appropriate instructions by Project Company to perform tasks that will be assigned to them. • Strong communication networks should be built between SMME's and project company so that the project goal can be accomplished / achieved. NOTE: It is best for the project company, together with AMSA establish a project communications platform. • Designated SMME's should be linked to any decision making processes and informed on time for any changes or adjustments during construction and operational phase as well by project company. • The project company should ensure that they schedule weekly or daily meetings to give feedback to designated SMME's on work in progress so that designated SMME's can be able to identify cracks during the construction phase. • The project team should link designated SMME's to the compulsory self-development (Skills, new ideas, techniques and/or methods). • Payments methods and structures should be negotiable as these protect SMME's during the phases / process and gain unique perks (preferential procurement / payment system should have discriminatory factors that support capacity of SMME's). • The project team should make it clear and understandable to designated SMME's on all skills and techniques they are looking for before performing any task during construction phase. • Discriminatory factors should be implemented that would prepare a conductive environment for small businesses (SMME's) and local government. Right at the beginning designated SMME's should be linked and or adopted by appointed firms for business coaching and development. • The project company should ensure that appropriate mentoring and training is conducted to small businesses (SMME's) (deliberate enterprise development and supplier development resolution).	Thank you for your comment and suggestions around how the Project can improve local procurement and the employment of local labour. Your suggestions will be provided to the Applicant and developer. A local procurement policy will be implemented to ensure that local procurement is maximised, the policy will include: • Reasonable targets for using local suppliers. • A clause of none discrimination on any grounds of gender, ethnicity, religion. • Criteria for monitoring local procurement and reporting on supplier performance management. • Clear and transparent criteria and tendering process prior to the commencement of construction activities; and • The procurement policy and tendering requirements must be easily accessible to potential suppliers. The Project will meet with the Local Municipality and the IDZ to access any available skills/employment-seekers database for the area. This database is to be updated and made available to the appointed contractors. Additional measure to maximize local procurement and employment are included in the EMPr.
Stefano Boggia	Ansaldo Energia S.p.A.	15.08.2016	Register	Please register Ansaldo Energia as an interested party for gas-fired power plant Project in Saldanha. Ansaldo Eneregia is a global EPC of complete power plants and manufacturer of gas turbines, steam turbines and generators. We would like to be involved in the supplier selection phase.	Thank you for your email. You have been added to our I&AP Database.

Basson Geldenhuys	Department of Public Works	15.08.2016	General	The above-mentioned project and our subsequent discussion regarding the matter have bearing. I would like to confirm whether the National Department of Public Works (NDPW) is registered as an Interested and Affected Party for the said project. Please indicate whether the pipeline is traversing through property which is owned by NDPW or how the government owned property is affected. We (NDPW) are the biggest custodians of property in South Africa and therefore you need to please show us in your submissions how (provide locality maps) NDPW properties are affected.	Mr Basson Geldenhuys was sent the following response by ERM via email on 17 August: In response to your email to Tougheeda, August 15 2016. Please find additional information below. We have the following people from the National Department of Public Works on our database: Ossie Lamb Property Management Department of Public Works Ossie.Lamb@dpw.gov.za Mr Fred Johnson Property Management: Chief Director: Regional Coordinator Department of Public Works frederick.johnson@dpw.gov.za The Project does not traverse any government owned land. For more detailed information you can refer to the Draft EIA, available on the project website: www.erm.com/saldanhasteel The Project is to be developed on a green field site owned by ArcelorMittal, approximately 5 km northeast of the Port of Saldanha, Western Cape. The site is located less than 1 km to the east of the existing ArcelorMittal Steelworks, immediately adjacent to the Blouwater substation. The two properties on which the proposed power plant site is located are detailed in below. Yzervarkensrug 129 Remaining Extent W014C04600000000012900000; Jackels kloof 195 2 W014C04600000000019500002 The proposed pipeline corridor intersects with the properties as listed below, all of which are owned by ArcelorMittal: None 0 1185 W014C04600000000185000000 STATE LAND 196 0 196 W014C04600000000196000000; HOPEFIELD 195 195 0 W014C04600000000195000001; HOPEFIELD 195 7 195 W014C04600000000195000070; Farm 195 1 195 W014C04600000000195000010; Jackals Kloof 195 2 195 W014C04600000000195000020; None 0 1132 W014C04600000000132000000; YZERVARKENSRUG 129 0 129 W014C04600000000129000001 The proposed feeder transmission line from the power plant to ArcelorMittal Steel intersects with the properties as listed below: Farm Name Portion Number Parcel Number SG Code YZERVARKENSRUG 129 0 129 W014C04600000000129000001; YZERVARKENSRUG 129 3 129; W015C04600000000129000030; None 0 1132 W014C04600000000132000000
H Steenkamp		16.08.2016	Pipeline route	Ek wil net weet. Gaan die pyplyn bo die grond of onder die grond loop?	Dankie vir u vraag. Die pyplyn gaan ondergrond wees, maar natuurlik tydens die konstruksie daarvan sal 'n sloot gegrawe word om die pyplyn in plek te sit. Die gebied sal daarna gerehabiliteer word. Ek hoop dit antwoord u vraag?
Doretha Kotze	West Coast District Municipality	19.08.2016	Water use and waste water disposal	It is noted that ± 30 000 $m^3$of water will be required during the construction phase of the development. Should surface and ground water be sourced from surrounding farms, the necessary authorisation should be obtained from the relevant authority. Should water be sourced from the Saldanha Bay Municipality, the normal procedure should be followed in liaison with GLS Consulting Engineers to ascertain whether sufficient water is available.	The Project will comply with the requirements of the National Water Act and local bylaws. The developer will consult with GLS Consulting Engineers if required. At this stage, no water will be required from the Saldanha Bay Municipality.
			Air Quality	The integrated environmental authorisation must also consider authorisation in terms of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)(NEM: AQA) with regards to licensing of listed activities.	The Project will comply with the necessary requirements of NEM: AQA and local bylaws. An application for an air emissions licence will be made.
				Electricity generation during the construction phase by means of three internal combustion generators using LPG as fuel should be included in the possible list of listed activities in terms of NEM: AQA, more specifically subcategory 1.5	Noted. This has been included in the list of activities.
				The National Dust Control Regulations should be included in the list of National legislation applicable to the project	The National Dust Control Regulations have been included as applicable legislation in Chapter 5 of the EIAr, and the Project will comply with these Regulations.
				The recommendations detailed in the Air Quality Specialist Study with report number uMN060-2016 must be applied during the construction and operational phases and special emphasis should be placed on the specialist's recommendation that ArcelorMittal's current ambient air quality monitoring program be expanded to include continuous $N0_2$ monitoring. Ambient monitoring results should be reported to the relevant authorities in an approved format.	The recommendations details in the Air Quality Specialist Study have been included in the EMPr and will be implemented by the Project. Please see the section pertaining to Air Quality in the EMPr.
			Emergency Response	A Fire Protection Plan, as well as building plans must be submitted to the Fire Services Division of both Saldanha Bay Municipality and the West Coast District Municipality for approval prior to any development taking place.	Noted. The required fire protection plan and building plans will be submitted to the Fire Services Division of Saldanha Bay Municipality and the West Coast District Municipality for approval. Fire Risk Management is also addressed in the EMPr.
			Emergency Response	Contingency (Disaster) and Management Plans must be compiled and the following need to be addressed: any form of pollution, disasters, fires, etc. All general management and maintenance issues should also be addressed.	The EMPr includes a section pertaining to Unplanned Events. ArcelorMittal Saldanha Works will update their Standard Operating Procedure (which provides a detailed emergency preparedness procedure for various unplanned events) to include this Project.

Keith Harrison	West Coast Bird Club	22.08.2016	Impact on Avifauna	The Avian Specialist report explained that the area of the project is situated between two Important Bird Areas (IBA) Langebaan Lagoon and Lower Berg River Wetlands. A threat not mentioned is that there are daily transfers of birds between the two IBAs along a very narrow corridor, which can be confirmed with daytime observations of the Kelp Gulls (Larus domicanus). Water birds and migratory waders probably use the flyway at night. It is known that there must be commuting between the IBAs but there has never been the need for a scientific study before but by using fixed points along the route the production site is on the narrow corridor. A mitigation would be to move the site 200 metres further east.	The siting of the proposed power plant is in an area already heavily impacted by industrial development (less than 900m away from the iron works to the west, industrial development to the north and the waste management / dump to the south). As it stands, there have been no serious impacts of said developments on avifauna flying overhead. As such, there is no reason to believe that the proposed development will change this. Unlike wind farms, where birds may be impacted by moving parts (such as turbine blades that they do not see or cannot judge / rationalise the movement) the gas-fired power plant does not pose significant threats to avifauna. The construction phase of the proposed development may cause a slight displacement impact, but this will mean avifauna skirts the development area (and seeing as the proposed development site is only 600m x 800m, this is not significant). Furthermore, it would be virtually impossible to ascertain an exact flight corridor utilised by bird species, as different species, weather conditions and other variables would all impact on the route birds utilise between two points. *Also see response below for specialist reasoning for daytime observations of Kelp Gulls.
			Impact on Avifauna	In the Water birds Special Issue on Gull Biology Volume 39 Published April 2016, There is a South African Paper: - Recent Trends of the Kelp Gull (Larus domicanus) in South Africa. Page 108 Table 2, since 2009 the number of breeding Kelp Gulls has reduced by 41% on the West Coast. This is an historic flyway possibly established when sea levels were higher and was the coastal route.	It is not disputed that Kelp Gulls could use this area as part of a flyway, however it is believed that the real reason behind daytime observations of birds in this area is as a result of the large waste management / dump located south of the proposed site location, where birds are coming to feed on discarded food. The species has become synonymous with rubbish dumps / tips, so much so for instance, that the rubbish dump near the Strandfontein Sewage Works on the Cape Flats regularly supports more than 1000 Kelp Gulls (the largest known concentration of the species outside a breeding colony). This could therefore explain the high number of Kelp Gulls flying into and out of the area.
			Impact on Avifauna	Although the line to the Grid has been removed to a separate EIA process, it must be remembered that this could also cross an ancient flyway down the Proto-Berg river valley. Great White Pelicans and Flamingos have been observed taking this overland route.	The 400kV transmission line has been excluded from this EIA as a grid network study must be carried out by Eskom to assess which substation is best suited receive the power. Once the preferred substation has been selected, an appropriate transmission line route will be developed. Eskom will decide on the mode and routing. If the existing Eskom lines were not already there, then the potential impact of a new power line would have been assessed as being of a much higher significance.
			Lighting	To reduce bird collisions, cables should be buried where possible and lights to be directed downwards, also motion activated. Lighting for aeroplane warning lights not to be a continuous light but intermittent.	Measures to reduce the impact of lighting at night are included in the EMPr (Chapter of 11 of the EIA) and stipulate that lighting should be directed downwards to avoid excess light spill. Where required, aviation warning lighting will comply with the required standards.
			Traffic Impact	There will be a large number of vehicular movements during construction and all vehicles of Developer, Contractors and Sub-contractors should be registered with the SBM Traffic Department in order for portions of the licence fees can be used for road infrastructure maintenance.	Local service providers will be used as far as possible during construction and operation, particularly for transportation of the workforce and these vehicles should be registered with the SBM Traffic Department.
			Socio-economic Impacts	The project being very technical means that job opportunities for semi-skilled and unskilled are low for both construction and production phases, this should be made known nationally to prevent attracting jobseekers from outside of the West Coast who will be unsuccessful. Therefore Contractors and Sub-contractors should endeavour to recruit 90% of their semi-skilled and unskilled labour with proven residence in the Saldanha Bay Municipal area. Learned from the floor at the Public Meeting was that the IDZ Co. has a data base of 40,000 people. Also, for fynbos control and clearance NGOs like the Cape West Coast Biosphere Reserve Co. have data a base of trained teams.	Saldanha Steel are committed to local employment and in 2014 and 2015, 73 % of new recruits were employed from local community. An employment and procurement plan will be developed for the Project which will promote the recruitment of local residence. The Project will liaise with the Local Municipality, the IDZ office and the Cape West Coast Biosphere Reserve to access their data bases in order to successfully source local labour.
Michael Madangatya		24.08.2016		Can you please tell me how/if my company- Khula Khula Transport Services- can be of service to you? I am in the transport industry and are currently operating in the Western Cape area. I can forward you my business profile if needed.	Thank you for your interest in the Project, your request has been passed on to the Project Proponent.
Carika S. van Zyl	West Coast Environmental Protection Association / Weskus Omgewings Bewarings Assosiasie	25.08.2016	Register	Please register the WCEPA as an Interested and Affected Party.	Thank you for your email, have been added to our stakeholder database.
			EIA Process	Downloading of the documents were not possible when clicking on them. Please have a look at it.	ERM had a technical issue with our website which was slow. The stakeholder was provided with an alternative FTP site to download the document.
			Environmental Impacts	The WCEPA supports efforts by industry to minimise their carbon footprint trough the utilization of renewable energy sources. Unfortunately LNG utilizes gas which is derived through shale gas ie. fracking. Fracking is not supported by the WCEPA as the process involved in getting the gas out is highly toxic to the environment through the contamination of groundwater and highly detrimental to human health. Although the gas will not be shaled within this area, there will be destruction within another area where the environment and people will be irrevocably and irreparable harmed.	Liquefied natural gas (LNG) is a natural gas that consist mostly of methane (more than 90%). The gas is not derived from fracking or shale gas. The natural gas is converted to liquid form for ease of storage or transport. The gas is odourless, colourless, non-toxic and non-corrosive. LNG for this project will be sourced from international producers.

Marné van der Westhuizen	SANParks – Cape Region	25.08.2016	Environmental Impacts	The total environmental impact of the proposed development is of concern to SANParks in terms of footprint impacts, cumulative impacts, aquatic impacts, etc.	Your concern is noted. The total potential environmental impacts of the Project have been assessed in the EIA.
			Marine Impacts	Recent studies indicate that the water quality in Saldanha Bay appears to be deteriorating (State of the Bay report, 2015). SANParks would be opposed to any discharge into the bay as it will have a detrimental impact, given the environmental sensitivities of the bay area, including Langebaan Lagoon (an international RAMSAR site).	The Project will not discharge into Saldanha Bay.
			Cumulative Impacts	The pro-active setting aside of high conservation value areas of endangered vegetation on the Saldanha Steel site is of paramount importance. To this end there is also a need for a collective plan detailing all proposed future developments of the site, to allow for assessment of cumulative impacts of all proposals.	Noted. The Open Space Management Plan in Chapter 11 includes mitigation to address this aspect.
Nazeema Duarte	Saldanha Bay Municipality	25.08.2016	Emergency Response	Please advise if the Disaster Management of the West Coast District Municipality was included as an Interested and Affected Party. The disaster management team of the Gas- Fired Independent Power Plant and the WCDM can create a standard Operating Procedure in the event of an incident.	The Disaster Management of the WCDM was not specifically included as an I&AP, although a number of Departments within the WCDM have been included as I&APs. The Disaster Management Department has now been added to the Stakeholder Database.
			Marine Impacts	Although the EIA for the import of gas is separate, the Saldanha Steel plant will be benefiting from the gas and therefore influencing shipping in the bay. The bay is already under duress (Please see the State of the Bay Report). Please advise if and what mitigation SS will put in place to alleviate this situation.	It is not possible to comment on mitigation measures since marine traffic and shipping will be considered as part of a separate EIA. Specific mitigation measures to address environmental impacts will be proposed by specialists appointed to undertake specific studies associated with the EIA.
			Emergency Response	Mr. Edward Makok is the Health and Safety Officer of the Saldanha Bay Municipality ("SBM") and you can provide him the risk assessment. The SBM is currently doing a Risk Assessment and Disaster Management Plan for the municipal area.	Your comment is noted. A copy of the risk assessment will be available on ERM website for download.
			Impact on Flora	The Environment and Heritage Section of the SBM does not support the destruction of Critical Biodiversity Areas.	Vegetation which is considered to be endangered has been identified during a field survey undertaken by a botanical specialist. These areas will be marked as No Go for development.
			General	The pipeline corridor cuts across a dynamic coastal area also known as "spreeuwalle".	Vegetation which is considered to be endangered has been identified during a field survey undertaken by a botanical specialist. These areas will be marked as No Go for development.
			General	Please familiarise yourselves with the municipal by-laws and civil engineering standards of the SBM. Please contact the relevant officials in this regard: Air Quality - rene.toesie@sbm.gov.za, Waste Management - david.wright@sbm.gov.za, Roads and Storm water - Jeremy.jarvis@sbm.gov.za, water and sewerage - gaving.williams@sbm.gov.za	The EMPr contains noise and air emissions management measures which will comply with local by-laws and legislation. The Project will comply with all municipal by-laws and civil engineering standards of the SBM.
			Transmission Line	The site is next to the Eskom Blouwaterbaai substation and the powerlines do not affect the municipal electrical networks. The report refers to excess energy being sold to IDZ, the municipality and other industrial consumers. In terms of the Electricity Regulation Act any excess energy may only be sold to Eskom and all the regulatory aspects are regulated by NERSA. This will be part of the licencing process from NERSA and does not affect the SBM at this stage.	Noted. An application will be made to NERSA.
			General	Please make available to the SBM the final co-ordinates of the total development for record purposes.	Co-ordinates of the corner points of the proposed power plant boundary are available in Table 3.6 of the EIA Report.
			Decommissioning	Will funds be made available during the operational phase for the eventual decommissioning to avoid abandoned infrastructure as this is common in the municipal area.	Financial provision will be made for decommissioning.
			Rezoning	Rezoning can be a parallel process.	Noted.
			General	Depending on the urgency of the matter, the SBM has an authorisation through the West Coast District Municipality for a reverse osmosis plant. Transnet also has a reverse osmosis plant. A possible PPP could be taken into consideration.	Noted, this information has been passed on the to Applicant.
Elsa Wessels	WeskusonTheline	25.08.2016	EIA Process	I have been trying to upload the draft presentation in order to comment and submit questions regarding the DRAFT EIA for the proposed power station at Saldanha Steel, but the webpage is not available and thus I believe nobody can access it in order to submit questions or comments. In the light of this, I would like to know how long the website has been compromised / unavailable and how on earth affected parties and concerned residents must give their input if they cannot access the report? 1. How many people responded online to the invitation to submit commentary on the EIA Draft and how long has the webpage been unavailable; 2. What were the most common concerns in these comments? 3. Apart from the environmental impact of the gas station alone, has any studies been done on the COMBINED impact of a steel manufacturing plant and a gas-fired power station on all environmental aspects of Saldanha Bay and is the local municipality equipped to police and monitor the situation to ensure all legal/safety/environmental conditions/rules and regulations are followed at all times?	Between 1 June 2016 and 24 August 2016 there were 45 page views. The web page was never unavailable during anytime, however, ERM did experience a slow response rate from our website during a time (24hrs) on 25 August 2016, when ERM was uploading our company sustainability report onto our global web platform. Concerns raised by stakeholders are all captured in this comments and responses report, and a summary of key concerns has been provided in Chapter 8 of the EIA Report. An assessment of the cumulative impacts associated with this Project and other known projects within the area has been included in Chapter 10 of the revised EIA Report.

Gerhard Gerber	Department of Environmental Affairs and Development Planning	25.08.2016	Waste Management	The Department's previous comments dated 6 April 2016 requested more information on the proposed sewage treatment and water reclamation plant to be constructed during phase 1 of the proposed development. The Draft EIA Report lacks critical information to assess whether all potential environmental impacts have been identified. In particular, a detailed description of the proposed water reclamation plant and sewage treatment plant with associated infrastructure; design capacity of both the water reclamation and sewage treatment plants; preferred technology (e.g. activated sludge, evaporation ponds, sequential batch reactors, etc.) and effluent disposal of the sewage treatment plant; etc. must be provided.	New information regarding the proposed sewage treatment and water reclamation plant have been included in Chapter 3.3.1 of the revised EIA Report (page 3-25 and 3-26). Impacts associated with these components of the proposed project have been addressed in Chapter 10.
Directorate: Development Management (Region 1) – Keagan-Leigh Adriaanse	Department of Environmental Affairs and Development Planning	25.08.2016	EIA Process	It is noted that some of the comments issued on 6 April 2016 on the Draft Scoping Report ("DSR") have not been addressed in the Draft EIA Report. In particular, the following comments/issues have not been addressed:	Noted.
			Project Description	The width of the road reserve has not been provided. This information is required to confirm the applicability of Activity 24 of Government Notice ("GN") No. R. 983 and Activity 4 of GN No. R. 985 of 4 December 2014.	The width of the road reserve is stated in Chapter 3 in the section under "Access routes and roads". Activity 24 will be triggered. Please also refer to updated Table 5.1 which list NEMA and EIA Regulations triggers from Listing Notice 1, 2 and 3.
			EIA Process	An indication of whether the preferred site has been previously used for agricultural activities on or after 1 April 1998 must be provided in order to determine whether Activity 28 of GN No. R. 983 of 4 December 2014 is applicable.	The site was used for grazing after 1 April 1998. Activity 28 of GN No. R. 983 of 4 December 2014 is included in the application form and Table 5.1 in Chapter 5.
			Air Quality	Proof of submission of the Atmospheric Emissions Licence ("AEL") application to the licencing authority has not been provided.	An application for an AEL will be submitted at a later stage.
			Waste Management	Confirmation that the Local Authority has sufficient, spare and unallocated capacity to provide solid waste removal and disposal and any other services, was requested. The Comments and Responses Report ("CRR") states that no services will be required from the Local Authority. An indication of the service provider(s) for the following must therefore be provided: - The disposal of dried powdered sludge (generated as part of the sewage treatment process and from canteen washing areas); - The disposal of dry/dissolved solids (generated as part of the desalination process); and - Refuse removal.	IPCSA are in discussions with the Local Municipality to confirm that their site has sufficient, spare and unallocated capacity to provide solid waste removal and disposal. Confirmation of the service provider(s) for the disposal of dried powdered sludge, dry/dissolved solids and refuse removal will be provided once final agreements have been reached.
			Marine Impacts	It is noted that the Liquefied Natural Gas ("LNG") will be imported via shipping transport and will connect to mooring or berthing facilities within the Port of Saldanha. It is further noted that the LNG marine facilities are not included in this application and will be subjected to another EIA application. However, given that the proposed development will have an impact on the Port (i.e. the number of ships entering the Port may increase), it is re-iterated that the following impacts be assessed: - Potential impacts related to marine traffic; and - Potential impacts related to the offloading of the LNG.	Chapter 3.3 has been updated to include information regarding marine traffic and offloading options. Please also refer to updated Chapter 10.2.2 for new assessment of marine traffic due to LNG import.
			Transmission Line	This Directorate requested on 6 April 2016 that confirmation must be provided in the EIA Report whether upgrades to the Aurora substation are required. The CRR indicates that permission to tie into or upgrade existing Eskom infrastructure will be the subject of specific agreements between the relevant parties and are not included in this EIA application. The request for confirmation of any upgrades to the Aurora substation was to determine whether the Aurora substation has the capacity to receive the additional electricity supply that is proposed. An indication of whether the Aurora substation has the capacity to receive the additional electricity supply must be provided. Should the Aurora substation not be able to receive the additional electricity supply, alternative substations must be identified.	The 400kV transmission line has been excluded from this EIA as a grid network study must be carried out by Eskom to assess which substation is best suited receive the power. Once the preferred substation has been selected, an appropriate transmission line route will be developed. Eskom will decide on the mode and routing. At this stage, consideration is being given to evacuating power at 132kV to the Aurora substation using the existing pair of 132kV power llines from Aurora. The indication at this stage is that Aurora substation and the 400kV line to Koeberg have insufficient capacity.
			Waste Management	As per comment 2 above, further information is required on the proposed sewage treatment and water reclamation plant.	Noted. See above response.
			Project Description	It is noted that LNG will be re-gasified prior to the gas being offloaded via a submersible pipeline to the proposed development. Further information pertaining to the re-gasification process and the potential impacts associated with this process must be provided.	Chapter 3.3 has been updated to include information regarding marine traffic and offloading options. Please also refer to updated Chapter 10.2.2 for new assessment of marine traffic due to LNG import.
			Alternatives	Given that the proposed development is dependent on marine facilities for the offloading of the LNG, alternative methods for delivering the LNG to the proposed development must be identified and the potential impacts associated with these alternative methods must be reported on.	Alternative options for delivering LNG have been included in Chapter 3.3 (page 3-8). ERM have not undertaken an assessment of the potential impact associated with these alternatives, as it is anticipated that this will be the subject of another application for environmental authorisation by the DoE and / or Transnet.
			Project Description	The proposed methods for the installation of the pipeline infrastructure and the potential impacts on the coastal environment must be assessed and reported on.	The detailed impact assessment for this installation has been screened out in Chapter 10. Mitigation measures to manage the impact have been included in Chapter 11 (EMPr).

			Emergency Response	The Environmental Management Programme ("EMPr") must include a detailed description of the on-site emergency procedures that will be followed in the event of an incident occurring; and	ArcelorMittal Saldanha Works have a Standard Operating Procedure (SHERQ-SPS-030, rev4) which provides a detailed emergency preparedness procedure for various unplanned events. The following types of emergencies, amongst other, are planned for: • Medical emergency • Threat of sabotage • Bomb threat • Gas clouds or chemical hazards • Fire / explosions • Structural and facilities failures and accidents • Energy and / or utility incidents • Confided space emergencies • Working at height emergencies • Vehicles and driving emergencies • Emergencies involving contractors. The procedure defines duties and responsibilities of designated persons and how emergencies should be reported (including contact numbers). Communication methods and training requirements are also documented. Maps are provided to indicate assembly points, equipment location, ambulance points and types of alarms, amongst other. The procedure defines how critical valves, pipes and pumps should be identified and shutoff. Re-entry procedures and recovery of equipment is also documented. Firefighting equipment, spills equipment and other rescue equipment is described and documented. The plan also provides details of emergency drills, how headcounts should be conducted and evacuations procedures. The document will be updated to include the proposed power plant and LNG import. It will document on-site emergency procedures that will be followed in the event of an incident or accident. The document cannot be made public due to the sensitive nature of the information it contains, however ArcelorMittal is willing to make it available to the Competent Authority upon request provided that it remains confidential.
			Project Description	In terms of regulation 5(6) of the EIA Regulations, 2014, you are required to provide the co-ordinates in degrees, minutes and seconds using the Hartebeesthoek94 WGS84 co-ordinate system.	Co-ordinates of the corner points of the proposed power plant boundary are available in Table 3.6 of the EIA Report.
Directorate: Waste Management – Thorsten Aab	Department of Environmental Affairs and Development Planning	25.08.2016	Waste Management	As per comment 2 above, further information is required on the proposed sewage treatment and water reclamation plant.	Noted. See above response.
			Waste Management	This Directorate is satisfied that potential waste management impacts during all phases of the proposed development have been identified and suitable mitigation measures provided for in the EMPr.	Noted.
Directorate: Air Quality Management – Peter Harmse	Department of Environmental Affairs and Development Planning	25.08.2016	Air Quality	The AEL application to be submitted to the licensing authority must include all applicable listed activities identified in terms of Section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA"). The design and operation of the gas-fired power plant must comply with the Minimum Emission Standard as listed in Section 21 of NEM:AQA.	An application for an AEL will be submitted at a later stage and will include applicable listed activities identified in terms of NEM:AQA.
Directorate: Pollution and Chemicals Management – Gunther Frantz	Department of Environmental Affairs and Development Planning	25.08.2016	Waste Management	As per comment 2 above, further information is required on the proposed sewage treatment and water reclamation plant.	Noted. See above response.
Directorate: Development Facilitation – Adri La Meyer	Department of Environmental Affairs and Development Planning	25.08.2016	Project Need and Desirability	This Directorate is of the opinion that the need and desirability of the proposed development has not been adequately addressed in the Draft EIA Report. Whilst it is recognised that the country experiences an electricity supply shortage, the need for a 1507 megawatts ("MW") combined-cycle gas turbine plant has not been motivated for. Information pertaining to the current electricity consumption and future demands by the applicant must be provided.	Chapter 2 (Project Motivation) has been updated to provide the relevant information requested.

Greenhouse Gas and Climate Change	It is noted that the significance of the impact (pre- and post-mitigation) of greenhouse gasses ("GHGs") during the operational phase of the proposed development have not been provided for in Chapters 10 and 12 of the Draft EIA Report. According to Section 4.2.1 of the Draft EIA Report, the magnitude of the project's GHG impacts from the 1307MW project (note that this should be 1507MW), is considered to be Very Large. This significant impact appears to be "glossed over" by comparing the emissions intensity of proposed development against the emissions intensity of the electricity generated by Eskom (Section 4.2.3 of the Draft EIA Report). It must be borne in mind that the electricity generated by Eskom represents approximately 95% of electricity generated and distributed in the South African electrical grid. No further mitigation measures to reduce the impacts of GHGs on the environment is provided for and rather the use of 500 kW of solar energy to meet some of the proposed development's auxiliary load requirements, is offered to make the proposal deem more acceptable.	ERM notes that the significance of the GHG impacts associated with the development are noted as 'High (Negative)' in Section 10.4 (under heading 'Project GHG impact significance rating) and in Section 12.2.2 ('Operational Phase Impacts'). For the avoidance of any doubt with respect to these findings, the impact rating has been added into Table 12.2, together with some text that contextualises the findings below Table 12.2. Furthermore, the significance rating has been updated to align with the terminology and classification used for the remaining topic areas, to 'Major (Negative)'. ERM's methodology for assessing the GHG impacts associated with a development differs to the 'standard' EIA impact significance rating methodology, as noted in the report. The significance rating for the impact is based on the magnitude or scale of the Project's GHG emissions because impact extent, duration and frequency – characteristics used as a basis on which to assess impact significance for other topic areas – do not form a good basis on which to assess the climate change impact associated with GHG emissions. Specifically, regardless of the source/project, the extent of GHG (climate change) impacts is global, the duration of the impact is permanent (CO2 has a residence time in the atmosphere of approximately 100 years), and the frequency of the impact is constant since GHG emissions will be produced throughout the lifetime of the plant. A magnitude scale based on standards from various international lender organisations or groupings is used to assess the magnitude of the project's GHG emissions, and this is directly translated to an impact significance rating. As noted in Chapters 10 and 12 and in Annex D, the magnitude of emissions using this scale is found to be 'Very Large' which translates to an impact significance of 'Major, Negative'.
		However, as noted in the report, in the absence of mitigation technologies such as carbon capture and storage (CCS) (which has not yet been demonstrated in South Africa) most (if not all) coal and gas-fired power stations will have major negative impacts owing to their significant GHG emissions. In order to provide more depth to the analysis, and to allow differentiation between different gas and coal power projects, the methodology used also includes an analysis of the GHG performance of the project relative to reference benchmarks on the GHG intensity of current electricity production in South Africa (i.e. Eskom's grid emissions factor), and of other gas-fired power plants. In addition, the magnitude of annual GHG emissions from the plant is considered in the context of South Africa's current and future projected GHG emissions, and the project's alignment with national climate change and energy policies is considered. The assessment illustrated that the relatively high thermal efficiency of the plant, and the significantly lower emissions intensity (i.e. GHGs emitted per unit of electricity produced) relative to Eskom's current grid emissions intensity, and more broadly the project's alignment with South Africa's energy strategy. Thus, whilst the magnitude of the emissions (and impact significance) is major and negative, it is important to frame this finding within this wider context. Mitigation measures are proposed under the heading 'Emissions Management Measures' in Annex D and under the heading 'Proposed mitigation' in Chapter 10, Section 10.4. Mitigation measures take the form of maximising the plant's thermal efficiency (thus minimising the plant's GHG emissions) and ensuring that thermal efficiency, energy and GHG emissions are measured, monitored and managed over time. Whilst this will help to ensure emissions are minimised, this is unlikely to reduce the overall magnitude and significance rating for the impact. The only mitigation option able to achieve significant cuts in GHG emissions and potentially alter the significance rating for the project is the use of CCS, which is not yet technically feasible in South Africa. Additions have been made to Chapter 10 (under 'Residual Impacts'), Chapter 12, and Annex D (GHG Assessment - 'GHG Impact Significance Rating Post-Mitigation') to clarify this. Note that the project capacity has been corrected in Section 4.2.1 to 1 507 MW.
Water use and waste water disposal	It is noted that approximately 30 000m3 of water will be required for concrete batching during the construction phase of the proposed development. The Draft EIA Report further states that water will initially be trucked in 30m3 loads from local farms where it will be transferred to a temporary stainless-steel tank for immediate use in preparing concrete. Section 3.5.2 of the Draft EIA Report however only assesses the impacts of transporting cement and concrete aggregate, rebar steel, equipment and structural steel during the construction phase. The traffic impacts of 1000 loads for water transportation during the construction phase (including noise and air quality impacts) on both site alternatives must also be assessed.	The construction period will be spread over 2 to 3 years and the civil work required will be spread over this time. It is anticipated that 400 to 500 trucks will be needed in year 1 , 300 to 400 trucks in year 2 and the balance year 3. At maximum rate will be less than 10 trucks a day which will not have a significant impact on noise or air quality.
General	Tables 3.5 and 4.5 of the Greenhouse Gas (GHG) Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay compiled by ERM dated 13 June 2016, erroneously refer to closed-cycle gas turbine plants. It is understood to be a typographical error and should refer to "combined-cycle gas turbines plants".	Very well spotted. :-) This has been corrected to refer to combined-cycle gas turbines plants.
Waste Management	As per comment 2 above, impacts related to the sewage treatment and water reclamation plant must also be incorporated into the EMPr.	Noted.

			EIA Process	The Department is of the opinion that the information contained in the Draft EIA Report is not sufficient for decision-making purposes as significant information is lacking and all not environmental impacts have been identified and addressed. It is recommended a Revised EIA Report be made available to all registered Interested and Affected Parties as per regulation 23(2) of GN No. R. 982 of 4 December 2014, prior to submission of the Final EIA Report to the competent authority.	A Revised EIA Report has been made available to all registered Interested and Affected Parties for a further 30 day comment period.
M.R. Maboa	Department of Agriculture Forestry & Fisheries	29.08.2016	Impact on Agricultural Land	Since the development will involve the removal of top soil according to Conservation of Agricultural Resources Act, 1983, (Act 43 of 1983), cultivation in relation to land, means any act by means of which top soil is distributed mechanically. Virgin lands is defined as any land which in the opinion of the executive officer has never been cultivated or mechanically distributed in the past proceeding ten years. CARA application for clearing the proposed area for development is required prior as stated in the act (regulation 2 of Act 43 of 1983) .	An CARA application will be made if required.
				The site clearing activities will include clearing, fencing the project boundary and site levelling. Construction of internal site roads may requires erosion control measures through action of either wind or water (regulation 4 & 5 of CARA act 43 of 1983). The proposed area for development is susceptible to seasonal wind erosion, in summer the area experience strong south & south-west winds with speed of 5.6 m/s and in winter the area experience north & northy westerly wind with 11.5% (frequently less than 3.5 m/s). The area is characterized by calcareous sand at the coastal areas to acidic sands further inland; shale and granite soils ae reported to relatively fertile and form backbone of agricultural in the area/region these confirm the agricultural potential of the area and soils. The impacts that might rise due to the proposed development which might have a negative impact on the environmental, negative impacts includes loss of soil resources and land capabilities through contamination and through physical disturbance. Land use impacts as the surface/topsoil as resulted from drilling and sometimes coupled with pitting or trenching to further deposits. It is furthermore advised that the rehabilitation should be an ongoing process once even after the power plant operation discontinues/stop.	Thanks for your comments. We take note of the impacts listed and have added the proposed conditions to the EMPr in Chapter 11.15.
				The Department has no objections on the proposed development and encourages the applicant to take responsibility that the above mentioned conditions are adhered too.	Thank you. The proposed conditions have been added to the EMPr in section 11.15.
Thabile Sangweni	Department of Environmental Affairs	25.08.2016	Listed Activities	Please ensure that all relevant listed activities are applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description.	Please refer to updated Table 5.1 which list NEMA and EIA Regulations triggers from Listing Notice 1, 2 and 3.
			Listed Activities	If the activities applied for in the application form differ from those mentioned in the final EIAr, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.	An amended application form will be resubmitted along with the Final EIR.
			Cumulative Impacts	A detailed cumulative impact assessment statement from all the specialists must be included in the final EIAr and must indicate the following: • Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated , i.e. hectares of cumulatively transformed land. • A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. • Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology approved with the acceptance of the scoping report. • The significance rating must also inform the need and desirability of the proposed development. • A cumulative impact environmental statement on whether the proposed development must proceed.	Each specialist has provided a cumulative impact assessment statement in their respective reports. A new detailed cumulative assessment section has been included in the revised Draft EIA Report in Chapter 10.16.
			Layout Plan	The preferred Layout Plan with the service routes and construction camp must be indicated in the final EIAr. A map combining the final Layout Plan superimposed (overlain) on the environmental sensitivity map must also be included in the final EIAr.	A site layout plan superimposed on an enviromental sensitivity map has been included in the revised Draft EIA Report in Annex C. The layout plan includes service routes, construction camp and environmental sensitivity.
			Specialist Reccomendations	Recommendations provided by specialist reports must be considered and used to inform the preferred layout alternative.	All mitigation measures provided by the specialists have been included in the Impact Assessment and EMP. Specifically, the pipeline route and site layout was adjusted to avoid sensitive vegetation.
			Specialist checklist	The specialist studies to be conducted must comply with Appendix 6 of the EIA Regulations, 2014 and proof of compliance must be provided in the final EIAr.	Specialist studies have been revised and now include a checklist to demonstrate compliance with Appendix 6 of the EIA Regulations.

Air Quality	The assessment of impacts on air quality in the EIAr as well as the Air Quality Specialist Study must include the following: • Reference to emission concentrations as stipulated in the Minimum Emission Standard. • Suitable abatement technology to be used for point source emissions must be considered and detailed in terms of availability and control efficient. • A compliance and road map with provincial and national regulations on dust and noise. • A compliance road map on the design and operation of the Gas-Fired Independent Power Plant with the Minimum Emission Standard. • Recent (2013 to 2016) Air Quality Emission results of the area. • The following Section 21 listed activities are triggered by the activity and mitigation measures must be addressed in the EIAr: o Subcategory 1.2: Liquid Fuel Combustion Installations; o Subcategory 1.4: Gas Combustion Installations; o Subcategory 2.4: Storage and Handling of Petroleum products; and, o Any additional activity which may arise in the near future.	Emission concentrations for the proposed facility are below the MES for NOx and there is no MES for CO. Detailed recommended mitigation measures are included in Chapter 11 (EMPr). The Air Quality Report draws on ambient monitoring by the Saldanha Bay Local Municipality, which commenced in July 2014. Refer to Section 6.3 of the Air Quality Report, Annex D. In addition, cumulative impacts are addressed in Section 7.8. of the Air Quality Report, Annex D. The Section 21 listed activities are addressed in the impact assessment undertaken by the specialist, and the findings thereof are provided in Chapter 10 of the EIA.
Offset	The Department requires confirmation, based on the botanical assessment conducted, from the specialist and Cape Nature that an offset is not required as part of the project. Should an off-set be required, it must be negotiated with Cape Nature. The offset must investigate the cumulative loss of species from the area, and must be finalised, agreed to and be included within the final EIAr.	Confirmation from CapeNature is included the comment received from CapeNature, in Annex B. The following extract is provided: As stated in our previous letter on the Draft Scoping Report, the preferred as well as alternative sites have been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine-scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by CapeNature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat) as less than 35% of the original extent of this vegetation type is now remaining. A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be Endangered, is considered to have a high negative impact and should require a biodiversity offset if development is approved. The botanical specialist confirmed the presence of Saldanha Flats Strandveld on the power plant site. He did however, also confirm that the vegetation on site has become very degraded and only approximately 25 percent of the species that would have originally occurred on site are still present. The impact of the proposed power plant on loss of Endangered habitat is therefore considered to be less than if the vegetation had been in better condition and **CapeNature is of the opinion that a biodiversity offset is not required for the power plant site**. We trust however, that Saldanha Steel will be willing to participate in a strategic offset project in future if other more intact areas of vegetation will be impacted.
Comments	This Department requires comments from the Department of Water and Sanitation (from the Impact Management and Resource Management Directorates); the Department of Environmental Affairs: Air Quality Management, the Department of Environmental Affairs: Climate Change as well as the Department of Environmental Affairs: Oceans and Coast Directorate which must be included in the EIAr.	All of these Departments are included on the Stakeholder Database and were invited to comment on the draft EIA Report, however, no comments were received. Proof of attempts to obtain comment from these Departments and follow-up emails is provided in Annex B. Further attempts will be made when the EIA is re-released for comment.
Storage and Handling of Dangerous Goods	The EIAr must assess the impacts of storing and handling of the preferred fuels for Phase 1 and 2 of the project and must include specialist assessments. This must also include a risk assessment of the storage and handling of the dangerous goods.	Phase 1 and 2 of the project both utilise LNG as the fuel for power generation. There will be no storage of LNG on site. An assessment of the risk of LNG handling (i.e. the pipeline risk) has been included in the Quantitative Risk Assessment, see Annex D. Small quantities of LPG will be stored on site for use in the onsite generators for black starts etc. The risk of storage of LPG on site has been included in the specialist study (see Annex D).
Storage of Dangerous Goods	The EIAr must assess the risks associated with the storage of dangerous goods. The risk of the possibility of pollution to surface {hydrological) and groundwater (hydrogeological) systems and flows must also be assessed. The risk assessment must make recommendations into the emergency preparedness and spill response plans.	It is not intended to use liquid fuel and there is no storage of diesel on-site during the operational phase. Standard mitigation for the protection of soil and groundwater is included in the EMPr, in Chapter 11.
Comments	Please ensure that all issues raised and comments received during the circulation of the EIAr from registered I&APs and organs of state which have jurisdiction (including this Department's Biodiversity Section) in respect of the proposed activity are adequately addressed and included in the Final EIAr. Proof should be submitted to the Department of the attempts that were made to obtain comments and proof that the proposed development was advertised in at least one local newspaper.	Please refer to Annex B for proof of compliance and attempts to obtain comments.
Comments	Proof that comments were obtained from all Departments as indicated in the SR and in this comment letter. Should no comments be obtained, proof that reasonable measures were undertaken to obtain comments and follow up's were made to the various Departments.	Comments received and proof of request for comments are included in Annex B.

		EMPr	The EMPr must include a provision to audit the effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation. The results must be made available to the Department and relevant competent authority on request and must be part of monitoring and audit reports.	Audit provisions have been included in Chapter 11.6.
		Conditions of Acceptance	Please note that the final EIAr must comply with all conditions of the acceptance of the scoping report signed on 16 May 2016 and must address all comments contained in this comments letter.	Noted.
		Undertaking	In terms of Appendix 3 of the EIA Regulations , 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to: • the correctness of the information provided in the reports; • the inclusion of comments and inputs from stakeholders and I&APs; • the inclusion of inputs and recommendations from the specialist reports where relevant; • any information provided by the EAP to I&APs; and, • responses by the EAP to comments or inputs made by I&APs.	Noted. All of this information is included in the report.
		Technical Details	The EIAr must provide the technical details of the proposed facility in a table format as well as their description and/or dimensions. A sample of the minimum information required was listed under point 2 of the EIA information required in the acceptance of SR.	A table with technical details of the project has been included on page one of the revised EIA Report.
		Requirements of EIA Regulations	You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Appendix 3 of the EIA Regulations, 2014.	An indication of these requirements and where they are included in the report is included in Table 1.3.
		Timeframes	Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).	Noted.
		EA	Failure to comply with the requirements of the acceptance of the SR, the comments of this letter as well as the requirements of the EIA Regulations, 2014, a negative Environmental Authorisation may be issued by this Department.	Noted.
Comments Received during Public Meeting					
Eugene Du Toit		11.08.2016	Socio-economic Impacts	The Municipality has developed a database for upskilling people in the area and has all unemployed people registered. This database should be sought from them as it is also current.	It is the intention of the IPSCA to have a dual function academy of technicians and employers for the power plant. The project will source this database.
Morgan Siwisa		11.08.2016	Socio-economic Impacts	How will the project address in-migration to the area and the social evils that may be linked to this.	Unfortunately the Project cannot control people that are not associated with the project (i.e. those who enter the area looking for work), however, awareness campaigns and school programmes will be developed to assist in mitigating this impact along with the assistance of NGOs, the Local Municipality and Civic Organisations. The potential impacts associated with in-migration and further mitigation measures are provided in Chapter 10 of the EIA
Morgan Siwisa		11.08.2016	Socio-economic Impacts	What is the definition of "locals" in the context of employment.	We have engaged with private groups and have discussed that construction will only start in a year after the EIA approval. Training of Saldanha locals is thus a possibility in the interim.
Keith Harrison		11.08.2016	Impact on Avifauna	The bird experts objective was to identify "flyways" but there seems to be no mention of that in the report. The new 400 kV line to Aurora substation was not discussed tonight. Eskom are wanting to put two new lines in. Will this be one of them?	The transmission line forms the scope of a separate EIA. Consideration is been given to upgrading the conductor on the existing line rather than developing a new line.
Keith Harrison		11.08.2016	Air Quality	Dust deposition and build up in the area is a serious problem. The dust is getting transported all the way to Vredenburg.	Dust emissions are due to mainly occur during the construction phase but mitigation measures are being put in place to reduce this impact. The contractor will make use of dust suppression as stipulated in the EMP, however it is likely that some level of dust will still be generated during the construction phase.
Morgan Siwisa		11.08.2016	Air Quality	Dust shouldn't be taken lightly in the area. There is currently an activist group challenging Transnet. Transnet has been around since 1973 and 43 yes later they're still struggling will the dust.	Noted. See above response.
Comments Received during Draft EIA Phase 2					
Basson Geldenhuys	Department of Public Works	19.09.2016		Our previous discussion regarding the above-mentioned project has bearing. As the pipeline is not traversing over NDPW land and therefore not affecting our properties we do not have any comments.	Noted.
Alana Duffell-Canham	Cape Nature	22.09.2016		The importance of full rehabilitation of the pipeline servitude cannot be overemphasised as this is the main mitigation measure from a biodiversity perspective especially for the pipeline component of the project. Most of the proposed pipeline servitude is located in an area determined as Critical Biodiversity Area (CBA). This area has been selected as CBA not only to meet conservation targets for vegetation types but also to maintain coastal-inland ecological connectivity and a portion of coastal corridor.	Noted. Rehabilitation requirements have been included in the EMPr (Chapter 11).

				We note and support the requirements laid out in the plant rescue and protection plan and rehabilitation requirements laid out in Sections 11.10 and 11.11 of the report. Monitoring requirements must be adhered to throughout the lifespan of the project and should be subject to auditing by a rehabilitation specialist.	Noted.
				The rehabilitation and monitoring requirements should be kept in the EMPr but should also be drawn up into a clear guideline document that can be updated if necessary. The success of search and rescue as well as seeding should be recorded.	Noted. This will be undertaken by the ECO.
				It should be noted that the OTMS pipeline for pumping seawater is proposed to transverse some of the same area as the pipelines for this project. Careful planning for construction needs to take place to ensure that the construction of one pipeline does not "undo" the rehabilitation efforts of the other. There should be strict control at all times of all vehicles and staff to ensure that all activities are kept within the approved servitude. The botanical specialist has stated that a 25m servitude should be sufficient but even this is considered to be a large servitude in terms of impacts on biodiversity.	This is noted. Discussions with the relevant parties, including Transnet as the landowner will be undertaken in order to coordinate construction and rehabilitation efforts.
				Please also note that the proposed OTMS pipeline will be pumping and discharging seawater in the same vicinity as the pipeline for this project. Was this considered in the assessment of cumulative impacts?	No water will be discharged by the pipeline for this Project. Discussions with OTMS will be undertaken in order to co-ordinate the pipeline locations in terms of intake.
				The area surrounding the power plant site is still considered to be of high conservation value and the applicant should manage all of the components of the power plant site in such a way that edge effects are minimised. As much as possible of the disturbed areas within the open space areas surrounding the power plant should also be rehabilitated. Any landscaping within the power plant compound should be done with locally indigenous vegetation.	Noted. The Open Space Management Plan in Chapter 11 includes mitigation to address this aspect.
				Although we have not requested a biodiversity offset for this specific project we would like to reiterate that it will be essential for all of the major industries, including Saldanha Steel, to participate in a strategic approach to formally conserving ecological corridors within the Saldanha Bay Municipality if ecological functioning within the landscape is to be maintained.	Saldanha Steel will, as part of this EIA and future development plan, consider participation in a strategic offset project in the future to set aside high conservation value areas of endangered vegetation.
				CapeNature is still not entirely satisfied that Environmental Authorisation for the powerline will be applied for separately as this is a significant component of the project which is likely to also result in loss of habitat. Cumulative impacts of linear activities, including powerlines, in Saldanha Municipality are now significant. Please note that even though we did not request that a biodiversity offset be acquired as part of this application, it may be necessary for the required powerline, depending on the final route that is proposed.	Noted. A grid network study will be carried out by Eskom to assess which substation is best suited receive the power from the proposed power plant. Once the preferred substation has been selected, appropriate alternative transmission line routes will be developed and studied in detail (including being the subject of an EIA).
Doretha Kotze	West Coast District Municipality	05.10.2016		Please be advised that the WCDM has no additional comments on the Revised DEIR. All comments provided by the WCDM during the course of this assessment, have been attended to in the Comments and Responses Report.	Noted
Ms Thabile Sangweni	Department of Environmental Affairs	18.10.2016		It is understood that disposal and treatment will consist of partial dewatering and disposal of concentrated slurry to a company who will own and operate a proposed biogas facility in Saldanha. However, as this biogas facility is still proposed, this Department requires that alternative disposal facilities form part of the final EIAr, particularly as it is likely that this Department would make a decision on this application before the proposed biogas facility is authorised.	ArcelorMittal South Africa have signed a long term off take agreement with West Coast Power Solutions (WCPS) for the developments, managements and supply of a biogas plant to the Saldanha Steel plant. WCPS are presently in final discussions with the Saldanha Bay Municipality in order to secure organic feedstock for the plant. The biogas plant will be operational Q1 2018, since the first gas needs to be supplied to Saldanha Steel at this time, according to their agreements. The proposed IPCSA gas fired power plant will be in its construction phase at this time. WCPS have confirmed their intent to receive organic waste, solid waste and sewage waste as part of disposal plans for the proposed project. A copy of the letter of intent is included in Annexure B (before the CRR).
				You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Append ix 3 of the EIA Regulations, 2014.	Noted
				Further note that in terms of Regulation 45 of the EIA Regulations 2014 , this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).	Noted
				Failure to comply with the requirements of the acceptance of the SR, the comments on the initial draft EIAr, the comments of this letter as well as the requirements of the EIA Regulations, 2014, a negative Environmental Authorisation may be issued by this Department.	Noted
				You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.	Noted
Thorsten Aab	Department of Environmental Affairs and Development	18.10.2016	Waste Management	This Directorate is satisfied that its comments dated 25 August 2016 on the Draft EIA Report have been adequately addressed and responded to.	Noted
Peter Harmse			Air Quality Management	This Directorate is satisfied that its comments dated 25 August 2016 on the Draft EIA Report have been adequately addressed and responded to.	Noted

Keagan-leigh Adriaanse	Planning		Development Management (Region 1) Listed activities	The width of the proposed road reserve for the onsite roads and access road from the OP7644 have not been provided. This information is required in order to confirm the applicability of Activity 24 of Government Notice ("GN") No. R. 983 of 4 December 2014 and Activity 4 of GN No. R. 985 of 4 December 2014.	Internal roads will be wider than 8m and therefore both Activity 24 of GNR983 and Activity 4 of GNR985 will be triggered.
				The width of the existing road reserve of Provincial Road OP7644 that is proposed to be widened,has not been provided. This information is required in order to confirm the applicability of Activity 56 of GN No. R. 983 of 4 December 2014.	The proclaimed road reserve for Minor Road 7644 is 13m as per Notice dated 29 June 1971. However the traffic specialist has indicated that if any section of road has been fenced and the width is greater than the said (minimum) width then this can be taken as the road reserve width. The current fence is located 25 m from the centre line of OP7644 and the road reserve can therefore be taken to be wider than 13.5 m. As previously indicated the road will be widened from 11 m to a 20 m wide over-taking 4- lane section.
			Development Management (Region 1) Activity Description	As previously requested in this Directorate's comment on the Draft EIA Report dated 25 August 2016, further information pertaining to the regasification process and the potential impacts associated with this process, must be provided.	The regasification process is an integral part of the import of the LNG. As indicated in the report, should the DoE LNG import project not continue a separate EIA will be undertaken by the developers for the LNG import component, the regasification process will be included in this EIA.
			Development Management (Region 1) Alternatives	Page 3-29 of the Revised EIA Report indicates that water could be supplied by West Coast District Municipality from the authorised reverse osmosis plant. Should water be supplied from the reverse osmosis plant, an indication of how this water will be supplied to the proposed development and the estimated volume of water to be supplied must be reported on in the Final EIA Report.	This option is not considered feasible at this stage based on our understanding of the current status of the project. Should it become feasible in future additional permitting will be undertaken at that stage as required. This statement has been removed from page 3-29.
				The Comments and Responses Report indicates that the Aurora substation and the 400kV power line to Koeberg has insufficient capacity to receive the excess electricity that will be generated in phase 2 of the proposed development. Alternatives with respect to the evacuation of the excess electricity must be reported on in the Final EIA Report to be submitted to the competent authority.	A grid network study will be carried out by Eskom to assess which substation is best suited receive the power from the proposed power plant. Once the preferred substation has been selected, appropriate alternative transmission line routes will be developed and studied in detail (including being the subject of an EIA).
			Development Management (Region 1) Services	The comments and responses report indicates that the International Power Consortium South Africa are in discussions with Saldanha Bay Municipality to confirm sufficient, spare and unallocated capacity to provide solid waste removal and disposal services. The confirmation of services must be included in the Final EIA Report to be submitted to the competent authority.	During a meeting between the Saldanha Bay Municipality, IPCSA and AMSS on Friday 7 October it was confirmed by IPCSA that no solid waste will be removed to the Municipality's disposal site.
			Development Management (Region 1) Maps	Figure 3.4 of the Revised EIA Report does not indicate the proposed location of the desalination plant. The layout plan must be amended to include the location of the desalination plant	Figure 3.4 has been amended to include the desalination plant.
			Development Management (Region 1) Water supply	Page 3-49 of the Revised EIA Report indicates that water will be trucked in from local farms. An indication of whether the water would be sourced from existing, registered water uses must be provided.	Yes, water will be obtained from registered water users.
			Development Management (Region 1) Specialist input	Page 5-12 of the Revised EIA Report and page 11-45 of the Draft Environmental Management Programme ("EMPr") indicates that a Major Hazard Installation ("MHI") risk assessment must be conducted in the planning and design phase of the proposed development. If the MHI risk assessment is not completed and included as part of the Final EIA Report to be submitted to the competent authority for decision making. the competent authority will have an incomplete set of information. which could preclude it to make an informed decision on the application for environmental authorisation.	A Quantitative Risk Assessment has been undertaken for this project and is included in Annex D. The QRA is also sometimes termed a preliminary MHI and is in essence an MHI assessment without some of the specifics required in terms of the MHI Regulations. The MHI can only be completed and submitted once design is finalised, since it must represent the actual site operations as they are / are to be built. Permits for air quality, water use and coastal discharges are deal with in a similar fashion i.e. the permit applciations are only finalised after the Environmental Authroisation is received.
			Environmental Management Programme	A full description of the proposed development (including all associated infrastructure) must be included in the EMPr;	Included in Section 11.3
				The amended layout, which includes the location of the desalination plant, must be included in the EMPr;	Included as Figure 11.2
				Mitigation measures associated with the proposed sewage treatment and desalination plant must be included in the EMPr. (In this regard, please also refer to comment 6.2 below.);	The sewage treatment facility will be a modular, factory-constructed plant and will comply with ISO 9001, OHSAS 18001:2007 and will be UVDB and FPAL verified. Similar plants have been erected in UK, Belgium, Nigeria, Libya and Sierra Leone, to name a few. Standard mitigation and management measures will be applied.
				A maintenance management plan for the proposed sewage treatment and desalination plant must be included in the EMPr;	Maintenance will be undertaken according to manufactures specifications and standards.
				The EMPr must be amended to include the emergency incident procedures referred to in Section 30 of the National Environmental Management Act. 1998 (Act No. 107 of 1998). Any incident must immediately be reported to the relevant authorities and all the necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes;	Included in Table 11.9.
				The plant rescue and protection plan must include an indication of when the search and rescue will be undertaken (i.e. the appropriate season);	Included in Section 11.9.2.
				A waste management plan must be compiled and included in the EMPr;	Included as Section 11.17 in the EMPr.
				All trucks transporting materials and water to and from the site must be appropriately covered during the construction phase;	Included in Chapter 11.
				The EMPr must be duly dated.	The date has been included in Chapter 11.
Gunther Frantz			Pollution and Chemicals Management	This Directorate is satisfied that its comments dated 25 August 2016 on the Draft EIA Report have been adequately addressed and responded to.	Noted.

Adri La Meyer			Development Facilitation	This Directorate is satisfied that its previous comments on the Draft EIA Report pertaining to the project need and desirability. greenhouse gas emissions and water requirements, have been adequately addressed.	Noted.
				As per comment 4.8.3 above. mitigation measures for the operation of the sewage treatment and water reclamation plant must be incorporated in the EMPr (e.g. powdered sludge removal. dry salts handling.etc .).	See response above.
Eugene Mmbadi	Saldanha Bay Municipality	18.10.2016		The Saldanha Bay Municipality ("SBM") feels that the assessment should discuss the entire project rather than separating the project into three EIA processes, namely the Power Plant (including gas pipelines), Transmission Lines to the substation and the Marine component. Separating these components could only reveal minimal potential environmental impacts associated with the development of this magnitude.	ERM acknowledges that the ideal situation would have been to assess the entire project, rather than separating the project into various impact assessments. However, as a result of the development stage of the project it was not possible to assess the tranmission line due to Eskom requirements due to the need for further engineering studies and discussions with Eskom. In addition, upon the commencement of this EIA the Department of Energy had already embarked on undertaking an assessment of the marine component for the import of LNG. Each subsequent EIA will need to carefully assess the cumulative imnpacts of the whole project. Finally, other applications for CCGT Power Plant development in the Saldanha Bay area have been submitted to DEA and approved based on the same notion that the Departmetn of Energy would be undertaking the EIA for the import of LNG.
				The Environment and Heritage Section of the SBM believes that the two components (Transmission Lines to the substation and Marine Infrastructure) excluded in this assessment are crucial for this development and they have significant potential negative environmental impacts. The transmission lines from the power plant to substation will have significant impacts on biodiversity. In the case where environmental authorisation is	See response above.
				SBM is responsible for monitoring ambient air quality within its jurisdiction and recommend that all the developments affecting ambient air quality should contribute towards ambient air quality monitoring. The contributions could be in the form of monitoring equipment that will add to existing SBM grid or monitoring data that will feed into the SBM Ambient Air Quality Report.	The recommendations are noted. This detail will be confirmed during the Air Emissions Licencing process.
				The Saldanha Bay Municipality supports the recycling of waste water to avoid the discharge of such water, however question the quality of that water due to continuous recycling. It is of SBM: Environment & Heritage section's opinion that water could only be recycled to a certain point as recycling may affect the properties of water and its quality.	This has been taken into consideration in the water calculations as included in Chapter 3 of the report.
				The pipeline included manholes for maintenance or monitoring purposes and it is discussed that the area along the pipeline will be fully rehabilitated. Is the access road for maintenance or monitoring purposes required along the pipeline?	No access road is required for maintenance or monitoring purposes.
				For consistency purpose in the report, the local authority should be addressed as Sa Idanha Bay Municipality ("SBM") or as Sa Idanha Bay Local Municipality ("SBLM"), not both.	Noted

All comments received during the initial engagement phase, draft scoping, final scoping, draft EIA phase and draft EIA phase 2 are provided in the following section.

Initial Notification Phase

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
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Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X		No	
I would like to receive my notifications by:	Email X	Post	Fax	

Comments;

Title and Name:	ANITA BROOKS		
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ANITA BROOKS	A Brooks	25 01 16
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Piet Fabricius
To:	ERM South Africa EIA Mailbox
Subject:	Fwd: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 08:17:19 AM
Attachments:	image001.png IPCSA Background Information Document_electronic.pdf

---

Please register West Coast District Municipality, PO Box 242, Moorreesburg, 7310. e-mail: westcoastdm@wcdm.co.za as commenting authority.

Regards,

Piet Fabricius
Manager: Air Quality
e-mail: pietfab@gmail.com
Will attend public meeting on 16 February 2016.

---------- Forwarded message ----------
From: **ERM South Africa EIA Mailbox** <SouthernAfrica.EIA@erm.com>
Date: Thu, Jan 21, 2016 at 4:26 PM
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
To: Tougheeda Aspeling <Tougheeda.Aspeling@erm.com>
Cc: Stephan van den Berg <Stephan.vandenBerg@erm.com>, Lindsey Bungartz <Lindsey.Bungartz@erm.com>

Dear Stakeholder,

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.

The Project requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, through an Environmental Impact Assessment (EIA) process.

This notification serves to announce the commencement of the EIA process and invites you to attend a public meeting to find out more about the Project. You will also be able to raise issues and pose questions to the Project team.

When: 16 February 2016

Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay

Time: 17:30 (the Project team will be available from 16h00 at the venue)

From:	Rossouw, Benice
To:	ERM South Africa EIA Mailbox
Cc:	Smit, Drieka
Subject:	FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 08:29:39 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png image008.png image009.png image010.png image011.png IPCSA Background Information Document_electronic.pdf

Good morning Tougheeda

Hope you are well, best wishes for 2016.

Please be informed that Dr Louis Scheepers will be attending.

Kind regards.

Benice Rossouw

Personal Assistant: Municipal Manager

T +27(0) 22 701 7097
F +27(0) 86 579 0594
E Benice.Rossouw@sbm.gov.za
W www.sbm.gov.za
saldanhabaymunicipality

Serve, Grow and Succeed Together

SALDANHA BAAI BAY
MUNISIPALITEIT | MUNICIPALITY | uMASIPALA

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

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From: Pronk, Frank
To: ERM South Africa EIA Mailbox
Subject: EIA Gas Plant
Date: 22 January 2016 09:19:46 AM

Dear Tougheeda

Thank you for the notification of the EIA relating to the Gas fired power station . As Ward Councillor and

Portfolio chair for strategic planning I register as an I& AP .

Regards

Frank Pronk

From:	Adri La Meyer
To:	Tougheeda Aspeling; ERM South Africa EIA Mailbox
Cc:	Stephan van den Berg; Lindsey Bungartz
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 09:52:01 AM
Attachments:	image001.png

Dear Tougheeda,

Thank you for your e-mail. Please register the Department of Environmental Affairs and Development Planning as a state Department having an interest in the application.

Could you please provide us with 1 hard copy and 2 electronic copies of the Draft Scoping Report (DSR) once it is available for public comment? Please address the DSR to the Directorate: Development Facilitation, who will collate the comments from all relevant directorates in the Department.

It is further noted that an AEL and/or WML authorisation may be required. In this regard, your attention is drawn to Section 36(5)(d) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) which states that the National Minister of Environmental Affairs is the licensing authority if "*the listed activity relates to the activities listed in terms of section 24(2) of the National Environmental Management Act, 1998, or in terms of section 19(1) of the National Environmental Management: Waste Act, 2008, or the Minister has been identified as the competent authority*."

Kind regards,
Adri

Adri La Meyer
Directorate: Development Facilitation
Department of Environmental Affairs and Development Planning
Western Cape Government

11th Floor, Utilitas Building, 1 Dorp Street, Cape Town

Tel: (021) 483 2887
Fax: (021) 483 4185
E-mail: Adri.LaMeyer@westerncape.gov.za
Website: www.westerncape.gov.za/eadp

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
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EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:

Email: saldanhasteel.eia@erm.com

Postnet Suite 90, Private Bag X12, Tokai, 7966

Tel: 021 681 5400

Fax to email: 086 5404072

www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	Mr A.H. Wicht		
Organisation:	Blue Bay Lodge		
Telephone:	022 714 1777	**Fax:**	022 7143160.
Cellphone:	082 748 6777	**Email:**	andre@bluebaylodge.co.za
Postal Address:	P.O. Box 18, Saldanha, 7395		

A.H. Wicht		22/1/16
Name	Signature	Date

ArcelorMittal

IPCSA International Power Consortium South Africa

ERM

From:	Akhona Mbenyana
To:	ERM South Africa EIA Mailbox
Cc:	Danielle Manuel; Rivaaj Mahabeer
Subject:	Registration : I &AP
Date:	22 January 2016 01:56:43 PM
Importance:	High

Dear Tougheeda

As per our telephonic conversation earlier on , the Department would like be registered as an I&AP for Saldanha Steel EIA process. Please add us to your stakeholder database and provide updates, information during the process.

Many thanks

Akhona Mbenyana
Directorate: Infrastructure Policies & Strategies
Department of Transport and Public Works
Western Cape Government

140 Loop Street, Cape Town, 8001
Private Bag X9185, Cape Town, 8000
Tel: 021 483 0984
E-mail: Akhona.Mbenyana@westerncape.gov.za
Website: www.westerncape.gov.za

Be 110% Green. Read from the screen

From:	Karen Low
To:	ERM South Africa EIA Mailbox
Subject:	I&AP registration
Date:	22 January 2016 03:18:23 PM
Attachments:	image001.png image002.png

Dear Tougheeda,

Please can you register me as an I&AP for the abovementioned project.

Regards,

Karen

Karen Low (*Pri. Sci. Nat.*)
Environmental Manager

MULILO
RENEWABLE PROJECT DEVELOPMENTS

Tel: +27 21 934 5278 **Fax:** +27 21 935 0505 **Email:** karen@mulilo.com
Physical: 303c Execujet Business Centre Tower Road Cape Town International Airport South Africa 7525
Postal : PO Box 50 Cape Town International Airport South Africa 7525

From:	Donald Matjuda
To:	ERM South Africa EIA Mailbox
Subject:	Register Eskom Distribution as I&AP
Date:	22 January 2016 03:21:05 PM

Good Day Tougheeda Aspeling,

Eskom would like to register as interested and affected party for this project. Eskom's comments are as follows;

1. The proposed activity should not compromise Eskom's asset integrity - both the line and the substation
2. The proposed activity should meet the minimum restrictions - not within 100metres (rough estimate) of the line and sub
3. Its buffer should not encroach on Eskom's operational and maintenance activities
4. Eskom should be able to have full access to its infrastructure without any hindrances or hurdles.

Could I ask if this project is an IPP or not?

Kind Regards
Donald Matjuda

Asset Creation: Land Development
Eskom Holdings SOC LTD: Distribution Division
Western Cape Operating Unit
Evkom Road, Brackenfell, 7560
Tel: +27 21 980 3364, Mobile: +27 78 939 0527
Fax: +27 21 9803053

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X		No
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
NONE			
Title and Name:	MRS ZG DAMONSE		
Organisation:	SEA BREEZE COMMUNITY DEVELOPMENT		
Telephone:	083 689 0259	**Fax:**	086 272 6813
Cellphone:	083 689 0259	**Email:**	zharon.lady@gmail.com
Postal Address:	P O BOX 100, ST HELENA BAY, 7390		

ZG DAMONSE		22/1/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From: keithhbharrison@lando.co.za
To: ERM South Africa EIA Mailbox
Cc: Angus & Gill Stewart
Subject: Gas-fired Independent Power Plant to support Saldanha Steel
Date: 24 January 2016 03:22:47 PM

Dear Tougheeda,

Please register the West Coast Bird Club as an Interested and Affected Party (IAP) to the above project.

Contact Details,

K.H.B. Harrison,
West Coast Bird Club,
P.O.Box 1404,
Vredenburg 7380.

Tel 022 – 7133026.

Email keithhbharrison@lando.co.za

Please may I have Scoping Report and Environmental Impact Assessment (EIA) in CD format.

From the map in the BID, the site chosen appears to be on the main flyway from Langebaan to St. Helena Bay/ Berg River
for water birds and migratory waders. Thousands of Kelp Gulls pass twice daily. This would need a Radar study to determine the night time use.

Regards,

Keith Harrison.

From:	Dorian Bilse Transnet National Ports Authority JHB
To:	ERM South Africa EIA Mailbox
Subject:	Registration for SLD Steel EIA
Date:	25 January 2016 07:36:28 AM
Attachments:	Attached Image.msg

Good morning,

Please register me as an I&AP – see attached form.

Regards and thanks,

Dorian Bilse, Pr Eng **Tel:** +27 11 773 2101
Chief Engineer **Cell:** 083 301 9473
Transnet National Ports Authority **Email:** dorian.bilse@transnet.net

From: Kaashifah Beukes
To: ERM South Africa EIA Mailbox
Cc: Doug Southgate
Subject: RSVP: AMSA EIA Public Meeting
Date: 25 January 2016 10:03:03 AM
Attachments: 116012510025302155.png
116012510025302455.png
116012510025302955.png
116012510025303355.png
116012510025303555.png
116012510025303955.png
116012510025304155.png

To whom it may concern,

Please accept my reply as confirmation of attendance at the public meeting scheduled for the 16th February in Saldanha Bay.

Representatives from the SBIDZ will be myself and my CEO, Mr Doug Southgate (cc'd herein).

Kind Regards,
Kaashifah

SALDANHABAY
INDUSTRIAL DEVELOPMENT ZONE

Kaashifah Beukes | Executive: Stakeholder Management
E: kaashifah@sbidz.co.za | **M:** +27 (0) 84 650 1042 | **T:** +27 (0) 22 714 0206
A: 24 Main Road, Saldanha Bay, 7395
A: 14th Floor Reserve Bank Building 60 St Georges Mall
| www.sbidz.co.za

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

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Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

&AP) and cess	Yes ✓	No	
	Email ✓	Post	Fax

Gerhard Bekker
Sales Representative

Sarens South Africa (Pty) Ltd
81 Koot Street, Withok Estate,
Brakpan, 1540
PostNet Suite 104, Private Bag X3,
Dalview, 1544
South Africa

T +27 11 861 3800
F +27 11 861 3791
M +27 82 455 6496
gerhard.bekker@sarens.com
www.sarens.com

Title and Name:	MR. GERHARD BEKKER		
Organisation:	SARENS S.A		
Telephone:	011 861 3800	**Fax:**	011 861 3791
Cellphone:	082 455 6496	**Email:**	gerhard.bekker@sarens.com
Postal Address:	POSTNET SUITE 104 PRIVATE BAG X3 DALVIEW, 1544 SOUTH AFRICA		

Name	Signature	Date
GERHARD BEKKER		25.01.2016

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Andre Dart
To:	ERM South Africa EIA Mailbox
Subject:	Contact details of "International Power Consortium South Africa" required
Date:	25 January 2016 02:40:14 PM
Importance:	High

Good day,

Could you please be so kind to forward the contact details of IPCSA to me so that I can obtain some more detailed information from them concerning the proposed CCGT plants they are proposing to erect and operate at Saldanha Steel.

This is required in preparation for 16 Feb'16 public meeting.

Regards

Andre Dart
Tel: 021-980 1275 **Cell:** 082-5634940
andre.dart@capetown.gov.za

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Tel: 021 681 5400
Fax to email: 086 5404072
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Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes	X	No		
I would like to receive my notifications by:	Email	X	Post		Fax

Comments;			
Title and Name:	Mrs. Elmien de Bruyn		
Organisation:	Dutco Steel Processing		
Telephone:	022 709 7127	**Fax:**	022 709 7342
Cellphone:	083 308 5938	**Email:**	elmiendb@dsp.co.za
Postal Address:	Private Bag X12, Saldanha, 7395		

Elmien de Bruyn		25-01-16
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Ryno
To:	ERM South Africa EIA Mailbox
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	25 January 2016 08:32:55 AM
Attachments:	image002.png image004.png

Dear Tougheeda

Thank you for the information. Please see that we are registered and receive documents as the process follows suite.

Regards

Ryno Pienaar | 0716758355/0221250050
CONSERVATION MANAGER mailto:rynop@capebiosphere.co.za
c/o R27 & R315 Yzerfontein, P.O Box 283 Darling 7345
Tel: 022 125 0050 | Fax: 086 236 4374
www.capebiosphere.co.za

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

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www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;

Title and Name:	MR. E.H. (Bill) ELOFF.		
Organisation:	ALL BIRDBOMB SOLUTIONS. Trans African Murals.		
Telephone:	-	**Fax:**	0866295585
Cellphone:	0824489767	**Email:**	billeloff@vodamail.co.za.
Postal Address:	P.O. Box 2871 CAPE TOWN 8000.		

E.H. ELOFF Name	Signature	25/01/2016 Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;			
Title and Name:	MR. SANDILE MTSHALI		
Organisation:	SMIT AMANDLA MARINE (Pty) Ltd		
Telephone:	021 507 5777	Fax:	021 507 5888
Cellphone:	082 738 9704	Email:	S.MTSHALI@SMIT.COM
Postal Address:	P.O. BOX 1339, CAPE TOWN, 8000		

SANDILE MTSHALI		22-01-16
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Andre Steyn
To:	ERM South Africa EIA Mailbox
Cc:	Tougheeda Aspeling; Stephan van den Berg; Lindsey Bungartz
Subject:	Re: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 09:36:45 AM
Attachments:	image001.png

Sounds good.
How many skilled and unskilled jobs will this project create? and when do the intend to start building the gas power plant?

A n d r é S t e y n
VFX GUY

Cell: *+27 (0)72 922 9020*
Email: *stereosteyn@gmail.com*
Portfolio: *http://www.andresteyn.com*

On Thu, Jan 21, 2016 at 4:26 PM, ERM South Africa EIA Mailbox <SouthernAfrica.EIA@erm.com> wrote:

> Dear Stakeholder,
>
> The International Power Consortium South Africa (Pty) Ltd (”IPCSA”) with Saldanha Steel (ArcelorMittal South Africa “AMSA”) being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.
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>
> When: 16 February 2016
>
> Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
>
> Time: 17:30 (the Project team will be available from 16h00 at the venue)

From:	John Selby
To:	Tougheeda Aspeling
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 03:58:14 PM
Attachments:	image001.png

Hi Tougheeda,
Please keep me on the list of I&AP's for this project
regards
John Selby

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: Thursday, January 21, 2016 4:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
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Time: 17:30 (the Project team will be available from 16h00 at the venue)

For further information about the EIA, the associated public participation process and how you can register as an Interested and Affected Party (I&AP), please refer to the attached Background Information Document.

To RSVP or register as an I&AP contact Tougheeda Aspeling of ERM:
Tel: 021 681 5400
Fax: 086 540 4072
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Visit the Project website: www.erm.com/saldanhasteel

From:	Mluleki Majola
To:	Tougheeda Aspeling
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 12:46:37 PM
Attachments:	image001.png

Dear Tougheeda,

I would like to RSVP for this hearing.

Best regards
Mlu Majola
MOGS
011 530 8075

Regards

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: Thursday, January 21, 2016 4:26 PM
To: Tougheeda Aspeling <Tougheeda.Aspeling@erm.com>
Cc: Stephan van den Berg <Stephan.vandenBerg@erm.com>; Lindsey Bungartz <Lindsey.Bungartz@erm.com>
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From:	Astrid October
To:	Stephan van den Berg
Cc:	Lindsey Bungartz; Tougheeda Aspeling
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	22 January 2016 11:31:39 AM
Attachments:	image002.png

Hi – please include them on your database as well as they deal directly with EIAs.

Kind Regards

Astrid October
Eskom Distribution WCOU
SHEQS Environmental Management
60 Voortrekker Road Bellville
Tel: 021-9152614
Cell: 082 200 7093

From: Stephan van den Berg [mailto:Stephan.vandenBerg@erm.com]
Sent: 22 January 2016 09:19 AM
To: Astrid October
Cc: Lindsey Bungartz; Tougheeda Aspeling
Subject: RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear Astrid,

Thanks for passing on our BID. Please let us know if we should register Donald, Justine and Barbara on our database too? Or will communications still go through you?

Kind regards,
Stephan

Stephan van den Berg
Senior Consultant

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** +27 21 686 0736 | **M** +27 84 869 9262
E stephan.vandenberg@erm.com | **W** www.erm.com

The world's leading sustainability consultancy

The number one EHS consulting brand - Verdantix EHS Global Survey 2015

From: Astrid October [mailto:OctobeA@eskom.co.za]
Sent: Friday, January 22, 2016 8:31 AM
To: Donald Matjuda; Justine Wyngaardt; Barbara Van Geems

Cc: Stephan van den Berg; Lindsey Bungartz
Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Good morning

Greetings for new year 2016.

Attached may be of interest to you in event of registering as an IAP.

Kind Regards

Astrid October
Eskom Distribution WCOU
SHEQS Environmental Management
60 Voortrekker Road Bellville
Tel: 021-9152614
Cell: 082 200 7093

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear Stakeholder,

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.

The Project requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, through an Environmental Impact Assessment (EIA) process.

This notification serves to announce the commencement of the EIA process and invites you to attend a public meeting to find out more about the Project. You will also be able to raise issues and pose questions to the Project team.

When: 16 February 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

From:	Marlan Mouton
To:	ERM South Africa EIA Mailbox
Subject:	REGISTER - I&AP
Date:	26 January 2016 09:16:52 AM
Attachments:	Screen Shot 2015-07-15 at 4.32.15 PM.png

Good day

I am interested in registering for this. Please can someone assist or indicate what is required.

Many thanks!

Regards

Marlan Mouton
CEO

M: +27 82 384 5547
T: +27 21 412 1500

HYBRID CAPITAL INVESTMENTS

mm@hybridcapitalinvest.com

3rd Floor, Icon Building, cnr Hans Strijdom Avenue and Long Street
Cape Town, South Africa

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓		No	
I would like to receive my notifications by:	Email ✓	Post	Fax	

Comments; The LNG import and re-gasification terminal, as well as pipelines, will be located within the Port of Saldanha. A Terminal Operator licence / agreement to operate the terminal must be issued in accordance with Section 56 of the National Ports Act. The location of the LNG Terminal and pipelines must be aligned to the Port Development Framework Plan.

Title and Name:	**Mr Willem Roux**		
Organisation:	**Transnet National Ports Authority**		
Telephone:	**022 703 5472**	**Fax:**	**086 516 4966**
Cellphone:	**083 452 0742**	**Email:**	**willem.roux@transnet.net**
Postal Address:	**Private Bag X1**		
	Saldanha, 7395		

WILLEM ROUX		2016'01'22
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;

Title and Name:	Glenville Marinus		
Organisation:	West Coast Project Management & Investment		
Telephone:	—	**Fax:**	0866111022
Cellphone:	0787489996	**Email:**	glenmarinus1@gmail.com
Postal Address:	16 Begonia Cresent Vredenburg		

G. Marinus	[signature]	2016-01-26
Name	Signature	Date

ArcelorMittal IPCSA International Power Consortium South Africa ERM

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X		No
I would like to receive my notifications by:	Email X	Post	Fax

Comments: FerroMarine Africa Pty Ltd (FMA) is the lease holder of TNPA property being 220 000m² of Portion 12 of Pienaarsport 197. This lease runs until 2022 + 15 years. As this Gas-fired Power Plant is proposed for the port of Saldanha, it is in close proximity to FMA's facility and thus we would like to register as an I&AP.

Title and Name:	Sofia Wagner. Facility Manager		
Organisation:	FerroMarine Africa Pty Ltd		
Telephone:	021 880 2070	**Fax:**	021 880 2071
Cellphone:	071 351 1644	**Email:**	sw@atlantiscorp.co.za
Postal Address:	Postnet Suite #481, Private Bag X 5061, Stellenbosch, 7599, South Africa		

Sofia Wagner	SWagner	26/01/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From: Andre PIETERS
To: ERM South Africa EIA Mailbox
Subject: Saldanha Steel Gas Plant Project EIA
Date: 26 January 2016 12:05:00 PM

Hi there Tougheeda - I would like to be registered as an I&AP in the above project. Kindly add me to your database?

Regards

André PIETERS
+27 73 600 5882

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	(Yes)		No
I would like to receive my notifications by:	(Email)	Post	Fax

Comments;			
Title and Name:	Mr. Wayne Glossop		
Organisation:	Wartsila		
Telephone:		**Fax:**	
Cellphone:	082 040 4778	**Email:**	wayne.glossop@wartsila.com
Postal Address:			

Wayne Glossop		26/01/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Callaghan, Kristan
To:	ERM South Africa EIA Mailbox; Tougheeda Aspeling
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	27 January 2016 10:55:11 AM
Attachments:	image001.png

Dear Tougheeda,

Thank you for the update.

Please may you reserve a seat for my colleague, Chris Klement (copied herein) and myself for the public participation process on 16 February 2016.

Thank you and kind regards,

Kristan Callaghan

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear Stakeholder,

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.

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This notification serves to announce the commencement of the EIA process and invites you to attend a public meeting to find out more about the Project. You will also be able to raise issues and pose questions to the Project team.

When: 16 February 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

For further information about the EIA, the associated public participation process and how you can register as an Interested and Affected Party (I&AP), please refer to the attached Background Information Document.

From:	Chrizelle Kriel
To:	ERM South Africa EIA Mailbox; Tougheeda Aspeling
Subject:	FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	29 January 2016 02:14:25 PM
Attachments:	image002.png image003.png

Good day

Me, Chrizelle Kriel and Kobus Munro as Director from the Spatial Planning Directorate would like to attend the public meeting on 16 February.

Thank you for the opportunity.

Regards,

Chrizelle Kriel *Pr. Pln*
Chief Town and Regional Planner
Directorate: Spatial Planning and Coastal Impact Management
DEPARTMENT ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

Postal address: 1 Dorp Street, Private Bag X9086, Cape Town, 8000
Street address: 5th Floor Atterbury House, Riebeeck Street, Cape Town
Tel: 021 483 0765 * Fax: 021 483 4527
E-mail: Chrizelle.Kriel@westerncape.gov.za
Website: www.westerncape.gov.za/eadp

From: Adri La Meyer
Sent: 22 January 2016 12:00 PM
To: Chrizelle Kriel
Subject: RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Hallo Chrizelle

Jy kan RSVP vir die EAP by saldanhasteel.eia@erm.com en Tougheeda.Aspeling@erm.com.

Baie dankie
Adri

From: Chrizelle Kriel
Sent: 22 January 2016 11:32 AM
To: Adri La Meyer
Subject: RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Hi Adri

Dankei vir die info. Ek en Kobus wil graag die vergadering op 16 Feb bywoon. Moet ons by iemand RSVP, of is dit nie nodig nie?

From: Adri La Meyer
Sent: 22 January 2016 10:10 AM
To: Joy Leaner; Peter Harmse; Wilna Kloppers; Zayed Brown; Catherine Bill; Kobus Munro; Ieptieshaam Bekko; Bhawoodien Parker; Chrizelle Kriel; Eddie Hanekom; Lance Mcbain-Charles; Eugeune Pienaar; Shaun Arendse; Alvan Gabriel; Taryn Dreyer; Zaahir Toefy
Cc: RABIA REYNOLDS; Melinda Groenewald; Anthea Geldenhuys

Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear all,

I trust this e-mail finds you well. Please find attached a BID for the proposed S&EIR process for a 1400 MW natural gas-fired independent power plant (Combined Cycle Gas Turbine) to the east of the existing steel manufacturing facility in Saldanha Bay.

A public meeting will be held on **16/02/2016 at the Hoedjiesbaai Hotel, 38 Main Road, Saldanha Bay at 17h30**. The Department has already been registered as a state Department that will be commenting on the application. As per the other S24O applications, the DDF will again be collating the Department's comments on the application. You will be provided with a copy of the DSR once we receive it. The EAP has already been informed that DEA is the licensing authority for the AEL application if any atmospheric emission listed activities are triggered.

Comments from the following components on the DSR will be appreciated:
- Coastal Impact Management
- Waste Management Licensing
- Air Quality Licensing
- Development Management
- Pollution and Chemicals Management

Please note: this application must not be confused with the floating power plant or Liquefied Natural Gas (LNG) applications currently in process.

Kind regards,
Adri

Adri La Meyer
Directorate: Development Facilitation
Department of Environmental Affairs and Development Planning
Western Cape Government

11th Floor, Utilitas Building, 1 Dorp Street, Cape Town

Tel: (021) 483 2887
Fax: (021) 483 4185
E-mail: Adri.LaMeyer@westerncape.gov.za
Website: www.westerncape.gov.za/eadp

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling
Cc: Stephan van den Berg; Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear Stakeholder,

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.

CapeNature

SCIENTIFIC SERVICES

postal Private Bag X5014 Stellenbosch 7599
physical Assegaaibosch Nature Reserve Jonkershoek
website www.capenature.co.za
enquiries Alana Duffell-Canham
telephone +27 21 866 8000 **fax** +27 21 866 1523
email aduffell-canham@capenature.co.za

reference **SSD14/2/6/1/8/4/129&195-2_Energy_Gas_SaldanhaSteel**
date **28 January 2016**

Tougheeda Aspeling
ERM Southern Africa
Postnet Suite 90
Private Bag X12
Tokai
7966

By email: saldanhasteel.eia@erm.com

Dear Ms Aspeling

Re: Proposed Independent Power Plan to support Saldanha Steel and other industries in Saldanha Bay – Background Information Document.
DEA ref: TBA

CapeNature would like to thank you for the opportunity to comment on this proposed activity and wish to make the following comments:

1. The site has been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine-scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by CapeNature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat). A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be endangered, is considered to have a high negative impact. A biodiversity offset may need to be considered for this project.

2. A detailed botanical study must be conducted on site in the appropriate season (late winter - early spring) especially as there are known localities of Species of Conservation Concern (SCC) close to the site.

3. Cumulative loss of habitat in the Saldanha area as a result of all industries and associated infrastructure such as roads and powerlines are of very high concern and must be considered in depth.

4. Water use and disposal of waste water is also of high concern and should be discussed in detail.

We will comment in more depth once detailed reports and specialist studies have been received. Please find attached our standard letter outlining our requirements for reports.

CapeNature reserves the right to revise initial comments and request further information based on any additional information that may be received.

Yours sincerely

Alana Duffell-Canham
For: Manager (Scientific Services)

From: Alet Fabricius
To: ERM South Africa EIA Mailbox
Subject: Registration as I&AP
Date: 28 January 2016 04:19:27 PM

Good day,

Kindly register me as an I&AP for the EIA for a Gas-fired Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay.

Please confirm registration.

Regards,

Alet Fabricius
Sales Consultant

c +27 82 779 6281

e alet.fabricius@enviroserv.co.za
Customer Care +27 (0) 800 192 783

ENVIROSERV
WASTE MANAGEMENT

From: Helene Meissenheimer (Uys)
To: ERM South Africa EIA Mailbox
Subject: Registering as interested and affected party
Date: 29 January 2016 11:08:45 AM

Dear Tougheeda,

I am the editor of Weslander, the local newspaper for the Saldanha Bay area, and I want to register as an interested and affected party for proposed gas-fired power plant at ArcelorMittal Saldanha Works.

Best regards,

Heléne Meissenheimer
Redakteur // Editor
T 022 713 1251
F 086 296 6519
E helene@media24.com

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X		No
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	MR. S.J. POGGENPOEL		
Organisation:	WEST COAST AQUACULTURE		
Telephone:	022 - 714 0403	**Fax:**	022 - 714 43 88
Cellphone:	082 - 7836 235	**Email:**	sjp@vikingaquaculture.co.za
Postal Address:			

S.J. POGGENPOEL		01/02/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	S. J. POGGENPOEL MR.		
Organisation:	WEST COAST OYSTER GROWERS		
Telephone:	022 - 7140403	**Fax:**	022 - 7144388
Cellphone:	082 7836 235	**Email:**	sj@vikingaquaculture.co.za
Postal Address:	BOX 1298, SALDANHA, 7395		

S J. POGGENPOEL		01/02/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From: faith filtane
To: ERM South Africa EIA Mailbox
Subject: RSVP for public meeting @ Hoedjiesbai Hotel
Date: 04 February 2016 05:46:09 PM

Good day Tougheeda Aspeling
I trust my email finds you well. My name is Faith Filtane, 25 owner at Filtane Training Academy (Pty/Ltd).
I would like to attend the public meeting of the Gas power plant that will be held at Saldanha Bay Hopedjiesbaai Gotel.

I, Faith Filtane will be attending with Joe Maswanganye and Lathiswa Vato.

I am looking forward to this event.
Thank you

Regards
faith Filtane
073 4730 231

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes	X	No	
I would like to receive my notifications by:	Email	X	Post	Fax

Comments;			
Title and Name:	MR MICHAEL MADANGATYA		
Organisation:	KHULA - KHULA TRANSPORT SERVICES CC		
Telephone:	022 - 7144536	**Fax:**	0880227144536
Cellphone:	0824989351	**Email:**	khulatrans@telkomsa.net
Postal Address:	P.O BOX 1409 SALDANHA		

MICHAEL		30/1/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From: samueladams.sa95
To: ERM South Africa EIA Mailbox
Subject: Information
Date: 04 February 2016 08:10:35 PM

I am interest in the Massive gas- fired power plant for Saldanha

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:

Email: saldanhasteel.eia@erm.com

Postnet Suite 90, Private Bag X12, Tokai, 7966

Tel: 021 681 5400

Fax to email: 086 5404072

www.erm.com/saldanhasteel

Please formaly register me as an Interested and Affected Party (I&AP) and provice further information and notifications during the EIA process	Yes	X	No	
I would like to receive my notifications by:	Email	X	Post	Fax

Comments;

Title and Name:	I.C. MATROOS		
Organisation:	M AND M CONTRACTING		
Telephone:	022 714 0208	**Fax:**	0863441885
Cellphone:	084 7773640	**Email:**	matroos.ian@gmail.com
Postal Address:	13 HENRY WICHT DRIVE, BLUEWATER BAY, 7395		

I.C. MATROOS	I.C. Matroos	04/02/2016
Name	Signature	Date

Many Thanks,

Colleen Daniels| Manager, Finance

ArcelorMittal South Africa

Finance | Saldanha Works

Private Bag X11, Saldanha, 7395

T +27 (0)22 709 4040 | F +27 (0)22 709 4987 | M +27 (0) 83 450 9367

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries In Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;			
Title and Name:	Mr Danood Shabudin		
Organisation:	Yusani Engineering		
Telephone:	022 7140073	**Fax:**	
Cellphone:	081 330 8488	**Email:**	danood@yusanigroup.com
Postal Address:	12 Main Road Saldanha Bay		

Danood Shabudin		05/02/2016
Name	Signature	Date

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments; I SEE THES PROJECT AS A GOOD BUSZNESS OPPORTUNITY FOR US LOCAL ENTREPRENEURS. IT WILL BRING LONG TERM EMPLOYMENT FOR OUR LOCAL COMUNITY.			
Title and Name:	MR SEGOPOTSO GLUIS TONG		
Organisation:	SE TONG (PTY) LTD		
Telephone:		**Fax:**	
Cellphone:	073 88 75 453	**Email:**	segopotsotong@hotmail.co.za
Postal Address:	5 BOT STREET, WITTERKLIP, UREDENBURG 7380		

SEGOPOTSO		05/02/2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From: Alta Le Roux
To: ERM South Africa EIA Mailbox
Subject: Registration
Date: 05 February 2016 12:21:42 PM
Attachments: Constansia Profile.pdf

Good day Tougheeda

As per telephonic discussion today we would like to RSVP and register for gas-fired power plant for Saldanha.

Company details:
Constansia Engineering
Attached please find Company Profile

Kind Regards

Alta Le Roux

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;

Title and Name:	MRS KAASHIFAH BEUKES		
Organisation:	SALDANHA BAY IDZ		
Telephone:	087 095 0261	**Fax:**	
Cellphone:	084 650 1042	**Email:**	kaashifah@sbidz.co.za
Postal Address:	14th FLOOR, SA RESERVE BANK BUILDING, 60 St. GEORGES MALL, CAPE TOWN, 8001		

KAASHIFAH BEUKES		5/02/2016
Name	Signature	Date

ArcelorMittal

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Registration and Comment Sheet

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Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments; The meeting of 28th January 2016 at ArcelorMittal Science Centre at Vredenburg were the most promising and positive

Title and Name:	MR. GLENVILLE MARINUS		
Organisation:	WEST COAST PROJECT MANAGEMENT & INVESTMENT		
Telephone:	-	**Fax:**	0865111022
Cellphone:	0787489996	**Email:**	glenmarinus1@gmail.com
Postal Address:	16 BEGONIA CRESENT LOUWVILLE VREDENBURG 7380		

G. A. MARINUS	[signature]	2016-02-05
Name	Signature	Date

ArcelorMittal   IPCSA International Power Consortium South Africa   ERM

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Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓		No
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;	INTERESTED PARTY		
Title and Name:	MR. DIEDERIK JOHANNES KOEKEMOER		
Organisation:	ARCELOR MITTAL, SOUTH AFRICA		
Telephone:	022 709 4456	**Fax:**	022 709 4983
Cellphone:	083 468 1640	**Email:**	dicky.koekemoer@arcelormittal.com
Postal Address:	MAIN STORE, PRIVATE BAG X11, SALDANHA, 7395 WESTERN CAPE		

D.J. KOEKEMOER		05/02/2016
Name	Signature	Date

ArcelorMittal

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International Power Consortium South Africa

ERM

From: Jsnyders66
To: ERM South Africa EIA Mailbox
Subject: Application
Date: 07 February 2016 10:04:39 PM

Good day
What is the process to apply for a job for this upcoming project? If you can just let me know please. Many thanks.
Sent from my Sony Xperia™ smartphone

From: Delia Saul
To: ERM South Africa EIA Mailbox
Subject: To register
Date: 08 February 2016 09:53:23 AM

Good day
I will please register me for the public meeting coming up on 16 February
I'm please to hear from u for confirmation
Kind regards
Amos Saul

From: Richard Murray
To: ERM South Africa EIA Mailbox
Subject: Rsvp gas fired power plant
Date: 08 February 2016 11:16:06 AM

Hi i would like too book a place for 2people Saldanha Hoedjiesbaai Hotel for 16Feb 17h30.Thx Richard Murray

Registration and Comment Sheet

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Postnet Suite 90, Private Bag X12, Tokai, 7966

Tel: 021 681 5400

Fax to email: 086 5404072

www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;			
Title and Name:	Mrs W. Coetzee		
Organisation:	Sea Harvest Corporation		
Telephone:	022-7014107	**Fax:**	
Cellphone:	082 079 0107	**Email:**	welmariec@seaharvest.co.z
Postal Address:	PO Box 52		
	Saldanha, 7395		

Welmarié Coetzee	Wcoetzee	8/2/2016
Name	Signature	Date

ArcelorMittal

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Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;			
Title and Name:	MR JACKIE LOUW		
Organisation:	WEST COAST MAINTENANCE AND CIVILS: VENDOR NO: 1161889		
Telephone:	022-7135742	**Fax:**	022-7135742
Cellphone:	0768957446	**Email:**	JACKIELOUW H@GMAIL.COM
Postal Address:	13 BOSWEWER STREET LOUWVILLE VREDENBURG 7380		

JACKIE LOUW		08.02.2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From: Albert Bossart
To: ERM South Africa EIA Mailbox
Subject: Saldanha 1400 MW CCPP
Date: 09 February 2016 04:34:57 PM

Dear Tougheeda

Please let me have as discussed a minute ago the background information for the project so I can better assess the status and timeline of the power plant. If you have an agenda for the public hearing I would appreciate. I could then ask a colleague from our Cape Town office to attend.

The question from my side at this stage of the announcement – is this a project for the upcoming RFI for Gas Plants in South Africa or will this be a private initiative?

Best regards
Albert

Albert Bossart
Regional Sales Manager - Power Generation
PP-PPVA-Sub-Sahara-Region
2 Lake Road
Longmeadow Business Estate (North)
1609, Modderfontein, ZA
Phone: +27 10 202 5881
Telefax: +27 11 579 8624
Mobile: +27 83 557 7058
email: Albert.Bossart@za.abb.com

Customer Contact Center +27 10 202 6995
Technical Support Line 0861 488 488

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Email: saldanhasteel.eia@erm.com

Postnet Suite 90, Private Bag X12, Tokai, 7966

Tel: 021 681 5400

Fax to email: 086 5404072

www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;	
Title and Name:	MRS. NOSIPHO NDZAKANE
Organisation:	SHINDANOV SOLUTIONS (PTY) LTD
Telephone:	021 946 1994
Fax:	0865522363
Cellphone:	079 146 4156
Email:	nosipho@shindanovsolutions.co.za
Postal Address:	68 DURBAN ROAD
	BELLVILLE 7530

NOSIPHO NDZAKANE		5.02.2016
Name	Signature	Date

From: Beatrice Landsberg
To: ERM South Africa EIA Mailbox
Subject: 16 Feb - public meeting
Date: 11 February 2016 09:31:36 AM
Attachments: Beatrice copy 2[2][4].png

Good day

We would like to attend this public meeting.

Is there any forms that we need to complete or cost involved?

West Coast Greetings

From: Koch, Helena: Absa
To: ERM South Africa EIA Mailbox
Cc: Reinertz, Portia: Absa; Loots, Talana: Absa
Subject: RSVP - Public meeting
Date: 11 February 2016 03:03:55 PM

Good day,

Please note that Helena Koch, Portia Reinertz and Talana Loots from Absa as well as Gerrit Reinertz from Pam Golding will attend the Public meeting on the 16th of February 2016.02.11
I trust you will find the above in order.

Kind Regards

Helena Koch | Relationship Executive | Commercial Business West Coast | Absa Retail and Business Banking
Tel: +27(0)22 701 7200 | Mobile: +27(0)82 494 4531 | E-mail: helena.koch@absa.co.za
Absa, 22 Main Street | Vredenburg | 7380 |
www.absa.co.za

Portia Reinertz | Transactional Banker | Commercial Business West Coast | Absa Retail and Business Banking
Tel: +27(0)22 701 7200 | Mobile: +27(0)82 4597 301 | E-mail: portiar@absa.co.za
Absa, 22 Main Street | Vredenburg | 7380 |
www.absa.co.za

Murchel Francke | Client Service Consultant | Regional Service Centre | Absa Business Bank
Phone: +27 11 335 4318| Fax : +27 21 950 6880 | Email : murchelk@absa.co.za
Address : Absa, 2nd Floor, Tijgerpark V, Willie van Schoor Avenue, Tyger Valley 7530

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EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	Mrs Michelle Pretorius		
Organisation:	Department of Agriculture Forstry and Fisheries		
Telephone:	021 430 7034	**Fax:**	
Cellphone:	082 647 2263	**Email:**	MichellePR@daff.gov.za
Postal Address:	Marine Research Aquarium, lower Beach Road, Seapoint Cape Town		

Michelle Pretorius		12 February 2016
Name	Signature	Date

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EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	Mr Gavin Stigling		
Organisation:	Advanced Projects		
Telephone:		**Fax:**	086 629 9585
Cellphone:	083 456 2277	**Email:**	gavstig@mweb.co.za
Postal Address:	P.O. Box 596		
	Sanlamhof 7532.		

Gavin George Stigling		22/01/2016.
Name	Signature	Date

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EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;	

Title and Name:	MR. E.H. (Bill) ELOFF.		
Organisation:	ALL BIRDBOMB SOLUTIONS. Trans African Murals. Newco LTD		
Telephone:	-	**Fax:**	086 2795 85
Cellphone:	082 4689767	**Email:**	billeloff@vodamail.co.za.
Postal Address:	P.O. Box 2871 CAPE TOWN 8000.		

E.H. ELOFF Name	 Signature	25/01/2016 Date

ArcelorMittal

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International Power Consortium South Africa

ERM

From:	Stefano Papale
To:	ERM South Africa EIA Mailbox
Subject:	1400 MW Project - info
Date:	12 February 2016 04:26:54 PM

Dear Sirs,

my name is Stefano Papale from FATA EPC, EPC company involved in the 2 peaking power plants AVON&DEDISA.
We would like know more about this project and in case how to be considered as potential EPC
I thank you in advance
Best Regards

Stefano Papale
Sales Manager

FATA
A Finmeccanica Company

FATA EPC – Division of FATA S.p.A.
Strada statale n.24 Km 12
10044 Pianezza (TO) – Italy
Tel. +39 011 9668237
Mob. +39 334 6203083
Fax +39 011 9668717
www.fataepc.com

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments; CAN WE HAVE MORE INFO ABOUT THIS PROJECT AND HOW TO BE CONSIDERED AS EPC FOR THE PROJECT.

Title and Name:	MR. STEFANO PAPALE		
Organisation:	FATA EPC		
Telephone:		Fax:	
Cellphone:	+39 334 6203083	Email:	s.papale@fataepc.com
Postal Address:			

STEFANO PAPALE		15/02/2016
Name	Signature	Date

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International Power Consortium South Africa

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Registration and Comment Sheet

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Fax to email: 086 5404072

www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	Mnr J Joubert		
Organisation:	PPC Ltd		
Telephone:	022 913 8100	**Fax:**	
Cellphone:	0826530583	**Email:**	jaco.joubert@ppc.co.za
Postal Address:	PO Box 10311, De Hoek 7321		

Jaco Joubert		2016/2/17
Name	Signature	Date

From: Info
To: ERM South Africa EIA Mailbox
Subject: RSVP- Public Meeting
Date: 04 February 2016 11:54:02 AM

Good Day

I would like to RSVP for the Public Meeting being held on the 16 February at Hoedjiesbaai Hotel.

Regards,

Russell Sabor
Director
GVJ Electrical & Instrumentation Contractors (Pty) Ltd
8 Natal Street
Paarden Eiland
7405
Tel: + 27 (0) 21 511 3171
Fax: + 27 (0) 21 511 3174
Mobile Phone: + 27 (0) 82 415 8443
Email: russell@gvj.co.za
Website: www.gvj.co.za

GVJ Electrical and Instrumentation Contractors

From:	Graeme Clemitson
To:	Tougheeda Aspeling
Subject:	I&AP Saldanha Steel Power Plant
Date:	04 February 2016 03:23:18 PM

Dear Tougheeda,

1. Please register Saldanha Bay Trading on this email address.

2. What is the status of the marine EIA.....already registered for that one.

Rgds
Graeme

Registration and Comment Sheet

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;

Title and Name:	Mrs. Mikne Talmarkes		
Organisation:	Made for Maid Cleaning Services		
Telephone:		Fax:	
Cellphone:	073 695 8189	Email:	mtalmarkes@yahoo.com
Postal Address:	12 Stokvis Street; White City; Saldanha; 7395		

Name	Signature	Date
MILENE	M. Talmarkes	08-02-2016

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

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Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;	PLEASE REGISTER THE WEST COAST DISTRICT MUNICIPALITY AS AN I+AP. DOCUMENTATION TO BE SENT TO: MUNICIPAL MANAGER: MR HF PRINS - hfprins@wcdm.co.za WEST COAST DM : westcoastdm@wcdm.co.za		
Title and Name:	DORETHA KOTZE		
Organisation:	WEST COAST DISTRICT MUNICIPALITY		
Telephone:	022 433 8400	**Fax:**	086 692 6113
Cellphone:	—	**Email:**	dkotze@wcdm.co.za
Postal Address:	BOX 242, MOORREESBURG, 7310		

D. KOTZE	D Kotze	11.2.16
Name	Signature	Date

ArcelorMittal

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Tel: 021 681 5400

Fax to email: 086 5404072

www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes ✓	No	
I would like to receive my notifications by:	Email ✓	Post	Fax

Comments;			
Title and Name:	Sophia Steynberg - Administration Manager		
Organisation:	PPC Saldanha		
Telephone:	(022) 703 - 8402	**Fax:**	(022) 715 - 3404
Cellphone:	082 558 4544	**Email:**	Sophia.Steynberg@ppc.co.za
Postal Address:	Private Bag x10, Saldanha, 7395		

Sophia Steynberg		19/02/2016
Name	Signature	Date

ArcelorMittal

IPCSA International Power Consortium South Africa

ERM

From: Shanon Neumann
To: ERM South Africa EIA Mailbox
Subject: Gas Fired Plant - Saldanha Bay
Date: 22 February 2016 11:52:07 AM

Good day Tougheeda,

My name is Shanon Neumann. I am writing to you in regarding our telephonic discussion we had on Friday morning.
Would it be able if you can forward me your draft report as well as Environmental Assessment Report regarding the Gas fired power station project in Saldanha.
You also mentioned that another report will be available beginning March.

Regards

Shanon Neumann
OperationsManager
Enlee Stevedoring
Tel: 022 714 0262 Fax: 0868025298
Cell: 083 611 4845 Email: ShanonN@enleestevedoring.co.za
3 Trighard Street Saldanha, PO Box 1271 Saldanha 7395

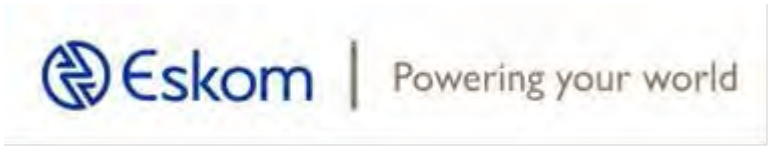
From:	Justine Wyngaardt
To:	ERM South Africa EIA Mailbox
Cc:	Owen Peters
Subject:	Registration as I&AP
Date:	23 February 2016 03:34:19 PM
Attachments:	image001.png

Good Day

Kindly register Eskom Distribution: Land Development & Environmental Management, Western Cape Operating Unit as I&AP on the EIA for Gas-Fired IPP to support Saldanha Steel and other industries in Saldanha Bay project, represented Justine Wyngaardt (Environmental Management) and Owen Peters (Land & Rights).

Kindly forward all project EIA information and supporting documents to us for comment:
Owen Peters PetersOw@eskom.co.za
Justine Wyngaardt wyngaajo@eskom.co.za

Regards,
Justine Wyngaardt
Environmental Manager
Land Development
Eskom: Western Cape Operating Unit
Tel +27 21 980 3112
Cell +27 82 938 3479
Fax +27 21 980 3053
Email: wyngaajo@eskom.co.za



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Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	(Yes)		No
I would like to receive my notifications by:	(Email)	Post	Fax

Comments;	Please register me as an IAP.		
Title and Name:	Miss Michelle Herbert		
Organisation:	Advisian		
Telephone:	(021) 912 3000	**Fax:**	086 509 5755
Cellphone:		**Email:**	michelle.herbert@advisian.com
Postal Address:	31 Allen Drive		
	Loevenstein, Bellville, 7530		

Michelle Herbert	[signature]	24/02/2016.
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Moses Ramakulukusha
To:	ERM South Africa EIA Mailbox
Subject:	Re: Environmental Impact Assessment for the Proposed Floating Power Plant in the Port of Saldanha, Western Cape, DEA Ref 14/12/16/3/3/2/885
Date:	01 March 2016 03:48:21 PM
Attachments:	IMAGE.png Moses Ramakulukusha.vcf

Good day

Can I please be emailed the Draft EIA Report.

Thanks.

Regards,
Ramakulukusha Moses

Environmental Officer Specialised Production
Coastal Conservation Strategies
Department of Environment Affairs

Tel: 021 819 2494 Fax: 021 819 2425
2 East Pier Shed, East Pier Road, V & A Waterfront, Cape Town, 8001, South Africa

P.O. Box 52126, V&A Waterfront, Cape Town, 8002

Email:MRamakulukusha@environment.gov.za

Website:www.environment.gov.za

>>> ERM South Africa EIA Mailbox <saldanhasteel.eia@erm.com> 2016/02/10 04:46 PM >>>
DEA Ref No: 14/12/16/3/3/2/885
ERM Ref No: 0320754

Dear Stakeholder

Environmental Impact Assessment for the Proposed Floating Power Plant in the Port of Saldanha, Western Cape

The Draft Scoping Report for the above mentioned Project was released for a 30 day comment period in November 2015, as part of Pre-Application Stakeholder Engagement. The Application has been submitted to the Department of Environmental Affairs (DEA) and a reference number assigned (14/12/16/3/3/2/885). In order to meet the administrative requirements of the DEA and the NEMA: EIA Regulations, the Draft Scoping Report will be re-released for public review and comment. The comment period will be open from 10 February to 11 March 2016.

The comments and responses report has been included in the Draft Scoping Report (*Annex B*) and has been attached to this email for your convenience. There have been no further changes to the Draft Scoping Report.

The Draft Scoping Report is available on the Project website: www.erm.com/gastopower

Draft Scoping Phase

From:	Hardwick, Al
To:	ERM South Africa EIA Mailbox
Cc:	Vaughn, Craig A.; Hudspith, Nigel; Renfro, Mike D.
Subject:	Saldanha Bay Power Project
Date:	14 March 2016 05:24:38 PM
Attachments:	ATT00001.txt

Please register our interest as an Interested and Affected Party and provide us with further information during the EIA process (application form attached).

In short, ConocoPhillips is one of the world's largest producers of LNG and we've been recently studying the potential gas demand growth in South Africa.
I'd be very grateful if you could offer me further information or put me in touch with the project manager for the IPCSA project at Saldanha Bay. Our main interest is in the potential provision of a Gas Supply Agreement and integrated FSRU solution.

Many thanks
Al Hardwick

Manager, Global LNG Trading & EMEA BD
ConocoPhillips Europe
Address: 6th floor, ConocoPhillips, Portman House, 2 Portman Street, London, W1H 6DU, United Kingdom. Registered in England and Wales, number 524868
Tel: +44 (0)20 7408 6250 (ETN - 377-6250)
Tel (mobile): +44 (0)7894 886504
Fax: +44 (0)20 7408 6839 (ETN - 377-6839)
Email: al.hardwick@conocophillips.com

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	(Yes)		No
I would like to receive my notifications by:	(Email)	Post	Fax

Comments; WE'RE INTERESTED IN POTENTIAL GAS SUPPLY AGREEMENTS AND PROVISION OF A FSRU AT SALDHANA BAY

Title and Name:	MR ALAN HARDWICK, MANAGER GLOBAL LNG TRADING		
Organisation:	CONOCOPHILLIPS		
Telephone:	+44 207 408 6250	**Fax:**	
Cellphone:	+44 7894 886504	**Email:**	AL.HARDWICK@COP.COM
Postal Address:	6TH FLOOR, PORTMAN HOUSE, 2 PORTMAN STREET		
	LONDON, UK, W1H 6DU		

AL HARDWICK		14/3/16
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Adri La Meyer
To:	ERM South Africa EIA Mailbox; Tougheeda Aspeling
Cc:	Thorsten Aab; Shaun Arendse; Peter Harmse; Hassan Parker; Taryn Dreyer; Zayed Brown; Russell Mehl; Ieptieshaam Bekko; Rainer Chambeau; Saa-rah Adams
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	14 March 2016 03:37:08 PM
Attachments:	image001.png

Good day,

Your e-mail dated 4 March 2016 and the Scoping Report received by the Department of Environmental Affairs and Development Planning on 8 March 2016, refer.

It is not clear whether the Application Form for S&EIR has been submitted to the National Department of Environmental Affairs. Kindly indicate whether the Application Form has been submitted and provide the Department with the DEA reference number.

It is noted that the commenting period on the Scoping Report (unsure whether this is a pre-application or Draft Scoping Report) is for 30 days from 4 March 2016 to 6 April 2016. Kindly confirm whether the public holidays have been excluded from the commenting period as per the 2014 EIA Regulations.

Regulation 3(1): *Subject to subregulations (2) and (3), when a period of days must in terms of these Regulations be reckoned from or after a particular day, that period must be reckoned as from the start of the day following that particular day to the end of the last day of the period, but if the last day of the period falls on a Saturday, Sunday or public holiday, that period must be extended to the end of the next day which is not a Saturday, Sunday or public holiday.*
Regulation 3(5): *Where a prescribed timeframe is affected by one or more public holidays, the timeframe must be extended by the number of public holiday days falling within that timeframe*.

Please do not hesitate to contact me should you require clarity on the above.

Kind regards,
Adri

Adri La Meyer
Directorate: Development Facilitation
Department of Environmental Affairs and Development Planning
Western Cape Government

11th Floor, Utilitas Building, 1 Dorp Street, Cape Town

Tel: (021) 483 2887
Fax: (021) 483 4185
E-mail: Adri.LaMeyer@westerncape.gov.za
Website: www.westerncape.gov.za/eadp

From: ERM South Africa EIA Mailbox [mailto:SouthAfrica.EIA@erm.com]
Sent: 04 March 2016 04:16 PM
To: Tougheeda Aspeling
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

ERM Ref: 0315829

DEA Ref: *14/12/16/3/3/2/910*

Dear Stakeholder

This notification serves to inform you that the Draft Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 04 March to 06 April 2016.

The Draft Scoping Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford (Newlands, Cape Town)

You are invited to submit your comments on the Draft Scoping Report to Tougheeda Aspeling of ERM:
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 0865404072

Your comments, and our response, will be incorporated into the Final Scoping Report to be submitted to DEA for consideration.

Please remember that your comments must reach ERM on or before **06 April 2016.**

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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Registration and Comment Sheet

[illegible]	Yes X	No	
[illegible]	Email X	Post	Fax

Comments: SERVICES- VALVE SUPPLY & SERVICE. INDUSTRIAL SERVICES, ROPE ACCESS. CRANES & LIFTING. LTI INSPECTIONS & LOADTEST HYDRAULICS, INSTRUMENTATION SUPPLY & INSTALL

[illegible]	SITE ENG'/MANAGER-SALDANHA-DAVE WATSON		
[illegible]	ENERMECH		
[illegible]	0227140342	[illegible]	H/O-0215123160-STEVE DAVID
[illegible]	0824190414	[illegible]	dwatson@enermech.com
[illegible]	P.O. BOX 701, SALDANHA, 7395		

DAVE WATSON	[signature]	01/03/2016
Name	Signature	Date

ArcelorMittal IPCSA ERM

WEST COAST BIRD CLUB
PO Box 1404, Vredenburg 7380
Affiliated To Birdlife South Africa

From, Keith Harrison, Conservation.

P.O. Box 1404, Tel, 022 – 7133026.

Vredenburg, Email. keithhbharrison@lando.co.za

7380,

To,

Tougheeda Aspeling, Tel, 021 – 681 5400.

ERM, Email, saldanhasteel.eia@erm.com

Postnet Suite 90, Private Bag X12, Tokai, 7966.

13th. March 2016.

ERM Ref. 0315829

DEA Ref. 14/12/16/3/3/2/910

Ref. Draft Scoping Report, EIA assessment of a Gas-fired Independent Power Plant to support Saldanha Steel and other Industries in Saldanha Bay.

Dear Tougheeda Aspeling,

Thank you for a very informative Draft Scoping Report, however there are some comments which I should like to make. Also the West Coast Bird Club (WCBC) reserves the right to comment further as information becomes available.

1. Site selection.
   The preferred site B lies across one of the main flyways for waterbirds and migrant waders, travelling between St. Helena Bay/Lower Berg River and Langebaan Lagoon. For periods of the year thousands of Kelp Gulls commute daily through the site.
   The route is Western end of the SFF Oil Tanks, East of Orex, Vredenburg landfill site and the switching yard (gravel road) at the corner where the St. Helena Bay road joins the R399 approximately longitude 18.03 east.
   In order to accurately determine this narrow route, a Radar survey would be necessary because migrant waders and waterbirds fly at night.
   A simple mitigation would be to move the Western boundary towards the Eastern boundary to miss the flyway, possibly about 100 metres.

2. Power evacuation and connection to the Grid.
   An avian impact analysis should be carried out into the effect of an increased number of power lines in the area, especially the proposed 400kV line to the Aurora Switching Station.

There are currently 5 large power lines using the servitude, also the effect at Aurora with additional lines going in and out.

3. Excavated material from levelling of site and foundations, where is it proposed to dispose of this material?

4. Site Traffic.
   How many traffic movements are expected, in and out of the site during construction, and the effect upon local road infrastructure?
   The vehicles used by the developer, contractors and sub-contractors should be registered with the Vredenburg Traffic Department so that some of the licence fee may be used to defray costs of damage to road infrastructure.

5. Labour employed.
   There is no breakdown of the labour to be sourced during construction and production into:-
   Skilled – to be brought in by contractors.
   Semi-skilled – to be sourced locally.
   Unskilled – to be sourced locally.

   Contractors and Sub-contractors should target employing 90% semi-skilled and unskilled labour that has 5 years proven residence in the Saldanha Bay Municipal Area.

Sincerely,

K.H.B. Harrison.

(Sent by Email 14th.March 2016)

From:	Christo
To:	ERM South Africa EIA Mailbox; Tougheeda Aspeling
Cc:	"Christo"
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	09 March 2016 02:50:30 PM
Attachments:	image001.png

Hi Tougheeda

Your draft Scoping Report for the Gas-fired Independent Power Plant with DEA Reference number 14/12/16/3/3/2/910 has reference:

- In Chapter 5 – Environmental and Social Baseline chapter, it is mentioned that an Area of Impact (AOI) will be the Port of Saldanha. Although mentioned as an area of Impact, the marine environment is excluded from your scoping report in total.
- It is suggested that in chapter 7 under heading Impacts and risks the following is addressed. This proposed project will increase shipping traffic in the Saldanha Bay marine environment, currently alien species infestation is a huge problem in the marine environment. The increased shipping due to gas transportation for the power station would potentially contribute to the alien impact in the bay and should be included in your EIA report.

It is recommended that the DEADP proposed generic Environmental Management Plan – Construction and Operational Phase (EMP) that is due for any project that would trigger increased shipping in Saldanha Bay should be applicable in this case and it is suggested that the EIA addresses this environmental risk.

The SBWQFT supports clean and sustainable industry and wishes you all the best with this endeavor.

Regards,

Christo van Wyk

SBWQFT

metsal@imaginet.co.za
022 - 714 3367 (Ph)
022 - 714 1156 (Fax)
082-376 8529 (cell)

SABS ISO 9001

From: ERM South Africa EIA Mailbox [mailto:SouthAfrica.EIA@erm.com]
Sent: Friday, March 04, 2016 4:16 PM
To: Tougheeda Aspeling
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

ERM Ref: *0315829*
DEA Ref: *14/12/16/3/3/2/910*

Dear Stakeholder

This notification serves to inform you that the Draft Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 04 March to 06 April 2016.

The Draft Scoping Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford (Newlands, Cape Town)

You are invited to submit your comments on the Draft Scoping Report to Tougheeda Aspeling of ERM:
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 0865404072

Your comments, and our response, will be incorporated into the Final Scoping Report to be submitted to DEA for consideration.

Please remember that your comments must reach ERM on or before **06 April 2016.**

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

From:	Sagar Sharma
To:	ERM South Africa EIA Mailbox
Cc:	"유양재_지사장님 YangJae Yu"
Subject:	FW: Daewoo International / Saldanha Gas IPP
Date:	09 March 2016 09:19:15 AM

Hi Tougheeda,

Further to my mail below, please could you furnish us with the 3 contact points of the individual project owners, so we may propose mutual cooperation for investment or development.

Thanks, looking forward to your response.

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444
Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

From: Sagar Sharma [mailto:sagar@daewooint.co.za]
Sent: Tuesday, 08 March 2016 8:13 AM
To: 'saldanhasteel.eia@erm.com' <saldanhasteel.eia@erm.com>
Cc: 'yjyu' <yjyu@daewoo.com>
Subject: FW: Daewoo International / Saldanha Gas IPP

Hi Tougheeda,

Hope you are well.

Please can you forward us more details on the 3 projects you mentioned.
Furthermore please send us the contact details of the different people in charge of the various projects so we can engage further.

Thank you, we look forward to hearing from you.

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)

Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444
Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

From: Sagar Sharma [mailto:sagar@daewooint.co.za]
Sent: Thursday, March 03, 2016 3:20 PM
To: saldanhasteel.eia@erm.com
Cc: '유양재 지사장님 YangJae Yu'
Subject: Daewoo International

Dear Tougheeda,

It was a pleasure speaking to you.
As you mentioned on the 3 upcoming projects, we are interested on each of the below projects:

- Richards bay Gas to power
- Saldanha Gas to Power
- AMSA Gas- Fired

We are interest to participate in these project where we can see a viable opportunity for cooperation. We have specialised companies within our group, namely Daewoo International, Posco energy and Posco E&C for power project organisation, EPC construction and O & M maintenance.
Please can you send us more information on the 3 project you mentioned. Thereafter if you can refer us to the right people per project so we can engage in further discussions.
Please review our company presentation material attached.

Thanks,

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444
Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

From:	Moses Ramakulukusha
To:	ERM South Africa EIA Mailbox; Tougheeda Aspeling
Subject:	Re: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	07 March 2016 10:27:58 AM
Attachments:	IMAGE.png Moses Ramakulukusha.vcf

Good day

Could you please kindly email me a copy of the available report.

Thanks.

Regards,
Ramakulukusha Moses

Environmental Officer Specialised Production
Coastal Conservation Strategies
Department of Environment Affairs

Tel: 021 819 2494 Fax: 021 819 2425
2 East Pier Shed, East Pier Road, V & A Waterfront, Cape Town, 8001, South Africa

P.O. Box 52126, V&A Waterfront, Cape Town, 8002

Email:MRamakulukusha@environment.gov.za

Website:www.environment.gov.za

>>> ERM South Africa EIA Mailbox <SouthAfrica.EIA@erm.com> 2016/03/04 04:16 PM >>>
ERM Ref: *0315829*
DEA Ref: *14/12/16/3/3/2/910*

Dear Stakeholder

This notification serves to inform you that the Draft Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 04 March to 06 April 2016.

The Draft Scoping Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford (Newlands, Cape Town)

You are invited to submit your comments on the Draft Scoping Report to Tougheeda Aspeling of ERM:
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 0865404072

Your comments, and our response, will be incorporated into the Final Scoping Report to be submitted to DEA for consideration.

Please remember that your comments must reach ERM on or before **06 April 2016.**

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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From:	Adri La Meyer
To:	Tougheeda Aspeling; ERM South Africa EIA Mailbox; Peter Harmse; Joy Leaner
Cc:	Stephan van den Berg; Lindsey Bungartz
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829
Date:	04 March 2016 02:15:32 PM
Attachments:	image003.png

AQM Reference: 19/4/4/BS1-Gas-fired Independent Power Plant, Saldanha

Dear Tougheeda,

Your e-mail dated 21 January with attached BID for the above-mentioned project, refers. Please find preliminary comment on the BID, as provided by the Directorate: Air Quality Management, to be addressed during the EIA process:

1. Noise and Dust Management

1.1 It is expected that dust and exhaust emissions will be generated during the construction phase of the proposed development, which could be a potentially significant impact.

1.2 The National Department of Environmental Affairs (DEA) gazetted the National Dust Control Regulations on 1 November 2013 (GN No. R. 827) in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA), which must be adhered to. These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fall, may have a detrimental effect on the environment, including health.

1.3 Noise generated during the construction and operational phases of the development must comply with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013.

1.4 Contractors must implement noise reduction measures, which must be addressed as part of the Environmental Management Programme.

2. Odour emission impact management

2.1 In terms of Section 35(2) of the NEM:AQA, the applicant must take all reasonable steps to prevent the emission of any offensive odour caused by any activity on the premises.

3. Air emission listed activity

3.1 The proposed operation triggers the following atmospheric emission listed activities identified in GN No. 893, promulgated in terms of Section 21 of NEM:AQA, being Category 1 (Combustion Installations), Subcategory 1.4 (Gas Combustion Installations) which is described as "*Gas combustion (including gas turbines burning natural gas) used primarily for steam raising or electricity generation*" and is applicable to "*All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used*."

3.2 The proposed installation must comply with the Minimum Emission Standard as listed under the above-mentioned subcategory.

More detailed comment from the Department will be provided once the Draft Scoping Report is made available for comment.

Kind regards,
Adri

Adri La Meyer
Directorate: Development Facilitation
Department of Environmental Affairs and Development Planning
Western Cape Government

11th Floor, Utilitas Building, 1 Dorp Street, Cape Town

Tel: (021) 483 2887
Fax: (021) 483 4185
E-mail: Adri.LaMeyer@westerncape.gov.za
Website: www.westerncape.gov.za/eadp

Be 110% Green. Read from the screen.

From: Adri La Meyer
Sent: 22 January 2016 09:49 AM
To: Tougheeda Aspeling; 'saldanhasteel.eia@erm.com'
Cc: Stephan van den Berg; Lindsey Bungartz
Subject: RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear Tougheeda,

Thank you for your e-mail. Please register the Department of Environmental Affairs and Development Planning as a state Department having an interest in the application.

Could you please provide us with 1 hard copy and 2 electronic copies of the Draft Scoping Report (DSR) once it is available for public comment? Please address the DSR to the Directorate: Development Facilitation, who will collate the comments from all relevant directorates in the Department.

It is further noted that an AEL and/or WML authorisation may be required. In this regard, your attention is drawn to Section 36(5)(d) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) which states that the National Minister of Environmental Affairs is the licensing authority if "*the listed activity relates to the activities listed in terms of section 24(2) of the National Environmental Management Act, 1998, or in terms of section 19(1) of the National Environmental Management: Waste Act, 2008, or the Minister has been identified as the competent authority.*"

Kind regards,
Adri

Adri La Meyer
Directorate: Development Facilitation
Department of Environmental Affairs and Development Planning
Western Cape Government

11th Floor, Utilitas Building, 1 Dorp Street, Cape Town

Tel: (021) 483 2887
Fax: (021) 483 4185
E-mail: Adri.LaMeyer@westerncape.gov.za
Website: www.westerncape.gov.za/eadp

Be 110% Green. Read from the screen.

From: ERM South Africa EIA Mailbox [mailto:SouthernAfrica.EIA@erm.com]
Sent: 21 January 2016 04:26 PM
To: Tougheeda Aspeling

Cc: Stephan van den Berg; Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay ERM Ref: 0315829

Dear Stakeholder,

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the primary user, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha, West Coast District Municipality and the Western Cape Province.

The Project requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, through an Environmental Impact Assessment (EIA) process.

This notification serves to announce the commencement of the EIA process and invites you to attend a public meeting to find out more about the Project. You will also be able to raise issues and pose questions to the Project team.

When: 16 February 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

For further information about the EIA, the associated public participation process and how you can register as an Interested and Affected Party (I&AP), please refer to the attached Background Information Document.

To RSVP or register as an I&AP contact Tougheeda Aspeling of ERM:
Tel: 021 681 5400
Fax: 086 540 4072
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Visit the Project website: www.erm.com/saldanhasteel

If you wish to be removed from this database, please reply to this email to inform ERM.

Yours sincerely

Tougheeda Aspeling
Stakeholder Engagement Consultant

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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From:	Sagar Sharma
To:	ERM South Africa EIA Mailbox
Cc:	"유양재_지사장님 YangJae Yu"
Subject:	Daewoo International
Date:	03 March 2016 03:23:31 PM
Attachments:	2016 Daewoo Int"l Power PPT.PDF 2016 POSCO E&C Intro.pdf

Dear Tougheeda,

It was a pleasure speaking to you.
As you mentioned on the 3 upcoming projects, we are interested on each of the below projects:

- Richards bay Gas to power
- Saldanha Gas to Power
- AMSA Gas- Fired

We are interest to participate in these project where we can see a viable opportunity for cooperation. We have specialised companies within our group, namely Daewoo International, Posco energy and Posco E&C for power project organisation, EPC construction and O & M maintenance.
Please can you send us more information on the 3 project you mentioned. Thereafter if you can refer us to the right people per project so we can engage in further discussions.
Please review our company presentation material attached.

Thanks,

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
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Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

CapeNature

SCIENTIFIC SERVICES

postal Private Bag X5014 Stellenbosch 7599
physical Assegaaibosch Nature Reserve Jonkershoek
website www.capenature.co.za
enquiries Alana Duffell-Canham
telephone +27 21 866 8000 **fax** +27 21 866 1523
email aduffell-canham@capenature.co.za

reference **SSD14/2/6/1/8/4/129&195-2_Energy_Gas_SaldanhaSteel**
date **24 March 2016**

Tougheeda Aspeling
ERM Southern Africa
Postnet Suite 90
Private Bag X12
Tokai
7966

By email: saldanhasteel.eia@erm.com

Dear Ms Aspeling

Re: Proposed Independent Power Plan to support Saldanha Steel and other industries in Saldanha Bay – Draft Scoping Report.
DEA ref: TBA

CapeNature would like to thank you for the opportunity to comment on the Draft Scoping Report for this application and wish to make the following comments:

1. The preferred as well as alternative sites have been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine-scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by CapeNature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat). A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be endangered, is considered to have a high negative impact.

2. Site alternative A (which we note is not preferred due to limitations on possible future expansion) is also not preferred by CapeNature as development on this site would have a greater impact on ecological connectivity as it is directly south of an outcrop of Saldanha Limestone Strandveld which is of high conservation importance (which the botanical specialist has noted).

3. We would like more detailed information on the impact of the powerline to Aurora substation. Several other power generation projects are proposing connection to Aurora substation and cumulative impacts on habitat, especially the Hopefield Sand Fynbos near the substation is of high concern. The main impact arising out of any new power line application is the need to create a servitude and access roads not only for

construction of the power line but also for maintenance purposes. Power line routes should aim to use existing servitudes and access roads.

4. Poor vegetation management under and in close proximity to power lines is one of the main causes of loss of biodiversity associated with power lines. Vegetation is often brush cut or mowed unnecessarily resulting in a loss of diversity over time. Long term management of access roads and servitudes must be addressed in the Environmental Management Programme.

5. A substantial amount of the Critical Biodiversity Areas has already undergone or will be undergoing transformation as a result of development in the Saldanha Bay Municipality and it has become increasing important to conserve the more intact areas of natural vegetation. The applicants land has been impacted on by their own development and that of lease-holders. The applicant does still own some intact areas which are of high conservation importance and a trade-off for existing and future development should be made by conserving certain areas. A strategic, proactive approach to conservation will allow other areas to be made available for development. This should be further investigated as part of this application, especially as it seems that the applicant intends to expand the power plant in the future. Formal conservation (including having a management plan) of the two areas that were required to be conserved as part of the original authorisation for Saldanha Steel processing plant should also be encouraged.

CapeNature reserves the right to revise initial comments and request further information based on any additional information that may be received.

Yours sincerely

Alana Duffell-Canham
For: Manager (Scientific Services)

From:	Sagar Sharma
To:	ERM South Africa EIA Mailbox
Cc:	"유양재_지사장님 YangJae Yu"
Subject:	RE: Daewoo International / Saldanha Gas IPP
Date:	23 March 2016 10:17:09 AM

Hi Tougheeda,

Please can you send me the contact details of the different PIC's involved in the project stated below. We are interested and need assistance with the contact details?

Please let me know asap?

Kind Regards,

Sagar Sharma
Marketing and Business Development
posco DAEWOO
Formerly Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444
Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

From: Sagar Sharma [mailto:sagar@daewooint.co.za]
Sent: Wednesday, 09 March 2016 9:19 AM
To: 'saldanhasteel.eia@erm.com' <saldanhasteel.eia@erm.com>
Cc: '유양재 지사장님 YangJae Yu' <yjyu@daewoo.com>
Subject: FW: Daewoo International / Saldanha Gas IPP

Hi Tougheeda,

Further to my mail below, please could you furnish us with the 3 contact points of the individual project owners, so we may propose mutual cooperation for investment or development.

Thanks, looking forward to your response.

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444

Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

From: Sagar Sharma [mailto:sagar@daewooint.co.za]
Sent: Tuesday, 08 March 2016 8:13 AM
To: 'saldanhasteel.eia@erm.com' <saldanhasteel.eia@erm.com>
Cc: 'yjyu' <yjyu@daewoo.com>
Subject: FW: Daewoo International / Saldanha Gas IPP

Hi Tougheeda,

Hope you are well.

Please can you forward us more details on the 3 projects you mentioned.
Furthermore please send us the contact details of the different people in charge of the various projects so we can engage further.

Thank you, we look forward to hearing from you.

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444
Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

From: Sagar Sharma [mailto:sagar@daewooint.co.za]
Sent: Thursday, March 03, 2016 3:20 PM
To: saldanhasteel.eia@erm.com
Cc: '유양재 지사장님 YangJae Yu'
Subject: Daewoo International

Dear Tougheeda,

It was a pleasure speaking to you.
As you mentioned on the 3 upcoming projects, we are interested on each of the below projects:

- Richards bay Gas to power
- Saldanha Gas to Power
- AMSA Gas- Fired

We are interest to participate in these project where we can see a viable opportunity for cooperation. We have specialised companies within our group, namely Daewoo International, Posco energy and Posco E&C for power project organisation, EPC construction and O & M maintenance.
Please can you send us more information on the 3 project you mentioned. Thereafter if you can refer us to the right people per project so we can engage in further discussions.
Please review our company presentation material attached.

Thanks,

Kind Regards,

Sagar Sharma
Marketing and Business Development
Daewoo International Corp.
6th Floor, Fredman Towers, 13 Fredman Drive
Sandton, Johannesburg, South Africa (2196)
Tel : (+27) 011 784-1326
Fax : (+27) 086 605 4444
Cell : (+27) 083 636 1090
IP : 070 7810 7375
E-Mail: sagar@daewooint.co.za

EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X		No	
I would like to receive my notifications by:	Email X	Post	Fax	

Comments;			
Title and Name:	Johann Bester		
Organisation:	Thebe Investment Corporation		
Telephone:	011 447 7800	**Fax:**	011 447 5502
Cellphone:	071 591 8568	**Email:**	johan@thebe.co.za
Postal Address:	P.O. Box 3308		
	Parklands, 2121		

Johann Bester	JABester	23 March 2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Vaughn, Craig A.
To:	ERM South Africa EIA Mailbox
Subject:	LNG - Saldanha Bay
Date:	21 March 2016 04:53:54 PM
Attachments:	ConocoPhillips LNG Overview.pdf

ConocoPhillips is the world's largest independent exploration & production company that is headquartered in Houston, Texas. Part of our value proposition includes the participation in numerous LNG projects across the globe (please see attached pdf). Our company has a long history of supplying LNG to the marketplace and we are interested in learning more about your future LNG needs in Saldanha Bay.

Can you please consider sharing the contact of the individual whom I may discuss ideas concerning future LNG supply arrangements?

Thank you very much for your consideration. If you have any questions, please free to contact me at your convenience. I have attached my contact information for your reference. Thanks,

Craig

WESKUS DISTRIKSMUNISIPALITEIT
WEST COAST DISTRICT MUNICIPALITY

Rig alle korrespondensie aan:
Address all correspondence to:

MUNISIPALE BESTUURDER/
MUNICIPAL MANAGER

Navrae/Enquiries : Doretha Kotze
Verw.Nr./Ref. No.: 13/2/12/3/1

Posbus / P O Box 242
MOORREESBURG, 7310

Telefoon/Phone (022) 433 8400
Faks/Fax Nr. 086 6926 113

E-Mail Adres/Address :
westcoastdm@wcdm.co.za

1 April 2016

ATTENTION: TOUGHEEDA ASPELING

Environmental Resources Management
Postnet Suite 90
Private Bag X12
TOKAI
7966

Madam

DRAFT SCOPING REPORT: PROPOSED GAS-FIRED POWER PLANT FOR SALDANHA STEEL AND OTHER INDUSTRIES, SALDANHA BAY

1. Your letter of 4 March 2016 and the Draft Scoping Report for the project have reference.

2. The West Coast District Municipality takes note of the information contained in the Draft Scoping Report for the proposal. However, it is recommended that more information be provided on the following:

   2.1 Cumulative impact on water resources taking into account all existing and proposed industrial developments at the Saldanha Port.

   2.2 Disaster Risk Management.

Yours faithfully

MUNICIPAL MANAGER
/dk

Sandheuwel
VREDENBURG
7380
Mobile number: 0616191385
Fax: 086595 1539
Email Address: anthonymlata@gmail.com

22 March 2016

ERM Ref: *0315829*
DEA Ref: *14/12/16/3/3/2/910*

Tougheeda Aspeling
Postnet Suite 90
Private Bag X12
Tokai
7966

To whom it concern:

RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Cederberg Golfers Association (Pty) Ltd is a Vredenburg/Saldanha based engineering and construction company. The Board of Directors of the abovementioned company supports the EIA for a gas-fired independent power plant to support Arcelor Mittal Saldanha and other Industries but draws the attention of the EIA on the following;

1. Saldanha Bay Municipality has over the years transformed from an Agriculture and Fishing community to an Industrial and Manufacturing community. Yes, many benefits came but thousands of workers on farms and at sea lost their work, therefore increasing poverty and unemployment levels in historically disadvantaged towns.

2. The building of Saldanha brought a new rush to the economy but also an influx of people from other provinces. This meant new phenomena erupted called competition. Workers from provinces with mines and industries were more successful as they complied with the minimum skills thrust.

3. Yes, some individuals were sent on training but this didn't have a strong enough impact to the pressure the towns found itself in

4. Three informal settlements grow and one came about as a direct result of Saldanha Steel.

Sandheuwel
VREDENBURG
7380
Mobile number: 0616191385
Fax: 086595 1539
Email Address: anthonymlata@gmail.com

5. Immediately there was a shortage of housing and tremendous pressure on municipal infrastructure

Considering the above IPCSA must also consider climate change and its impact.

Water is a severe scarcity in the country. Alternative water supplies to the plant must be considered. A Think tank between IPCSA and Saldanha Bay municipality must be established to consider alternative solutions

During the EIA stages, applicable skills needs must be identified throughout the different stages of construction and must a training development campaign be launched for individuals and SMME's within the area of jurisdiction.

Plans with the municipality should be considered to address possible pressure on the municipal infrastructure, especially basic services. Consideration should be given to the current IDZ developments and its impact on the environment.

Recommendation

Cederberg Golfers Association (Pty) Ltd;
1. Note the EIA report
2. Support the initiative with the proviso that this report be considered

Best Regards

[Electronic copy]

Anthony V Mlata
Chief Executive Officer/Director

SALDANHA BAAI BAY
MUNISIPALITEIT | MUNICIPALITY | uMASIPALA

REF NO:
Pl 129 rem; Pl195/2
ENQUIRIES:
N Duarte; E Mmbadi
Ms Mr

Tougheeda Aspeling

REGISTERED MAIL

ERM Southern Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
Tokai
7966

RE: DRAFT SCOPING REPORT FOR PROPOSED GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY, WESTERN CAPE PROVINCE.

1. The Proposed Gas-Fired Independent Power Plant to support Saldanha Steel and other Industries in Saldanha Bay: Draft Scoping Report dated 04 March 2016 refers.

2. The negative cumulative impact on the Critical Biodiversity Area within the Saldanha Bay area due to development of industries and associated infrastructures is Saldanha Bay Municipality's priority concern. A detailed botanical study is required for further comments.

3. Storm water management and waste water discharge are of serious concern and should be discussed in detail.

4. Please inform the Environment & Heritage Section of the Saldanha Bay Municipality on any Paleontological and Archaeological findings for our records.

pp: MUNICIPAL MANAGER
Date: 05-04-16
/em

T: (022) 701 7000 ◦ F: (022) 715 1518
mun@sbm.gov.za ◦ www.sbm.gov.za
Private Bag X12 ◦ Vredenburg ◦ 7380

Serve, Grow and Succeed Together

Western Cape Government
Environmental Affairs and Development Planning
BETTER TOGETHER.

Adri La Meyer
DIRECTORATE: DEVELOPMENT FACILITATION
Adri.LaMeyer@westerncape.gov.za

REFERENCES:
16/3/3/6/4/1/1/F4/17/3013/16 (Development Management)
19/2/5/3/F4/18/WL0043/16 (Waste Management)
19/4/4/BS1-Gas-Fired Independent Power Plant, Saldanha (Air Quality Management)

DATE: 2016 -04- 06

The Board of Directors
ERM South Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
TOKAI
7966

For attention: Ms Tougheeda Aspeling

Tel: (021) 681 5400
Fax: (021) 686 0736

Dear Madam

COMMENT ON THE DRAFT SCOPING REPORT AND PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED COMBINED CYCLE GAS TURBINE POWER PLANT AND ASSOCIATED INFRASTRUCTURE ON THE REMAINING EXTENT OF THE FARM YZERVARKENSRUG NO. 129 AND PORTION 2 OF THE FARM JAKKALSKLOOF NO. 195, SALDANHA BAY (DEA REREFENCE 14/12/16/3/3/2/910)

1. The Draft Scoping Report (DSR) and Plan of Study (PoS) for Environmental Impact Assessment (EIA) for the above-mentioned application dated 4 March 2016 and received by the Department on 8 March 2016, refer. The following consolidated comment by various directorates in the Department of Environmental Affairs and Development Planning (hereinafter referred to as "the Department") is hereby offered.

2. Directorate: Development Management (Region 1) – Keagan-Leigh Adriaanse (Keagan-Leigh.Adriaanse@westerncape.gov.za; Tel: (021) 483 8349):

2.1 The EIA Report must provide an adequate activity description of the following components of the proposed development:

2.1.1 The coordinates of the proposed submersible pipeline (which will transport liquefied natural gas (LNG) or compressed natural gas (CNG) from the Port of Saldanha to the proposed facility). This must include the starting point, middle point and end point of the pipeline.

2.1.2 The coordinates of the proposed combined cycle gas turbine (CCGT) power plant.
2.1.3 The coordinates of the proposed transmission lines that will be developed from the proposed CCGT power plant to the Aurora and Blouwater substations. This must include the starting point, middle point and end point of the transmission lines.
2.1.4 The route of the proposed pipeline and the property details of the affected farms.
2.1.5 The property details of the affected farms in relation to the proposed transmission lines.
2.1.6 The width of the road reserve of the proposed access road(s).
2.1.7 The estimated capacities of the fuel storage tanks and the chemical storage facilities.
2.1.8 The total development footprint of the proposed CCGT power plant and associated infrastructure.

2.2 Applicable Listed Activities:

2.2.1 GN No. R. 983 of 4 December 2014

2.2.1.1 Given that the proposed development entails the clearance of approximately 45ha of indigenous vegetation and that Activity 15 of GN No. R. 984 of 4 December 2014 has been applied for; this Directorate is of the opinion that Activity 27 of Listing Notice 1 is not triggered by the proposed development.

2.2.1.2 It is noted that the proposed site has been previously used for agricultural activities. An indication of whether the proposed site has been used for agriculture on or after 1 April 1998 must be provided to determine whether Activity 28 of Listing Notice 1 is applicable.

2.2.2 GN No. R. 984 of 4 December 2014

This Directorate is of the opinion that Activity 6 of GN No. R. 984 of 4 December 2014 is triggered by the proposed development and should be applied for. This is based on the fact that the proposed development requires an Atmospheric Emissions Licence (AEL) in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA).

2.2.3 GN No R. 985 of 4 December 2014

It is noted that Activity 12 of this listing notice has been included in the DSR. However, please note that the proposed development is not mapped as having any critically endangered or endangered ecosystem listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): National List of Ecosystems that are threatened and in need of protection (Government Gazette No. 34809 of 9 December 2011). As such, Activity 12 is not triggered by the proposed development.

2.3 Legislative requirements:

2.3.1 It is noted that an AEL will be required in terms of NEM:AQA. Proof of submission of the AEL application to the licensing authority must be included in the EIA Report.

2.3.2 Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is applicable to the proposed development. It is uncertain whether Heritage Western Cape or the South African Heritage Resources Agency is the competent heritage resources authority. A Notice of Intent to Develop (NID) should have been submitted to the competent heritage resources authority when the DSR was released for comment and a NID should at least be submitted prior to the submission of the Scoping Report to the Department of Environmental Affairs (DEA). In terms of section 38(8) of the NHRA, DEA must ensure that the relevant heritage authority's requirements in terms of a heritage assessment are fulfilled. The NID together with the DSR will enable the competent heritage resources authority to provide an indication of their heritage requirements and to determine whether the Terms of Reference for the Heritage Impact Assessment is sufficient.

2.4 Services:

2.4.1 Confirmation that the Local Authority has sufficient, spare and unallocated capacity to provide solid waste removal and disposal and any other services required for the proposed development, must be provided in the EIA Report.

2.4.2 It is noted that water for the operational phase of the proposed development will be sourced from annual precipitation and stored in water storage tanks. Given the existing drought in the West Coast Region, it is recommended that alternative water supply options be investigated. (In this regard, also see comment 3.2 below.)

2.5 Impact assessment:

2.5.1 It is noted that a pipeline will be developed from the Port of Saldanha to the proposed CCGT power plant and that possible mooring or berthing facilities may be required. The following potential impacts must therefore be included in the list of impacts to be assessed in the EIA Report:

2.5.1.1 The potential impacts related to marine traffic;

2.5.1.2 The potential impacts related to marine flora and fauna;

2.5.1.3 The potential impacts related to the offloading of products; and

2.5.1.4 The potential impacts related to the development of the submersible pipeline.

2.5.2 The potential risks associated with the proposed development must be identified and assessed.

2.5.3 Given that there are at least two other EIA processes being undertaken for gas turbine power plants within close proximity to the proposed site (i.e. on Portion 1 of Farm Uyekraal No. 189, Saldanha and on Portion of the Remainder of Farm Langeberg No. 188, Saldanha Bay), the potential cumulative impacts of the proposed development in relation to other electricity generation projects must be identified and assessed.

2.6 General:

2.6.1 Given that the Aurora substation is anticipated to receive the additional electricity, confirmation must be provided by ESKOM whether the Aurora substation would require any upgrades. This must be included in the EIA Report.

3. Directorate: Waste Management – Thorsten Aab (Thorsten.Aab@westerncape.gov.za; Tel: (021) 483 3009):

3.1 The DSR indicates that very little waste is expected to be generated through the use of CNG and LNG as fuel source for the gas turbines. Although the volume of general and hazardous waste that will be generated and stored at the CCGT facility would not require a waste management licence, the applicant's attention is drawn to his "general duty of care" as prescribed in Section 28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) to ensure that storage of waste does not impact on the environment.

3.2 As per comment 2.4.2 above, alternative water sources (e.g. the desalination of sea water) for use during the power generation process must be considered and assessed during the EIA phase.

3.3 The DSR indicates that a wastewater treatment and water reclamation plant will be constructed during phase 1 of the proposed development. The EIA Report must provide further details on the treatment and reclamation plant (e.g. development footprint, location and coordinates, design capacity, effluent disposal, etc.).

4. Directorate: Air Quality Management – Peter Harmse (Peter.Harmse@westerncape.gov.za; Tel: (021) 483 8343):

4.1 Noise and dust management:

4.1.1 It is anticipated that dust and exhaust emissions will be generated during the construction and operational phase of the proposed development, which could potentially result in significant biophysical impacts.

4.1.2 DEA gazetted the National Dust Control Regulations on 1 November 2013 (GN No. R. 827) in terms of NEM:AQA, which must be complied with. These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fall, may have a detrimental effect on the environment, including health.

4.1.3 Noise generated from the construction and operation of the proposed development must comply with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013.

4.2 Odour emission impact management:

4.2.1 In terms of Section 35(2) of NEM:AQA, the applicant must take all reasonable steps to prevent the emission of any offensive odour caused by any activity at the CCGT plant.

4.3 Air emission impact management:

4.3.1 It is expected that possible emissions to air from a gas turbine facility would include carbon dioxide, water vapour, carbon monoxide, oxides of nitrogen, and minor emissions of metals and metal compounds and organics.

4.3.2 Other emissions of air pollutants are expected from gas venting during commissioning, maintenance shutdowns and from process vents. The Air Quality Management Study must identify appropriate management and mitigation measures to address the emission sources from the proposed CCGT plant.

4.3.3 The Air Quality Management Study must further address impacts associated with engine emissions from construction and operational traffic.

4.4 Atmospheric emission listed activities:

4.4.1 The proposed development triggers the following atmospheric emission listed activity identified in GN No. 893, promulgated in terms of Section 21 of NEM:AQA, being Category 1 (Combustion Installations), Subcategory 1.4 (Gas Combustion Installations) which is described as *"Gas combustion (including gas turbines burning natural gas) used primarily for steam raising or electricity generation"* and is applicable to *"All installations with design capacity equal to or greater than 50MW heat input per unit, based on the lower calorific value of the fuel used"*.

4.4.2 The proposed development may also include the storage of petroleum products. It should be noted that Subcategory 2.4 (Storage and Handling of Petroleum Products) is applicable to *"All permanent immobile liquid storage facilities at a single site with a combined storage capacity of greater than 1 000 cubic meters"*. The EIA Report must indicate the petroleum storage capacity of the CCGT plant to determine whether Subcategory 2.4 of GN No. 893 is triggered by the proposed development.

4.4.3 The design and operation of the CCGT plant must comply with the Minimum Emission Standard as listed under the above-mentioned subcategories.

4.5 General:

4.5.1 Section 3.8.3 of the DSR (technology alternatives) states that there are two types of gas fired power plants, being open-cycle and combined cycle gas turbine plants. The heading however refers to "*Open-cycle vs Closed-cycle Gas Turbines*". Although it is understood to be a typographical error and should read "*Open-cycle vs Combined cycle Gas Turbines*", it should be noted that all three turbine types (i.e. open, closed and combined cycle) exist and should be comparatively assessed.

4.5.2 It is noted that dry/air cooling is the preferred alternative for the cooling system of the gas turbine plant. However, dry/air cooling is less efficient than the once-through and wet cooling systems, thus resulting in greater atmospheric emissions. The EIA Report should comparatively assess all identified cooling system alternatives and also investigate other cooling system alternatives, e.g. hybrid cooling.

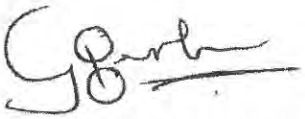
5. Directorate: Pollution and Chemicals Management – Zayed Brown (Zayed Brown@westerncape.gov.za; Tel: (021) 483 8367)

5.1 This Directorate has no comments on the DSR and awaits the EIA Report to provide detailed comment.

6. Please direct all enquiries to the officials indicated in this correspondence should you require any clarity on any of the issues/comments provided.

7. The Department reserves the right to revise initial comments and request further information based on the information received.

Yours faithfully



pp **HEAD OF DEPARTMENT**
DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447· PRETORIA · 0001· Environment House · 473 Steve Biko, Arcadia· PRETORIA
Tel (+ 27 12) 399 9372

DEA Reference: 14/12/16/3/3/2/910
Enquiries: Ms Thabile Sangweni
Telephone: (012) 399 9409 **E-mail:** TSangweni@environment.gov.za

Mr Stuart-Heather Clark
Environmental Resources Management South Africa
Postnet Suite 90
Private Bag X12
TOKAI
7966

Telephone Number: (021) 681 5400
Email Address: Stuart.heather-clark@erm.com

PER E-MAIL / MAIL

Dear Mr Clark

COMMENTS ON THE DRAFT SCOPING REPORT FOR THE PROPOSED SALDANHA STEEL GAS-FIRED INDEPENDENT POWER PLANT IN SALDANHA BAY WITHIN THE SALDANHA BAY LOCAL MUNICIPALITY IN THE WESTERN CAPE PROVINCE

The draft Scoping Report (SR) dated March 2016 and received by this Department on 10 March 2016 refers.

This Department has the following comments on the abovementioned application:

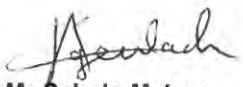
i. Please ensure that all relevant listed activities are applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description.
ii. With regards to GN R. 985 Activities 2, 4 and 12, written comments from relevant authorities must be obtained and submitted to this Department confirming their applicability to the proposed development. In addition, a graphical representation of the proposed development within the respective geographical areas must be provided.
iii. If the activities applied for in the application form differ from those mentioned in the final SR, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.
iv. Please ensure that all issues raised and comments received during the circulation of the SR from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the Final SR. Proof of correspondence with the various stakeholders must be included in the Final SR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments. The Public Participation Process must be conducted in terms of Regulation 39, 40 41, 42, 43 & 44 of the EIA Regulations 2014.
v. Further to the above, this Department requires comments from this Department's Biodiversity and Conservation Directorate, the Climate Change Directorate as well as the Air Quality Directorate, and the Department of Energy.
vi. In accordance with Appendix 2 of the EIA Regulations 2014, the details of—

(i) the EAP who prepared the report; and
(ii) the expertise of the EAP to carry out Scoping and Environmental Impact assessment procedures;
must be submitted.

vii. This Department recommends that a specialist study investigates and assesses the climate change risks associated with the proposed development.
viii. This Department recommends that a transport impact study be done.
ix. The SR must include an assessment of the risk of transporting, storing and processing of dangerous goods on site, including gas, petroleum, etc.
x. The SR must assess the impacts of use of water on site (sourcing, treating, disposing etc.).
xi. The SR must assess the impacts on Air Quality in the area.
xii. Based on the above, and in accordance with Appendix 2 of the EIA Regulations 2014, the final SR must include a detailed assessment of the various alternatives investigated to determine the preferred alternatives that will be further assessed in the EIAr.
xiii. All comments raised by Interested and Affected Parties must be responded to.
xiv. You are further reminded that the final SR to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of scoping reports in accordance with Appendix 2 and Regulation 21(1) of the EIA Regulations, 2014.
xv. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of the these Regulations, unless an extension has been granted in terms of Regulation 3(7).

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.

Yours faithfully



Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Environmental Affairs
Signed by: Mr Coenrad Agenbach
Designation: Deputy Director: Strategic Infrastructure Developments
Date: 05/04/2016

cc:	Mr Richard Holcroft	ArcelorMittal South Africa	Email: Ricard.Holcroft@arcelormittal.com

Final Scoping Phase

From:	EIICHI TAKAHASHI
To:	Tougheeda Aspeling
Cc:	Takatsune Hirayama
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	14 April 2016 10:02:25 AM
Attachments:	image001.png

Dear Mr. Aspeling

Thank you sending the information.
Would you do me one favor. Can you please add Mr. Hirayama who is my colleague in ITOCHU so that he can receive the information related to the captioned matter from now on.
Mr. Hirayama's e-mail is hirayama-t@itochu.co.jp and is already included in this e-mail as CC.

Best regards

==========
Eiichi Takahashi

ITOCHU Corporation
Power Project Investment Section
Power Project Department
Machinery Company

Tel: 81-3-3497-3031
Fax: 81-3-3497-4137
==========

From: ERM South Africa EIA Mailbox [mailto:SouthAfrica.EIA@erm.com]
Sent: Wednesday, April 13, 2016 12:01 AM
To: Tougheeda Aspeling
Cc: Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

This notification serves to inform you that the Final Scoping Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay has been submitted to the Department of Environmental Affairs for adjudication.

A copy of the Final Scoping Report is available on the Project website, www.erm.com/saldanhasteel and a copy of the Comments and Responses Report has been attached to this email. You are encouraged to read through the comments and responses report and ensure that your comment has been recorded and responded to.

Should you have any questions, please contact Tougheeda Aspeling of ERM:

Email: saldanhasteel.eia@erm.com
Tel: 021 681 5400
Fax: 0865404072

Thank you for your participation in this process.

Regards

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

The world's leading sustainability consultancy

ILifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

Our Ref:	HM/WEST COAST/SALDANHA BAY/FARM YZERVARKENSRUG 129 & PORTION 2 OF FARM JACKELSKLOOF 195
Case No.:	16041107AS0425E
Enquiries:	Andrew September
E-mail:	andrew.september@westerncape.gov.za
Tel	021 483 9543
Date:	06 May 2016

Stuart Heather-Clark
2nd Floor Great Westerford
240 Main Road
Rondebosch
7700
Stuart.heather-clark@erm.com

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: HIA REQUIRED
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED ARCELORMITTAL GAS TURBINES AND ASSOCIATED ELECTRICAL INFRASTRUCTURE ON REMAINDER EXTENT ON FARM YZERVARKENSRUG 129 AND PORTION 2 OF FARM JACKELSKLOOF 195, SALDANHA BAY, WEST COAST, SUBMITTED IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 16041107AS0425E
DEADP Reference: N/A
The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received on 25 April 2016. This matter was discussed at the Heritage Officers meeting held on 29 April 2016.

You are hereby notified that, since there is reason to believe that the proposed gas turbines and associated electrical infrastructure will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following:

- Impacts to archaeological heritage resources
- Impacts to palaeontological heritage resources

The required HIA must have an integrated set of recommendations.

The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

Yours faithfully

.....
Mr Mxolisi Dlamuka
Chief Executive Officer, Heritage Western Cape

From: Lana Ignjatovic
To: Tougheeda Aspeling
Subject: Register as an I&AP: Saldanha Bay Gas Fired Power Plant
Date: 19 July 2016 03:01:32 PM
Attachments: image002.png
Importance: High

Good afternoon,

Please would you register me as an interested party in the above mentioned EIA process. We are interested in the project once the EA has been issued, and would like to follow the process. We will not be making any comments for or against the proposed project.

Your kind assistance will be greatly appreciated.

Kindest regards,

LEADS2 BUSINESS

Lana Ignjatovic
Branch Administrator
Cape Town

W: www.L2B.co.za
E: Lanal@L2B.co.za
P: +27 21 250 0109
F: +27 21 250 0098

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Draft EIA Phase

SCIENTIFIC SERVICES

postal Private Bag X5014 Stellenbosch 7599
physical Assegaaibosch Nature Reserve Jonkershoek
website www.capenature.co.za
enquiries Alana Duffell-Canham
telephone +27 21 866 8000 **fax** +27 21 866 1523
email aduffell-canham@capenature.co.za
reference **SSD14/2/6/1/8/4/129&195-2_Energy_Gas_SaldanhaSteel**
date **08 August 2016**

Tougheeda Aspeling
ERM Southern Africa
Postnet Suite 90
Private Bag X12
Tokai
7966

By email: saldanhasteel.eia@erm.com

Dear Ms Aspeling

Re: Proposed Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay – Draft Environmental Impact Assessment Report.
DEA ref: 14/12/16/3/3/2/910

CapeNature would like to thank you for the opportunity to comment on the Draft Environmental Impact Report for this application and wish to make the following comments:

Impacts on terrestrial habitat:

1. Power Plant: As stated in our previous letter on the Draft Scoping Report, the preferred as well as alternative sites f have been mapped by the South African Vegetation Map as well as the vegetation maps compiled as part of the CAPE fine-scale project as being covered by Saldanha Flats Strandveld. According to a more recent analysis (than that used for the NSBA 2011 listings) conducted by CapeNature Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat) as less than 35% of the original extent of this vegetation type is now remaining. A portion of the site has also been determined as Critical Biodiversity Area (CBA). The objective of the CBA is to maintain natural land, rehabilitate to natural or near natural and manage for no further degradation. Therefore any loss of natural vegetation within a CBA, especially vegetation which is considered to be Endangered, is considered to have a high negative impact and should require a biodiversity offset if development is approved.

   The botanical specialist confirmed the presence of Saldanha Flats Strandveld on the power plant site. He did however, also confirm that the vegetation on site has become very degraded and only approximately 25 percent of the species that would have originally occurred on site are still present. The impact of the proposed power plant on

loss of Endangered habitat is therefore considered to be less than if the vegetation had been in better condition and CapeNature is of the opinion that a biodiversity offset is not required for the power plant site. We trust however, that Saldanha Steel will be willing to participate in a strategic offset project in future if other more intact areas of vegetation will be impacted.

2. Pipeline route: The pipelines will pass through more intact vegetation which contains at least nine plant Species of Conservation Concern. However, it appears that the planned route for the pipeline will avoid the main areas considered to be of high sensitivity.

   The pipeline servitude is fairly wide (36m) and will require active rehabilitation. The success of rehabilitation must be monitored throughout the lifetime of the project.

   CapeNature must be informed of any deviations to the pipeline route if changes are made to what is indicated in this report.

3. Powerline corridor: We note that Comments and Response Report states that the powerline to Aurora substation is now out of the scope of this application. CapeNature is of the opinion that this is not acceptable. The powerline has the potential to have the highest impact of all the proposed infrastructure related to this project and the potential impacts of the powerline should be assessed as part of this application. The Environmental Management Programme (EMPr) should address long-term management of servitudes and access roads.

   Cumulative impacts of existing and planned power production projects and associated powerlines are of extremely high concern and further loss of Hopefield Sand Fynbos in the vicinity of Aurora substation will be considered to have a high negative impact. Further loss of Critical Biodiversity Areas east of the proposed power plant and close to the substation will have a high negative impact and compromise being able to reach biodiversity targets. Impacts on avifauna are also of concern.

   If sharing of a powerline is an option this should be explored and put forward as an alternative for this application.

Air Quality:

4. It is outside of CapeNature's current expertise to comment on specific air quality impacts. We would like to note however, that we are concerned about the decreasing air quality in the Saldanha Bay region and trust that the applicant will fulfil all the requirements that are laid out by other departments and the municipality which will issue the air emissions licence.

Water use and waste water disposal

5. We note that a seawater desalination plant is proposed in conjunction with rainwater harvesting. If this is the case, more details on the potential impacts of the desalination plant need to be included in the Final Environmental Impact Report.

   Please provide clarity on the volumes of waste water (non-sewage related) the project is likely to produce and how this will be disposed of.

Additional comments:

6. The "Open Space Management Plan" for the power plant site which has been included as part of the EMPr does not appear to be particularly useful for biodiversity

conservation, particularly as the power plant site will be fenced and highly fragmented due to the amount of infrastructure that will be on the site.

CapeNature reserves the right to revise initial comments and request further information based on any additional information that may be received.

Yours sincerely

Alana Duffell-Canham
For: Manager (Scientific Services)

ILifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

Our Ref:	HM/SALDANHA BAY/FARM YZERVARKENSRUG 129 & PORTION 1 OF JACKELSKLOOF 195
Case No.:	16041107AS0425M
Enquiries:	Andrew September
E-mail:	andrew.september@westerncape.gov.za
Tel	021 483 9543
Date:	15 August 2016

Lita Webley
8 Jacobs Ladder
St. James
7945
Lita.webley@aco-associatescom

FINAL COMMENT
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

HERITAGE IMPACT ASSESSMENT: PROPOSED ARCELORMITTAL GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES, FARM YZERVARKENSRUG 129 & PORTION 1 OF JACKELSKLOOF 195, SALDANHA BAY, SUBMITTED IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 16041107AS0425M

The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received on18 July 2016. This matter was discussed at the Heritage Operational Management Services (HOMS) meeting held on 5 August 2016.

The Committee noted that:

- Matter taken out IACOM agenda by HOMs as they have delegation to deal with items where there are no objection and where the recommendations in the HIA are fully agreed with.
- HOMS supports the development proposal.

FINAL COMMENT
HOMS supports the consultant's recommendation as per report July 2016.

However, should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately and Heritage Western Cape must be notified without delay.

This letter does not exonerate the applicant from obtaining any necessary approval from any other applicable statutory authority.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

Yours faithfully

.....
Mr Mxolisi Dlamuka
Chief Executive Officer, Heritage Western Cape

From:	Riaan Myburgh
To:	Chinga Mazhetese
Cc:	Tougheeda Aspeling; Matsidiso Ogbogbo
Subject:	FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	16 August 2016 04:09:35 PM
Attachments:	image001.png

Dear Chinga

As this resorts in your area of responsibility it will be appreciated if you could respond to Tougheeda in this regard.

Kind regards

Riaan

From: Tougheeda Aspeling [mailto:Tougheeda.Aspeling@erm.com] **On Behalf Of** ERM South Africa Project Saldanha Steel
Sent: 15 August 2016 12:16
To: Tougheeda Aspeling
Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Dear Stakeholder,

We would like to remind you that the Draft Environmental Impact Assessment Report for the proposed gas-fired power plant to support Saldanha Steel and other industries in Saldanha Bay was made available for a day 30 comment period on 22 July 2016. A public meeting was held in Saldanha to present the findings of the assessment undertaken by ERM and independent specialists . The presentation from the public meeting is now available on the project website: www.erm.com/saldanhasteel.

If you wish to comment on the report please submit your comments to us on or before 25 August 2016 using the contact details below.

Thank you for your participation.

Kind Regards

Tougheeda Aspeling
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax: 086 5404072

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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From: Tougheeda Aspeling **On Behalf Of** saldanhasteel.eia@erm.com
Sent: Friday, July 22, 2016 4:29 PM
To: Tougheeda Aspeling
Cc: Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

This notification serves to inform you that the Draft Environmental Impact Assessment (EIA) Report for the proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay is available for comment. The comment period will be open for 30 days, from 22 July to 25 August 2016.

The Draft EIA Report is available at the following locations or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

We invite you to attend a public meeting where the Project Team will present the findings of the impact assessment and you will be able to raise issues and pose questions.

When: 11 August 2016
Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

Please submit your comments on the Draft EIA to Tougheeda Aspeling of ERM:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Your comments must reach ERM, in writing, on or before 25 August 2016.

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
T +27 21 681 5400 | **F** 086 5404 072 | **M** +27 84 2066187
E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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From:	Martin Steenkamp
To:	ERM South Africa Project Saldanha Steel
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	16 August 2016 11:51:55 AM
Attachments:	image001.png

Goeie dag,

Ek wil net weet. Gaan die pyplyn bo die grond of onder die grond loop?

Groete,

H Steenkamp

From: Tougheeda Aspeling [mailto:Tougheeda.Aspeling@erm.com] **On Behalf Of** ERM South Africa Project Saldanha Steel
Sent: Monday, August, 2016 12:16
To: Tougheeda Aspeling
Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Dear Stakeholder,

We would like to remind you that the Draft Environmental Impact Assessment Report for the proposed gas-fired power plant to support Saldanha Steel and other industries in Saldanha Bay was made available for a day 30 comment period on 22 July 2016. A public meeting was held in Saldanha to present the findings of the assessment undertaken by ERM and independent specialists . The presentation from the public meeting is now available on the project website: www.erm.com/saldanhasteel.

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Thank you for your participation.

Kind Regards

Tougheeda Aspeling
Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax: 086 5404072

Tougheeda Aspeling

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E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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From: Tougheeda Aspeling **On Behalf Of** saldanhasteel.eia@erm.com
Sent: Friday, July 22, 2016 4:29 PM
To: Tougheeda Aspeling
Cc: Lindsey Bungartz
Subject: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

DEA Ref: 14/12/16/3/3/2/910
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Time: 17:30 (the Project team will be available from 16h00 at the venue)

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Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

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Your comments must reach ERM, in writing, on or before 25 August 2016.

Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

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E Tougheeda.Aspeling@erm.com| **W** www.erm.com

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EIA For A Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Registration and Comment Sheet

Should you have any queries, comments or suggestions regarding the proposed Project, please note them below.

Return this comment sheet to Tougheeda Aspeling of ERM Southern Africa:
Email: saldanhasteel.eia@erm.com
Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400
Fax to email: 086 5404072
www.erm.com/saldanhasteel

Please formally register me as an Interested and Affected Party (I&AP) and provide further information and notifications during the EIA process	Yes X	No	
I would like to receive my notifications by:	Email X	Post	Fax

Comments;			
Title and Name:	Mr. Stefano Boggia		
Organisation:	Ansaldo Energia S.p.A.		
Telephone:		**Fax:**	
Cellphone:	076-0913150	**Email:**	stefano.boggia@ansaldoenergia.com
Postal Address:	401, 4th Floor, Strauss Daly Place		
	41, Richefond Circle, Umhlanga, 4319 South Africa		

Stefano Boggia		15.08.2016
Name	Signature	Date

ArcelorMittal

IPCSA
International Power Consortium South Africa

ERM

From:	Basson Geldenhuys
To:	ERM South Africa Project Saldanha Steel
Cc:	Frederick Johnson; Vuyo Ngonyama
Subject:	FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	15 August 2016 02:44:25 PM
Attachments:	image001.png

Dear Tougheeda

The above-mentioned project and our subsequent discussion regarding the matter have bearing. I would like to confirm whether the National Department of Public Works (NDPW) is registered as an Interested and Affected Party for the said project. Please indicate whether the pipeline is traversing through property which is owned by NDPW or how the government owned property is affected. We (NDPW) are the biggest custodians of property in South Africa and therefore you need to please show us in your submissions how (provide locality maps) NDPW properties are affected.

Your response is appreciated.

Kind regards

Basson Geldenhuys Pr.Pln ¦chief town planner¦professional services ¦national department of public works, cape town regional office¦room 1419, customs house ¦lower heerengracht street ¦cape town ¦e-mail: basson.geldenhuys@dpw.gov.za ¦telephone number: +27 21 402 2174¦Fax number: 086 272 8660¦cell phone number: 071 648 8656

From: Frederick Johnson
Sent: 15 August 2016 01:27 PM
To: Basson Geldenhuys
Cc: Vuyo Ngonyama
Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Hi Basson

Below for your information

Regards

RM

From: Tougheeda Aspeling [mailto:Tougheeda.Aspeling@erm.com] **On Behalf Of** ERM South Africa Project Saldanha Steel
Sent: 15 August 2016 12:52 PM
To: Tougheeda Aspeling
Subject: FW: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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Where: Hoedjiesbaai Hotel, 38 Main Rd, Saldanha Bay
Time: 17:30 (the Project team will be available from 16h00 at the venue)

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Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Tel: 021 681 5400,
Fax: 086 5404072

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Thank you for your participation in this process.

Yours sincerely

Tougheeda Aspeling

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E Tougheeda.Aspeling@erm.com| **W** www.erm.com

CEDERBERG
GOLFERS ASSOCIATION

Sandheuwel
VREDENBURG
7380

Mobile number: 0616191385
Facsimile: 086 595 1539
Email Address: anthonymlata@gmail.com

Reference Number: CBGA371016/IPCA

Enquiries: Company Engineer, Khanya Mananga

Khanya661@gmail.com / 0719182781

Comments on Combined Cycle Gas Turbine (CCGT) power plant

1. The new gas turbine power plant leadership should identify locally based companies on the AMSA database and immediately commence with a quality, environment and health and safety readiness audit.

2. Qualifying and AMSA audited SMME's should be involved in the process improvement during construction and operational phase. Furthermore, all local listed companies to be incorporated in the process must be BEE compliant between level 3 and 1. Even Joint ventures should be carefully scrutinized to meet the quality assurance and standards and Bee specification as mentioned above.

3. Designated SMME's should be provided with relevant procedures and / or appropriate instructions by Project Company to perform tasks that will be assigned to them.

4. Strong communication networks should be built between SMME's and project company so that the project goal can be accomplished / achieved. NOTE: It is best for the project company, together with AMSA establish a project communications platform.

5. Designated SMME's should be linked to any decision making processes and informed on time for any changes or adjustments during construction and operational phase as well by project company.

6. The project company should ensure that they schedule weekly or daily meetings to give feedback to designated SMME's on work in progress so that designated SMME's can be able to identify cracks during the construction phase.

7. The project team should link designated SMME's to the compulsory self-development (Skills, new ideas, techniques and/or methods).

CEDERBERG
GOLFERS ASSOCIATION

Sandheuwel
VREDENBURG
7380

Mobile number: 0616191385
Facsimile: 086 595 1539
Email Address: anthonymlata@gmail.com

Reference Number: CBGA371016/IPCA

8. Payments methods and structures should be negotiable as these protect SMME's during the phases / process and gain unique perks (preferential procurement / payment system should have discriminatory factors that support capacity of SMME's).

9. The project team should make it clear and understandable to designated SMME's on all skills and techniques they are looking for before performing any task during construction phase.

10. Discriminatory factors should be implemented that would prepare a conductive environment for small businesses (SMME's) and local government. Right at the beginning designated SMME's should be linked and or adopted by appointed firms for business coaching and development.

11. The project company should ensure that appropriate mentoring and training is conducted to small businesses (SMME's) (deliberate enterprise development and supplier development resolution).

WESKUS DISTRIKSMUNISIPALITEIT
WEST COAST DISTRICT MUNICIPALITY

Rig alle korrespondensie aan:
Address all correspondence to:

**MUNISIPALE BESTUURDER/
MUNICIPAL MANAGER**

Navrae/Enquiries : Doretha Kotze
Verw.Nr./Ref. No.: 13/2/12/3/1

Posbus / P O Box 242
MOORREESBURG, 7310

Telefoon/Phone (022) 433 8400
Faks/Fax Nr. 086 6926 113

E-Mail Adres/Address :
westcoastdm@wcdm.co.za

19 August 2016

ATTENTION: TOUGHEEDA ASPELING

Environmental Resources Management
Postnet Suite 90
Private Bag X12
TOKAI
7966

Madam

DRAFT EIR: PROPOSED GAS-FIRED POWER PLANT FOR SALDANHA STEEL AND OTHER INDUSTRIES, PORTION 2 OF FARM 195 AND FARM 129, DIVISION MALMESBURY, SALDANHA BAY MUNICIPALITY

1. I refer to your letter dated 22 July 2016 and the Draft EIR for the proposal.

2. It is noted that ± 30 000 m^3 of water will be required during the construction phase of the development. Should surface and ground water be sourced from surrounding farms, the necessary authorisation should be obtained from the relevant authority. Should water be sourced from the Saldanha Bay Municipality, the normal procedure should be followed in liaison with GLS Consulting Engineers to ascertain whether sufficient water is available.

3. The following comments regarding air quality are pertinent:

   3.1 The integrated environmental authorisation must also consider authorisation in terms of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)(NEM: AQA) with regards to licensing of listed activities;

   3.2 Electricity generation during the construction phase by means of three internal combustion generators using LPG as fuel should be included in the possible list of listed activities in terms of NEM: AQA, more specifically subcategory 1.5;

2/...

3.3 The National Dust Control Regulations should be included in the list of National legislation applicable to the project;

3.4 The recommendations detailed in the Air Quality Specialist Study with report number uMN060-2016 must be applied during the construction and operational phases and special emphasis should be placed on the specialist's recommendation that ArcelorMittal's current ambient air quality monitoring program be expanded to include continuous NO_2 monitoring. Ambient monitoring results should be reported to the relevant authorities in an approved format.

4. A Fire Protection Plan, as well as building plans must be submitted to the Fire Services Division of both Saldanha Bay Municipality and the West Coast District Municipality for approval prior to any development taking place.

5. Contingency (Disaster) and Management Plans must be compiled and the following need to be addressed: any form of pollution, disasters, fires, etc. All general management and maintenance issues should also be addressed.

Yours faithfully

MUNICIPAL MANAGER
/df

WEST COAST BIRD CLUB
PO Box 1404, Vredenburg 7380
Affiliated To Birdlife South Africa

From, Keith Harrison, Conservation.

P.O. Box 1404, Tel, 022 – 7133026.

Vredenburg, Email. keithhbharrison@lando.co.za

7380,

To, Tougheeda Aspeling,

Postnet Suit 90, Tel, 021 – 681 5400.

Private Bag X12, Email, Tougheeda .Aspeling@erm.com

Tokai,

7966.

22nd.August 2016.

DEA Ref. 14/12/16/3/3/2/910

ERM Ref. 0315829

Draft Environmental Impact Assessment (EIA) Report for the proposed Gas-fired Independent Power Plant to supply Saldanha Steel and other Industries in Saldanha Bay.

Dear Tougheeda Aspeling,

Thank you for the opportunity to comment upon the above project. The West Coast Bird Club (WCBC) in principal agrees with the project, and reserves the right to comment as further information becomes available.

However I would like to comment upon the following.

1. Avian Flyways, the Avian Specialist report explained that the area of the project is situated between two Important Bird Areas (IBA) Langebaan Lagoon and Lower Berg River Wetlands. A threat not mentioned is that there are daily transfers of birds between the two IBAs along a very narrow corridor, which can be confirmed with daytime observations of the Kelp Gulls *(Larus domicanus).* Waterbirds and migratory waders probably use the flyway at night. It is known that there must be commuting between the IBAs but there has never been the need for a scientific study before but by using fixed points along the route the production site is on the narrow corridor. A mitigation would be to move the site 200 metres further east.

In the Waterbirds Special Issue on Gull Biology Volume 39 Published April 2016,
There is a South African Paper: - **Recent Trends of the Kelp Gull (Larus domicanus) in South Africa.** Page 108 Table 2, since 2009 the number of breeding Kelp Gulls has reduced by 41% on the West Coast.
This is an historic flyway possibly established when sea levels were higher and was the coastal route.

2. 400kV line to Aurora Substation, although the line to the Grid has been removed to a separate EIA process, it must be remembered that this could also cross an ancient flyway down the Proto-Berg river valley. Great White Pelicans and Flamingos have been observed taking this overland route.

3. Lighting,
   To reduce bird collisions, cables should be buried where possible and lights to be directed downwards, also motion activated. Lighting for aeroplane warning lights not to be a continuous light but intermittent.

4. Traffic,
   There will be a large number of vehicular movements during construction and all vehicles Of Developer, Contractors and Sub-contractors should be registered with the SBM Traffic Department in order for portions of the licence fees can be used for road infrastructure maintenance.

5. Labour,
   The project being very technical means that job opportunities for semi-skilled and unskilled are low for both construction and production phases, this should be made known nationally to prevent attracting jobseekers from outside of the West Coast who will be unsuccessful. Therefore Contractors and Sub-contractors should endeavour to recruit 90% of their semi-skilled and unskilled labour with proven residence in the Saldanha Bay Municipal area. Learned from the floor at the Public Meeting was that the IDZ Co. has a data base of 40,000 people. Also, for fynbos control and clearance NGOs like the Cape West Coast Biosphere Reserve Co. have data a base of trained teams.

Sincerely,

Keith Harrison.

(Sent by E mail 22nd August 2016)

From:	Khulatrans
To:	ERM South Africa Project Saldanha Steel
Subject:	New Business Opportunity
Date:	24 August 2016 01:24:25 PM

Good day Tougheeda.

I confirm that I have received all correspondence via email. I need some clarity though.

Can you please tell me how/if my company- Khula Khula Transport Services- can be of service to you? I am in the transport industry and are currently operating in the Western Cape area. I can forward you my business profile if needed.

Kind Regards
Michael Madangatya

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447 · PRETORIA · 0001 · Environment House · 473 Steve Biko Road · Arcadia · PRETORIA
Tel (+ 27 12) 399 9372

DEA Reference: 14/12/16/3/3/2/910
Enquiries: Ms Thabile Sangweni
Telephone: (012) 399 9409 **E-mail:** TSangweni@environment.gov.za

Mr Stuart – Heather Clark
Environmental Resources Management South Africa
Postnet Suite 90
Private Bag X12
TOKAI
7966

Telephone Number: (021) 681 5400
Email Address: Stuart.heather-clark@erm.com

PER E-MAIL / MAIL

Dear Mr Clark

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED 1507 MW SALDANHA STEEL GAS – FIRED POWER PLANT AND ITS ASSOCIATED INFRASTRUCTURE IN SALDANHA BAY WITHIN THE SALDANHA BAY MUNICIPALITY IN THE WESTERN CAPE PROVINCE

The draft Environmental Impact Assessment report (EIAr) dated July 2016 and received by this Department on 25 July 2016 refers.

This Department has the following comments on the abovementioned application:

i. Please ensure that all relevant listed activities are applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description.
ii. If the activities applied for in the application form differ from those mentioned in the final EIAr, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.
iii. A detailed cumulative impact assessment statement from all the specialists must be included in the final EIAr and must indicate the following:
    - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
    - A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
    - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology approved with the acceptance of the scoping report.
    - The significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.
iv. The preferred Layout Plan with the service routes and construction camp must be indicated in the final EIAr. A map combining the final Layout Plan superimposed (overlain) on the environmental sensitivity map must also be included in the final EIAr.

v. Recommendations provided by specialist reports must be considered and used to inform the preferred layout alternative.

vi. The specialist studies to be conducted must comply with Appendix 6 of the EIA Regulations, 2014 and proof of compliance must be provided in the final EIAr.

vii. The assessment of impacts on air quality in the EIAr as well as the Air Quality Specialist Study must include the following:

- Reference to emission concentrations as stipulated in the Minimum Emission Standard.
- Suitable abatement technology to be used for point source emissions must be considered and detailed in terms of availability and control efficient.
- A compliance and road map with provincial and national regulations on dust and noise.
- A compliance road map on the design and operation of the Gas-Fired Independent Power Plant with the Minimum Emission Standard.
- Recent (2013 to 2016) Air Quality Emission results of the area.
- The following Section 21 listed activities are triggered by the activity and mitigation measures must be addressed in the EIAr:
  - Subcategory 1.2: Liquid Fuel Combustion Installations;
  - Subcategory 1.4: Gas Combustion Installations;
  - Subcategory 2.4: Storage and Handling of Petroleum products; and,
  - Any additional activity which may arise in the near future.

viii. The Department requires confirmation, based on the botanical assessment conducted, from the specialist and Cape Nature that an offset is not required as part of the project. Should an off-set be required, it must be negotiated with Cape Nature. The offset must investigate the cumulative loss of species from the area, and must be finalised, agreed to and be included within the final EIAr.

ix. This Department requires comments from the Department of Water and Sanitation (from the Impact Management and Resource Management Directorates); the Department of Environmental Affairs: Air Quality Management, the Department of Environmental Affairs: Climate Change as well as the Department of Environmental Affairs: Oceans and Coast Directorate which must be included in the EIAr

x. The EIAr must assess the impacts of storing and handling of the preferred fuels for Phase 1 and 2 of the project and must include specialist assessments. This must also include a risk assessment of the storage and handling of the dangerous goods.

xi. The EIAr must assess the risks associated with the storage of dangerous goods. The risk of the possibility of pollution to surface (hydrological) and groundwater (hydrogeological) systems and flows must also be assessed. The risk assessment must make recommendations into the emergency preparedness and spill response plans.

xii. Please ensure that all issues raised and comments received during the circulation of the EIAr from registered I&APs and organs of state which have jurisdiction (including this Department's Biodiversity Section) in respect of the proposed activity are adequately addressed and included in the Final EIAr. Proof should be submitted to the Department of the attempts that were made to obtain comments and proof that the proposed development was advertised in at least one local newspaper.

xiii. Proof that comments were obtained from all Departments as indicated in the SR and in this comment letter. Should no comments be obtained, proof that reasonable measures were undertaken to obtain comments and follow up's were made to the various Departments.

xiv. The EMPr must include a provision to audit the effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation. The results must be made available to the Department and relevant competent authority on request and must be part of monitoring and audit reports.

xv. Please note that the final EIAr must comply with all conditions of the acceptance of the scoping report signed on 16 May 2016 and must address all comments contained in this comments letter.

xvi. In terms of Appendix 3 of the EIA Regulations, 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to:

- the correctness of the information provided in the reports;

- the inclusion of comments and inputs from stakeholders and I&APs;
- the inclusion of inputs and recommendations from the specialist reports where relevant;
- any information provided by the EAP to I&APs; and,
- responses by the EAP to comments or inputs made by I&APs.

xvii. The EIAr must provide the technical details of the proposed facility in a table format as well as their description and/or dimensions. A sample of the minimum information required was listed under point 2 of the EIA information required in the acceptance of SR.

xviii. You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Appendix 3 of the EIA Regulations, 2014.

xix. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).

xx. Failure to comply with the requirements of the acceptance of the SR, the comments of this letter as well as the requirements of the EIA Regulations, 2014, a negative Environmental Authorisation may be issued by this Department.

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Environmental Affairs
Signed by: Mr Coenrad Agenbach
Designation: Deputy Director: Strategic Infrastructure Developments
Date: 25/08/2016

cc:	Mr R Holcroft	ArcelorMittal SA	Email: Richard.Holcroft@arcelormittal.com

From:	Carika van Zyl
To:	ERM South Africa Project Saldanha Steel
Subject:	Register of West Coast Environmental Protection Association, I&AP and comments
Date:	25 August 2016 11:57:04 AM

Good day

Please register the WCEPA as an Interested and Affected Party.

Downloading of the documents were not possible when clicking on them. Please have a look at it.

The WCEPA supports efforts by industry to minimise their carbon footprint trough the utilization of renewable energy sources. Unfortunately LNG utilizes gas which is derived through shale gas ie. fracking. Fracking is not supported by the WCEPA as the process involved in getting the gas out is highly toxic to the environment through the contamination of groundwater and highly detrimental to human health. Although the gas will not be shaled within this area, there will be destruction within another area where the environment and people will be irrevocably and irreparable harmed.

Kind Regards

Carika S. van Zyl
Chairperson
West Coast Environmental Protection Association / Weskus Omgewings Bewarings Assosiasie

M-Tech Nature Conservation

34 Voortrekker straat
Hopefield

SALDANHA BAAI BAY
MUNISIPALITEIT | MUNICIPALITY | uMASIPALA

129 rem 195/2; 12/1/2/71
REF NO:

ENQUIRIES:
N Duarte; E Mmbadi
Ms Mr

Tougheeda Aspeling

REGISTERED MAIL

ERM Southern Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
Tokai
7966

RE: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT FOR A GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY, WESTERN CAPE PROVINCE.

1. The Proposed Gas-Fired Independent Power Plant to support Saldanha Steel and other Industries in Saldanha Bay: Draft Scoping Report dated 22 July 2016 refers.

2. 2-3 Subsidises not subsides

3. Please advise if the Disaster Management of the West Coast District Municipality was included as an Interested and Affected Party. The disaster management team of the Gas-Fired Independent Power Plant and the WCDM can create a standard Operating Procedure in the event of an incident.

4. Although the EIA for the import of gas is separate, the Saldanha Steel plant will be benefiting from the gas and therefore influencing shipping in the bay. The bay is already under duress (Please see the State of the Bay Report). Please advise if and what mitigation SS will put in place to alleviate this situation.

5. Mr Edward Makok (Edward.makok@sbm.gov.za) is the Health and Safety Officer of the Saldanha Bay Municipality ("SBM") and you can provide him the risk assessment. The SBM

is currently doing a Risk Assessment and Disaster Management Plan for the municipal area.

6. The Environment and Heritage Section of the SBM does not support the destruction of Critical Biodiversity Areas.

7. The pipeline corridor cuts across a dynamic coastal area also known as "spreeuwalle".

8. Please familiarise yourselves with the municipal by-laws and civil engineering standards of the SBM. Please contact the relevant officials in this regard:
   Air Quality: rene.toesie@sbm.gov.za
   Waste Management: david.wright@sbm.gov.za
   Roads and Storm water: Jeremy.jarvis@sbm.gov.za
   Water and Sewerage: gavin.williams@sbm.gov.za

9. Electrical Department of the SBM:
   The site is next to the Eskom Blouwaterbaai substation and the powerlines do not affect the municipal electrical networks. The report refers to excess energy being sold to IDZ, the municipality and other industrial consumers. In terms of the Electricity Regulation Act any excess energy may only be sold to Eskom and all the regulatory aspects are regulated by NERSA. This will be part of the licencing process from NERSA and does not affect the SBM at this stage.

10. Please make available to the SBM the final co-ordinates of the total development for record purposes.

11. Will funds be made available during the operational phase for the eventual decommissioning to avoid abandoned infrastructure as this is common in the municipal area.

12. Rezoning can be a parallel process.

13. Depending on the urgency of the matter, the SBM has an authorisation through the West Coast District Municipality for a reverse osmosis plant. Transnet also has a reverse osmosis plant. A possible PPP could be taken into consideration.

pp: MUNICIPAL MANAGER

Date: 25-08-16

/nd

Tel: (021) 689 4441
E-mail: marne.vanderwesthuizen@sanparks.org
Our Ref: WCNP-SS EIA

addo elephant
agulhas
augrabies falls
bontebok
golden gate highlands
karoo
kgalagadi transfrontier
knysna lake area
kruger
mapungubwe
marakele
mountain zebra
namaqua
table mountain
tankwa-karoo
tsitsikamma
|ai-|ais/richtersveld
vaalbos
west coast
wilderness

25 August 2016

Via E-mail: saldanhasteel.eia@erm.com
ERM Southern Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
Tokai
7966

Attention: Tougheeda Aspeling

Dear Ms Aspeling

COMMENT ON DRAFT ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY (DEA Ref: 14/12/16/3/3/2/910; ERM Ref: 0315829)

The above mentioned Draft Environmental Impact Assessment Report (EIA) refers.

1. The total environmental impact of the proposed development is of concern to SANParks in terms of footprint impacts, cumulative impacts, aquatic impacts, etc.
2. Recent studies indicate that the water quality in Saldanha Bay appears to be deteriorating (State of the Bay report, 2015). SANParks would be opposed to any discharge into the bay as it will have a detrimental impact, given the environmental sensitivities of the bay area, including Langebaan Lagoon (an international RAMSAR site).
3. The pro-active setting aside of high conservation value areas of endangered vegetation on the Saldanha Steel site is of paramount importance. To this end there is also a need for a collective plan detailing all proposed future developments of the site, to allow for assessment of cumulative impacts of all proposals.

Note that SANParks reserves the right to submit additional comments on this application based on any additional information received and to request further information.

Yours sincerely,

Marné van der Westhuizen
Regional Manager: Planning and Implementation
SANParks – Cape Region

Western Cape Government
Environmental Affairs and Development Planning
BETTER TOGETHER.

Adri La Meyer
DIRECTORATE: DEVELOPMENT FACILITATION
Adri.LaMeyer@westerncape.gov.za

REFERENCES:
16/3/3/6/4/1/1/F4/17/3013/16 (Development Management)
19/2/5/3/F4/18/WL0043/16 (Waste Management)
19/4/4/BS1-Gas-Fired Independent Power Plant, Saldanha (Air Quality Management)

DATE: 25 AUGUST 2016

The Board of Directors
ERM South Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
TOKAI
7966

For attention: Mr Stuart Heather Clark

Tel: (021) 681 5400
E-mail: stuart.heather-clark@erm.com

Dear Sir

COMMENT ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED COMBINED CYCLE GAS TURBINE POWER PLANT ON THE REMAINING EXTENT OF THE FARM YZERVARKENSRUG NO. 129, PORTION 2 OF THE FARM JAKKALSKLOOF NO. 195 AND VARIOUS OTHER FARMS, SALDANHA BAY (DEA REREFENCE 14/12/16/3/3/2/910)

1. The electronic mail notification dated 22 July 2016 of the release of the Draft Environmental Impact Assessment ("EIA") Report and the draft EIA Report dated July 2016 that was received by this Department on 25 July 2016, refer.

2. The Department's previous comments dated 6 April 2016 requested more information on the proposed sewage treatment and water reclamation plant to be constructed during phase 1 of the proposed development. The Draft EIA Report lacks critical information to assess whether all potential environmental impacts have been identified. In particular, a detailed description of the proposed water reclamation plant and sewage treatment plant with associated infrastructure; design capacity of both the water reclamation and sewage treatment plants; preferred technology (e.g. activated sludge, evaporation ponds, sequential batch reactors, etc.) and effluent disposal of the sewage treatment plant; etc. must be provided.

3. The following specific comment by various directorates in the Department is hereby offered.

4. Directorate: Development Management (Region 1) – Keagan-Leigh Adriaanse (Keagan-Leigh.Adriaanse@westerncape.gov.za; Tel: (021) 483 8349):

4.1 It is noted that some of the comments issued on 6 April 2016 on the Draft Scoping Report ("DSR") have not been addressed in the Draft EIA Report. In particular, the following comments/issues have not been addressed:

4.1.1 The width of the road reserve has not been provided. This information is required to confirm the applicability of Activity 24 of Government Notice ("GN") No. R. 983 and Activity 4 of GN No. R. 985 of 4 December 2014.

4.1.2 An indication of whether the preferred site has been previously used for agricultural activities on or after 1 April 1998 must be provided in order to determine whether Activity 28 of GN No. R. 983 of 4 December 2014 is applicable.

4.1.3 Proof of submission of the Atmospheric Emissions Licence ("AEL") application to the licencing authority has not been provided.

4.1.4 Confirmation that the Local Authority has sufficient, spare and unallocated capacity to provide solid waste removal and disposal and any other services, was requested. The Comments and Responses Report ("CRR") states that no services will be required from the Local Authority. An indication of the service provider(s) for the following must therefore be provided:

4.1.4.1 The disposal of dried powdered sludge (generated as part of the sewage treatment process and from canteen washing areas);

4.1.4.2 The disposal of dry/dissolved solids (generated as part of the desalination process); and

4.1.4.3 Refuse removal.

4.1.5 It is noted that the Liquefied Natural Gas ("LNG") will be imported via shipping transport and will connect to mooring or berthing facilities within the Port of Saldanha. It is further noted that the LNG marine facilities are not included in this application and will be subjected to another EIA application. However, given that the proposed development will have an impact on the Port (i.e. the number of ships entering the Port may increase), it is re-iterated that the following impacts be assessed:

4.1.5.2 Potential impacts related to marine traffic; and

4.1.5.3 Potential impacts related to the offloading of the LNG.

4.1.6 This Directorate requested on 6 April 2016 that confirmation must be provided in the EIA Report whether upgrades to the Aurora substation are required. The CRR indicates that permission to tie into or upgrade existing Eskom infrastructure will be the subject of specific agreements between the relevant parties and are not included in this EIA application. The request for confirmation of any upgrades to the Aurora substation was to determine whether the Aurora substation has the capacity to receive the additional electricity supply that is proposed. An indication of whether the Aurora substation has the capacity to receive the additional electricity supply must be provided. Should the Aurora substation not be able to receive the additional electricity supply, alternative substations must be identified.

4.2 Activity Description

4.2.1 As per comment 2 above, further information is required on the proposed sewage treatment and water reclamation plant.

4.2.2 It is noted that LNG will be re-gasified prior to the gas being offloaded via a submersible pipeline to the proposed development. Further information pertaining to the re-gasification process and the potential impacts associated with this process must be provided.

4.3 Alternatives

4.3.1 Given that the proposed development is dependent on marine facilities for the offloading of the LNG, alternative methods for delivering the LNG to the proposed development must be identified and the potential impacts associated with these alternative methods must be reported on.

4.4 Potential Impacts

4.4.1 The proposed methods for the installation of the pipeline infrastructure and the potential impacts on the coastal environment must be assessed and reported on.

4.5 General

4.5.1 The Environmental Management Programme ("EMPr") must include a detailed description of the on-site emergency procedures that will be followed in the event of an incident occurring; and

4.5.2 In terms of regulation 5(6) of the EIA Regulations, 2014, you are required to provide the co-ordinates in degrees, minutes and seconds using the Hartebeesthoek94 WGS84 co-ordinate system.

5. Directorate: Waste Management – Thorsten Aab (Thorsten.Aab@westerncape.gov.za; Tel: (021) 483 3009):

5.1 As per comment 2 above, further information is required on the proposed sewage treatment and water reclamation plant.

5.2 This Directorate is satisfied that potential waste management impacts during all phases of the proposed development have been identified and suitable mitigation measures provided for in the EMPr.

6. Directorate: Air Quality Management – Peter Harmse (Peter.Harmse@westerncape.gov.za; Tel: (021) 483 8343):

6.1 The AEL application to be submitted to the licensing authority must include all applicable listed activities identified in terms of Section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA"). The design and operation of the gas-fired power plant must comply with the Minimum Emission Standard as listed in Section 21 of NEM:AQA.

7. Directorate: Pollution and Chemicals Management – Gunther Frantz (Gunther.Frantz@westerncape.gov.za; Tel: (021) 483 2975):

7.1 As per comment 2 above, further information is required on the proposed sewage treatment and water reclamation plant.

8. Directorate: Development Facilitation – Adri La Meyer (Adri.LaMeyer@westerncape.gov.za; Tel: (021) 483 2887):

8.1 This Directorate is of the opinion that the need and desirability of the proposed development has not been adequately addressed in the Draft EIA Report. Whilst it is recognised that the country experiences an electricity supply shortage, the need for a 1507 megawatts ("MW") combined-cycle gas turbine plant has not been motivated for. Information pertaining to the current electricity consumption and future demands by the applicant must be provided.

8.2 It is noted that the significance of the impact (pre- and post-mitigation) of greenhouse gasses ("GHGs") during the operational phase of the proposed development have not been provided for in Chapters 10 and 12 of the Draft EIA Report. According to Section 4.2.1 of the Draft EIA Report, the magnitude of the project's GHG impacts from the 1307MW project (note that this should be 1507MW), is considered to be **Very Large**. This significant impact appears to be "glossed over" by comparing the emissions intensity of proposed development against the emissions intensity of the electricity generated by Eskom (Section 4.2.3 of the Draft EIA Report). It must be borne in mind that the electricity generated by Eskom represents approximately 95% of electricity generated and distributed in the South African electrical grid. No further mitigation measures to reduce the impacts of GHGs on the environment is provided for and rather the use of 500 kW of solar energy to meet some of the proposed development's auxiliary load requirements, is offered to make the proposal deem more acceptable.

8.3 It is noted that approximately 30 000m^3 of water will be required for concrete batching during the construction phase of the proposed development. The Draft EIA Report further states that water will initially be trucked in 30m^3 loads from local farms where it will be transferred to a temporary stainless-steel tank for immediate use in preparing concrete. Section 3.5.2 of the Draft EIA Report however only assesses the impacts of transporting cement and concrete aggregate, rebar steel, equipment and structural steel during the construction phase. The traffic impacts of 1000 loads for water transportation during the construction phase (including noise and air quality impacts) on both site alternatives must also be assessed.

8.4 Tables 3.5 and 4.5 of the *Greenhouse Gas (GHG) Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay* compiled by ERM dated 13 June 2016, erroneously refer to closed-cycle gas turbine plants. It is understood to be a typographical error and should refer to "*combined-cycle gas turbines plants*".

8.5 As per comment 2 above, impacts related to the sewage treatment and water reclamation plant must also be incorporated into the EMPr.

9. The Department is of the opinion that the information contained in the Draft EIA Report is not sufficient for decision-making purposes as significant information is lacking and all not environmental impacts have been identified and addressed. It is recommended a Revised EIA Report be made available to all registered Interested and Affected Parties as per regulation 23(2) of GN No. R. 982 of 4 December 2014, prior to submission of the Final EIA Report to the competent authority.

10. Please direct all enquiries to the officials indicated in this correspondence should you require any clarity on any of the issues/comments provided.

11. The Department reserves the right to revise initial comments and request further information based on the information received.

Yours faithfully

PP **HEAD OF DEPARTMENT**
DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

Copy to: Ms Thabile Sangweni (DEA) E-mail: TSangweni@environment.gov.za

agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Directorate: Land Use and Soil Management
Private Bag x 2, Sanlamhof, 7532,
17 Strand Street, Bellville, 7530
Tel: 021 944 1422/24 **Fax:** 021 944 1427 **E-mail:** RahabM@nda.agric.za
Enquiries: Maboa M.R **Date:** 10/08/2016

Attention: Tougheeda Aspeling
ERM, Southern Africa (Pty) Ltd
2nd Floor, Great Westerford, 240 Main Road
Rondebosch, 7700

COMMENTS FOR ENVIRONMENTAL IMPACT ASSESSMENT FOR A GAS-FIRED INDENDENT POWER PLANT TO SUPPORT SALDAHNA STEEL AND OTHER INDUSTRIES IN SALDAHNA BAY, DEA & DP REF 14/12/16/3/3/2/910 & ERM 0315829.

The Department of Agriculture, Fisheries & Forestry Directorate: Land Use and Soil Management administer and implement the Conservation of Agricultural Resources Act, (CARA) 43 of 1983). The Act is regarded as one of the principal Acts governing the protection of agricultural natural resources. The main aim of the Act is to control the utilization of natural agricultural resources to ensure the conservation of soil, water and vegetation, as well as the combating of alien and invasive plants. According to Section 1 of the Act, conservation of natural agricultural resources includes the protection, recovery as well as the reclamation thereof.

Since the development will involve the removal of top soil according to Conservation of Agricultural Resources Act, 1983, (Act 43 of 1983), cultivation in relation to land, means any act by means of which top soil is disturbed mechanically. Virgin land is defined as

any land which in the opinion of the executive officer has never been cultivated or mechanically disturbed in the past proceeding ten years. CARA application for clearing the proposed area for development is required prior as stated in the act (regulation 2 of Act 43 of 1983). From the report the area has been used previously for agricultural activities on or after April 1998. The site clearing activities will include clearing, fencing the project boundary and site leveling. Construction of internal site roads may requires erosion control measures through action of either wind or water (regulation 4 & 5 of CARA act 43 of 1983). The proposed area for development is susceptible to seasonal wind erosion, in summer the area experience strong south & south-west winds with speed of 5.6 m/s and in winter the area experience north & north westerly wind with 11.5% (frequently less than 3.5 m/s).

The area is characterized by calcareous sand at the coastal areas to acidic sands further inland; shale and granite soils are reported to relatively fertile and form backbone of agricultural in the area/ region these confirm the agricultural potential of the area and soils.

The impacts that might rise due to the proposed development which might have a negative impact on the environment; negative impacts includes loss of soil resources and land capabilities through contamination and through physical disturbance. Land use impacts as the surface/ topsoil as resulted from drilling and sometimes coupled with pitting or trenching to further deposits. It is furthermore advised that the rehabilitation should be an ongoing process once even after the power plant operation discontinues/ stop.

Therefore, this Department has no objections on the proposed development and encourages the applicant to take responsibility that the above mentioned conditions are adhered to. However, the Department reserves the right to revise its initial comments and request further information from you based on any new or revised information received.

pp. EXECUTIVE OFFICER: Act No 43 OF 1983
Director: Land Use and Soil Management

From:	ewes@mweb.co.za
To:	ERM South Africa Project Saldanha Steel
Cc:	saldanha-steel.eia@erm.com
Subject:	NB Response to DRAFT EIA for Saldanha Steel
Date:	25 August 2016 09:02:06 AM

Dear Sir / Madam

I have been trying to upload the draft presentation in order to comment and submit questions regarding the DRAFT EIA for the proposed power station at Saldanha Steel, but the webpage is not available and thus I believe nobody can access it in order to submit questions or comments. In the light of this, I would like to know how LONG the website has been compromised / unavailable and how on earth affected parties and concerned residents must give their input if they cannot access the report?

The question is also how residents and affected parties can make calculated decisions regarding such a power station if they are not properly informed about ALL the potential impacts of such a power station in combination with the existing Arcelor-Mittal Saldanha plant - with other words the accumulative and combined environmental impact of two such industries in close proximity.

Can anyone please comment on the following:

1. How many people responded online to the invitation to submit commentary on the EIA Draft and how long has the webpage been unavailable;
2. What were the most common concerns in these comments?
3. Apart from the environmental impact of the gas station alone, has any studies been done on the COMBINED impact of a steel manufacturing plant and a gas-fired power station on all environmental aspects of Saldanha Bay and is the local municipality equipped to police and monitor the situation to ensure all legal/safety/environmental conditions/rules and regulations are followed at all times?

I would appreciate your reply to the above questions ASAP as it is of great concern to all residents and affected parties in the Saldanha area - especially since today is the deadline for online comment.

Kind regards,

Elsa Wessels
Editor: weskusonTheline

Tel: 0842401540
ewes@mweb.co.za

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447 · PRETORIA · 0001 · Environment House · 473 Steve Biko Road · Arcadia · PRETORIA
Tel (+ 27 12) 399 9372

DEA Reference: 14/12/16/3/3/2/910
Enquiries: Ms Thabile Sangweni
Telephone: (012) 399 9409 **E-mail:** TSangweni@environment.gov.za

Mr Stuart – Heather Clark
Environmental Resources Management South Africa
Postnet Suite 90
Private Bag X12
TOKAI
7966

Telephone Number: (021) 681 5400
Email Address: Stuart.heather-clark@erm.com

PER E-MAIL / MAIL

Dear Mr Clark

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED 1507 MW SALDANHA STEEL GAS – FIRED POWER PLANT AND ITS ASSOCIATED INFRASTRUCTURE IN SALDANHA BAY WITHIN THE SALDANHA BAY MUNICIPALITY IN THE WESTERN CAPE PROVINCE

The draft Environmental Impact Assessment report (EIAr) dated July 2016 and received by this Department on 25 July 2016 refers.

This Department has the following comments on the abovementioned application:

i. Please ensure that all relevant listed activities are applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description.
ii. If the activities applied for in the application form differ from those mentioned in the final EIAr, an amended application form must be submitted. Please note that the Department's application form template has been amended and can be downloaded from the following link https://www.environment.gov.za/documents/forms.
iii. A detailed cumulative impact assessment statement from all the specialists must be included in the final EIAr and must indicate the following:
    - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e. hectares of cumulatively transformed land.
    - A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
    - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology approved with the acceptance of the scoping report.
    - The significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.
iv. The preferred Layout Plan with the service routes and construction camp must be indicated in the final EIAr. A map combining the final Layout Plan superimposed (overlain) on the environmental sensitivity map must also be included in the final EIAr.

v. Recommendations provided by specialist reports must be considered and used to inform the preferred layout alternative.

vi. The specialist studies to be conducted must comply with Appendix 6 of the EIA Regulations, 2014 and proof of compliance must be provided in the final EIAr.

vii. The assessment of impacts on air quality in the EIAr as well as the Air Quality Specialist Study must include the following:

- Reference to emission concentrations as stipulated in the Minimum Emission Standard.
- Suitable abatement technology to be used for point source emissions must be considered and detailed in terms of availability and control efficient.
- A compliance and road map with provincial and national regulations on dust and noise.
- A compliance road map on the design and operation of the Gas-Fired Independent Power Plant with the Minimum Emission Standard.
- Recent (2013 to 2016) Air Quality Emission results of the area.
- The following Section 21 listed activities are triggered by the activity and mitigation measures must be addressed in the EIAr:
  - Subcategory 1.2: Liquid Fuel Combustion Installations;
  - Subcategory 1.4: Gas Combustion Installations;
  - Subcategory 2.4: Storage and Handling of Petroleum products; and,
  - Any additional activity which may arise in the near future.

viii. The Department requires confirmation, based on the botanical assessment conducted, from the specialist and Cape Nature that an offset is not required as part of the project. Should an off-set be required, it must be negotiated with Cape Nature. The offset must investigate the cumulative loss of species from the area, and must be finalised, agreed to and be included within the final EIAr.

ix. This Department requires comments from the Department of Water and Sanitation (from the Impact Management and Resource Management Directorates); the Department of Environmental Affairs: Air Quality Management, the Department of Environmental Affairs: Climate Change as well as the Department of Environmental Affairs: Oceans and Coast Directorate which must be included in the EIAr

x. The EIAr must assess the impacts of storing and handling of the preferred fuels for Phase 1 and 2 of the project and must include specialist assessments. This must also include a risk assessment of the storage and handling of the dangerous goods.

xi. The EIAr must assess the risks associated with the storage of dangerous goods. The risk of the possibility of pollution to surface (hydrological) and groundwater (hydrogeological) systems and flows must also be assessed. The risk assessment must make recommendations into the emergency preparedness and spill response plans.

xii. Please ensure that all issues raised and comments received during the circulation of the EIAr from registered I&APs and organs of state which have jurisdiction (including this Department's Biodiversity Section) in respect of the proposed activity are adequately addressed and included in the Final EIAr. Proof should be submitted to the Department of the attempts that were made to obtain comments and proof that the proposed development was advertised in at least one local newspaper.

xiii. Proof that comments were obtained from all Departments as indicated in the SR and in this comment letter. Should no comments be obtained, proof that reasonable measures were undertaken to obtain comments and follow up's were made to the various Departments.

xiv. The EMPr must include a provision to audit the effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation. The results must be made available to the Department and relevant competent authority on request and must be part of monitoring and audit reports.

xv. Please note that the final EIAr must comply with all conditions of the acceptance of the scoping report signed on 16 May 2016 and must address all comments contained in this comments letter.

xvi. In terms of Appendix 3 of the EIA Regulations, 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to:

- the correctness of the information provided in the reports;

- the inclusion of comments and inputs from stakeholders and I&APs;
- the inclusion of inputs and recommendations from the specialist reports where relevant;
- any information provided by the EAP to I&APs; and,
- responses by the EAP to comments or inputs made by I&APs.

xvii. The EIAr must provide the technical details of the proposed facility in a table format as well as their description and/or dimensions. A sample of the minimum information required was listed under point 2 of the EIA information required in the acceptance of SR.

xviii. You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Appendix 3 of the EIA Regulations, 2014.

xix. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).

xx. Failure to comply with the requirements of the acceptance of the SR, the comments of this letter as well as the requirements of the EIA Regulations, 2014, a negative Environmental Authorisation may be issued by this Department.

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Environmental Affairs
Signed by: Mr Coenrad Agenbach
Designation: Deputy Director: Strategic Infrastructure Developments
Date: 25/08/2016

cc:	Mr R Holcroft	ArcelorMittal SA	Email: Richard.Holcroft@arcelormittal.com

Draft EIA Phase 2

From:	Basson Geldenhuys
To:	ERM South Africa Project Saldanha Steel; Tougheeda Aspeling
Cc:	Ossie Lamb; Frederick Johnson; Vuyo Ngonyama
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	19 September 2016 08:43:23 AM
Attachments:	image001.png

Dear Tougheeda

Our previous discussion regarding the above-mentioned project has bearing. As the pipeline is not traversing over NDPW land and therefore not affecting our properties we do not have any comments.

Regards

Basson Geldenhuys Pr.Pln ¦chief town planner¦professional services ¦national department of public works, cape town regional office¦room 1419, customs house ¦lower heerengracht street ¦cape town ¦e-mail: basson.geldenhuys@dpw.gov.za ¦telephone number: +27 21 402 2174¦Fax number: 086 272 8660¦cell phone number: 071 648 8656

From: Tougheeda Aspeling [mailto:Tougheeda.Aspeling@erm.com] **On Behalf Of** ERM South Africa Project Saldanha Steel
Sent: 16 September 2016 04:28 PM
To: Tougheeda Aspeling
Subject: RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

The Draft Environmental Impact Assessment (EIA) Report for the Proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay was released for a 30 day comment period between 22 July and 25 August 2016. Comments received have been included in the Comments and Response Report in Annex B.

The Draft EIA Report was revised, based on comments received, and is now available again for comment for a further 30 days. You are hereby requested to submit your comments to ERM, in writing, on or before 18 October 2016 on the revised Draft EIA Report. The document is available at the following locations, or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

New text added to this revised Draft EIA Report has been underlined. No other changes have been made to the document.

Comments can be submitted to Tougheeda Aspeling of ERM using the contact detail below:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Kindly note that your comments must reach ERM, in writing, on or before **18 October 2016.**

Thank you for your participation in this process.

Regards

Tougheeda Aspeling

ERM Southern Africa (Pty) Ltd
2nd Floor | Great Westerford | 240 Main Road | Rondebosch | 7700 | Cape Town | South Africa
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CapeNature

SCIENTIFIC SERVICES

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telephone +27 21 866 8000 **fax** +27 21 866 1523
email aduffell-canham@capenature.co.za
reference **SSD14/2/6/1/8/4/129&195-2_Energy_Gas_SaldanhaSteel**
date **22 September 2016**

Tougheeda Aspeling
ERM Southern Africa
Postnet Suite 90
Private Bag X12
Tokai
7966

By email: saldanhasteel.eia@erm.com

Dear Ms Aspeling

Re: Proposed Independent Power Plant to support Saldanha Steel and other industries in Saldanha Bay – Revised Draft Environmental Impact Assessment Report.
DEA ref: 14/12/16/3/3/2/910

CapeNature would like to thank you for the opportunity to comment on the Revised Draft Environmental Impact Report for this application. Our previous comments dated 8 August 2016 should be read in conjunction with the following comments:

1. The importance of full rehabilitation of the pipeline servitude cannot be overemphasised as this is the main mitigation measure from a biodiversity perspective especially for the pipeline component of the project. Most of the proposed pipeline servitude is located in an area determined as Critical Biodiversity Area (CBA). This area has been selected as CBA not only to meet conservation targets for vegetation types but also to maintain coastal-inland ecological connectivity and a portion of coastal corridor.

   We note and support the requirements laid out in the plant rescue and protection plan and rehabilitation requirements laid out in Sections 11.10 and 11.11 of the report. Monitoring requirements must be adhered to throughout the lifespan of the project and should be subject to auditing by a rehabilitation specialist.

   The rehabilitation and monitoring requirements should be kept in the EMPr but should also be drawn up into a clear guideline document that can be updated if necessary. The success of search and rescue as well as seeding should be recorded.

   It should be noted that the OTMS pipeline for pumping seawater is proposed to transverse some of the same area as the pipelines for this project. Careful planning for construction needs to take place to ensure that the construction of one pipeline does not “undo” the rehabilitation efforts of the other. There should be strict control at all

times of all vehicles and staff to ensure that all activities are kept within the approved servitude. The botanical specialist has stated that a 25m servitude should be sufficient but even this is considered to be a large servitude in terms of impacts on biodiversity.

Please also note that the proposed OTMS pipeline will be pumping and discharging seawater in the same vicinity as the pipeline for this project. Was this considered in the assessment of cumulative impacts?

2. The area surrounding the power plant site is still considered to be of high conservation value and the applicant should manage all of the components of the power plant site in such a way that edge effects are minimised. As much as possible of the disturbed areas within the open space areas surrounding the power plant should also be rehabilitated. Any landscaping within the power plant compound should be done with locally indigenous vegetation.

3. Although we have not requested a biodiversity offset for this specific project we would like to reiterate that it will be essential for all of the major industries, including Saldanha Steel, to participate in a strategic approach to formally conserving ecological corridors within the Saldanha Bay Municipality if ecological functioning within the landscape is to be maintained.

4. CapeNature is still not entirely satisfied that Environmental Authorisation for the powerline will be applied for separately as this is a significant component of the project which is likely to also result in loss of habitat. Cumulative impacts of linear activities, including powerlines, in Saldanha Municipality are now significant. Please note that even though we did not request that a biodiversity offset be acquired as part of this application, it may be necessary for the required powerline, depending on the final route that is proposed.

CapeNature reserves the right to revise initial comments and request further information based on any additional information that may be received.

Yours sincerely

Alana Duffell-Canham
For: Manager (Scientific Services)

From:	Doretha Kotze
To:	ERM South Africa Project Saldanha Steel
Cc:	Collaborate Mailbox
Subject:	RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Date:	05 October 2016 09:30:56 AM
Attachments:	image003.png

Ref: 13/2/12/3/1

ATTENTION: TOUGHEEDA ASPELING

Madam

Please be advised that the WCDM has no additional comments on the Revised DEIR. All comments provided by the WCDM during the course of this assessment, have been attended to in the Comments and Responses Report.

Regards

D o r e t h a K o t z e
Stads- en Streekbeplanner/Town and Regional Planner
Weskus Distriksmunisipaliteit
Langstraat 58 Long Street
Posbus 242 PO Box
MOORREESBURG 7310
Tel: 022 433 8523
West Coast District Municipality

From: Tougheeda Aspeling [mailto:Tougheeda.Aspeling@erm.com] **On Behalf Of** ERM South Africa Project Saldanha Steel
Sent: 16 September 2016 04:28 PM
To: Tougheeda Aspeling
Subject: RE: Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

DEA Ref: 14/12/16/3/3/2/910
ERM Ref: 0315829

Dear Stakeholder,

The Draft Environmental Impact Assessment (EIA) Report for the Proposed Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay was

released for a 30 day comment period between 22 July and 25 August 2016. Comments received have been included in the Comments and Response Report in Annex B.

The Draft EIA Report was revised, based on comments received, and is now available again for comment for a further 30 days. You are hereby requested to submit your comments to ERM, in writing, on or before 18 October 2016 on the revised Draft EIA Report. The document is available at the following locations, or on request from ERM:

- Online at: www.erm.com/saldanhasteel
- Saldanha Public Library
- ERM's offices in the Great Westerford Building (240 Main Road, Newlands, Cape Town)

New text added to this revised Draft EIA Report has been underlined. No other changes have been made to the document.

Comments can be submitted to Tougheeda Aspeling of ERM using the contact detail below:

Email: saldanhasteel.eia@erm.com
Postal address: Postnet Suite 90, Private Bag X12, Tokai, 7966
Fax: 086 5404072

Your comments, and our response, will be incorporated into the Final EIA Report to be submitted to Department of Environmental Affairs (DEA) for consideration.

Kindly note that your comments must reach ERM, in writing, on or before **18 October 2016.**

Thank you for your participation in this process.

Regards

Tougheeda Aspeling

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Tel (+ 27 12) 399 9372

DEA Reference: 14/12/16/3/3/2/910
Enquiries: Ms Thabile Sangweni
Telephone: (012) 399 9409 **E-mail:** TSangweni@environment.gov.za

Mr Stuart Heather - Clark
Environmental Resources Management South Africa
Postnet Suite 90
Private Bag X12
TOKAI
7966

Telephone Number: (021) 681 5400
Email Address: Stuart.heather-clark@erm.com

PER E-MAIL / MAIL

Dear Mr Clark

COMMENTS ON THE AMENDED DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED 1507 MW SALDANHA STEEL GAS – FIRED POWER PLANT AND ITS ASSOCIATED INFRASTRUCTURE IN SALDANHA BAY WITHIN THE SALDANHA BAY MUNICIPALITY IN THE WESTERN CAPE PROVINCE

The amended draft Environmental Impact Assessment report (EIAr) dated September 2016 and received by this Department on 19 September 2016 refers.

This Department has the following comments on the abovementioned application:

i. It is understood that disposal and treatment will consist of partial dewatering and disposal of concentrated slurry to a company who will own and operate a proposed biogas facility in Saldanha. However, as this biogas facility is still proposed, this Department requires that alternative disposal facilities form part of the final EIAr, particularly as it is likely that this Department would make a decision on this application before the proposed biogas facility is authorised.
ii. You are further reminded that the final EIAr to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of the EIAr in accordance with Appendix 3 of the EIA Regulations, 2014.
iii. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of these Regulations, unless an extension has been granted in terms of Regulation 3(7).
iv. Failure to comply with the requirements of the acceptance of the SR, the comments on the initial draft EIAr, the comments of this letter as well as the requirements of the EIA Regulations, 2014, a negative Environmental Authorisation may be issued by this Department.

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Mr Sabelo Malaza
Chief Director: Integrated Environmental Authorisations
Department of Environmental Affairs
Signed by: Mr Coenrad Agenbach
Designation: Deputy Director: Strategic Infrastructure Developments
Date: 14/10/2016

cc:	Mr R Holcroft	ArcelorMittal SA	Email: Richard.Holcroft@arcelormittal.com

Western Cape Government
Environmental Affairs and Development Planning
BETTER TOGETHER.

Adri La Meyer
DIRECTORATE: DEVELOPMENT FACILITATION
Adri.LaMeyer@westerncape.gov.za

REFERENCES:
19/2/5/3/F4/18/WL0043/16 (Waste Management)
19/4/4/BS1-Gas-Fired Independent Power Plant, Saldanha (Air Quality Management)
16/3/3/6/4/1/1/F4/17/3013/16 (Development Management)

DATE: 2016 -10- 18

The Board of Directors
ERM South Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
TOKAI
7966

For attention: Ms Tougheeda Aspeling

Tel: (021) 681 5400
E-mail: Tougheeda.Aspeling@erm.com

Dear Madam

COMMENT ON THE REVISED ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED COMBINED CYCLE GAS TURBINE POWER PLANT ON THE REMAINING EXTENT OF THE FARM YZERVARKENSRUG NO. 129, PORTION 2 OF THE FARM JAKKALS KLOOF NO. 195 AND VARIOUS OTHER FARMS, SALDANHA BAY (DEA REREFENCE 14/12/16/3/3/2/910)

1. The electronic mail notification dated 22 July 2016 of the release of the Draft Environmental Impact Assessment ("EIA") Report, the Draft EIA Report dated July 2016 that was received by this Department on 25 July 2016, this Department's comment on the Draft EIA Report dated 25 August 2016, the Revised EIA Report dated September 2016 and received by this Department on 19 September 2016 and the authorities site meeting held on 6 October 2016, refer. The following consolidated comment from various directorates in the Department is hereby offered.

2. Directorate: Waste Management – Thorsten Aab (Thorsten.Aab@westerncape.gov.za; Tel: (021) 483 3009):

2.1 This Directorate is satisfied that its comments dated 25 August 2016 on the Draft EIA Report have been adequately addressed and responded to.

3. Directorate: Air Quality Management – Peter Harmse (Peter.Harmse@westerncape.gov.za; Tel: (021) 483 8343):

3.1 This Directorate is satisfied that its comments dated 25 August 2016 on the Draft EIA Report have been adequately addressed and responded to.

4. Directorate: Development Management (Region 1) – Keagan-leigh Adriaanse (Keagan-leigh.Adriaanse@westerncape.gov.za; Tel: (021) 483 8349):

4.1 Listed activities

4.1.1 The width of the proposed road reserve for the onsite roads and access road from the OP7644 have not been provided. This information is required in order to confirm the applicability of Activity 24 of Government Notice ("GN") No. R. 983 of 4 December 2014 and Activity 4 of GN No. R. 985 of 4 December 2014.

4.1.2 The width of the existing road reserve of Provincial Road OP7644 that is proposed to be widened, has not been provided. This information is required in order to confirm the applicability of Activity 56 of GN No. R. 983 of 4 December 2014.

4.2 Activity Description

4.2.1 As previously requested in this Directorate's comment on the Draft EIA Report dated 25 August 2016, further information pertaining to the regasification process and the potential impacts associated with this process, must be provided.

4.3 Alternatives

4.3.1 Page 3-29 of the Revised EIA Report indicates that water could be supplied by West Coast District Municipality from the authorised reverse osmosis plant. Should water be supplied from the reverse osmosis plant, an indication of how this water will be supplied to the proposed development and the estimated volume of water to be supplied must be reported on in the Final EIA Report.

4.3.2 The Comments and Responses Report indicates that the Aurora substation and the 400kV power line to Koeberg has insufficient capacity to receive the excess electricity that will be generated in phase 2 of the proposed development. Alternatives with respect to the evacuation of the excess electricity must be reported on in the Final EIA Report to be submitted to the competent authority.

4.4 Services

4.4.1 The comments and responses report indicates that the International Power Consortium South Africa are in discussions with Saldanha Bay Municipality to confirm sufficient, spare and unallocated capacity to provide solid waste removal and disposal services. The confirmation of services must be included in the Final EIA Report to be submitted to the competent authority.

4.5 Maps

4.5.1 Figure 3.4 of the Revised EIA Report does not indicate the proposed location of the desalination plant. The layout plan must be amended to include the location of the desalination plant.

4.6 Water supply

4.6.1 Page 3-49 of the Revised EIA Report indicates that water will be trucked in from local farms. An indication of whether the water would be sourced from existing, registered water uses must be provided.

4.7 Specialist input

4.7.1 Page 5-12 of the Revised EIA Report and page 11-45 of the Draft Environmental Management Programme ("EMPr") indicates that a Major Hazard Installation ("MHI") risk assessment must be conducted in the planning and design phase of the proposed development. If the MHI risk assessment is not completed and included as part of the Final EIA Report to be submitted to the competent authority for decision making, the competent authority will have an incomplete set of information, which could preclude it to make an informed decision on the application for environmental authorisation.

4.8 Environmental Management Programme

4.8.1 A full description of the proposed development (including all associated infrastructure) must be included in the EMPr;

4.8.2 The amended layout, which includes the location of the desalination plant must be included in the EMPr;

4.8.3 Mitigation measures associated with the proposed sewage treatment and desalination plant must be included in the EMPr. (In this regard, please also refer to comment 6.2 below.);

4.8.4 A maintenance management plan for the proposed sewage treatment and desalination plant must be included in the EMPr;

4.8.5 The EMPr must be amended to include the emergency incident procedures referred to in Section 30 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). Any incident must immediately be reported to the relevant authorities and all the necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes;

4.8.6 The plant rescue and protection plan must include an indication of when the search and rescue will be undertaken (i.e. the appropriate season);

4.8.7 A waste management plan must be compiled and included in the EMPr;

4.8.8 All trucks transporting materials and water to and from the site must be appropriately covered during the construction phase; and

4.8.9 The EMPr must be duly dated.

5. Directorate: Pollution and Chemicals Management – Gunther Frantz (Gunther.Frantz@westerncape.gov.za; Tel: (021) 483 2975):

5.1 This Directorate is satisfied that its comments dated 25 August 2016 on the Draft EIA Report have been adequately addressed and responded to.

6. Directorate: Development Facilitation – Adri La Meyer (Adri.LaMeyer@westerncape.gov.za; Tel: (021) 483 2887):

6.1 This Directorate is satisfied that its previous comments on the Draft EIA Report pertaining to the project need and desirability, greenhouse gas emissions and water requirements, have been adequately addressed.

6.2 As per comment 4.8.3 above, mitigation measures for the operation of the sewage treatment and water reclamation plant must be incorporated in the EMPr (e.g. powdered sludge removal, dry salts handling, etc.).

7. Please direct all enquiries to the officials indicated in this correspondence should you require any clarity on any of the issues/comments provided.

8. The Department reserves the right to revise initial comments and request further information based on any or new information received.

Yours faithfully

pp **HEAD OF DEPARTMENT**
DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

Copy to: Ms Thabile Sangweni (DEA)

E-mail: TSangweni@environment.gov.za

SALDANHA BAAI BAY
MUNISIPALITEIT | MUNICIPALITY | uMASIPALA

REF NO:
129 rem 195/2

ENQUIRIES:
N Duarte; E Mmbadi
Ms Mr

DEA REFERENCE: 14/12/16/3/3/2/910

Tougheeda Aspeling

REGISTERED MAIL

ERM Southern Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
Tokai
7966

RE: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT FOR PROPOSED GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY, WESTERN CAPE PROVINCE.

1. The Proposed Gas-Fired Independent Power Plant to support Saldanha Steel and other Industries in Saldanha Bay: Draft EIA Report dated September 2016 refers.

2. The Saldanha Bay Municipality ("SBM") feels that the assessment should discuss the entire project rather than separating the project into three EIA processes, namely the Power Plant (including gas pipelines), Transmission Lines to the substation and the Marine component. Separating these components could only reveal minimal potential environmental impacts associated with the development of this magnitude.

3. The Environment and Heritage Section of the SBM believes that the two components (Transmission Lines to the substation and Marine Infrastructure) excluded in this assessment are crucial for this development and they have significant potential negative environmental impacts. The transmission lines from the power plant to substation will have significant impacts on biodiversity. In the case where environmental authorisation is

4. SBM is responsible for monitoring ambient air quality within its jurisdiction and recommend that all the developments affecting ambient air quality should contribute towards ambient air quality monitoring. The contributions could be in the form of monitoring equipment that will add to existing SBM grid or monitoring data that will feed into the SBM Ambient Air Quality Report.

5. The Saldanha Bay Municipality supports the recycling of waste water to avoid the discharge of such water, however question the quality of that water due to continuous recycling. It is of SBM: Environment & Heritage section's opinion that water could only be recycled to a certain point as recycling may affect the properties of water and its quality.

6. The pipeline included manholes for maintenance or monitoring purposes and it is discussed that the area along the pipeline will be fully rehabilitated. Is the access road for maintenance or monitoring purposes required along the pipeline?

7. For consistency purpose in the report, the local authority should be addressed as Saldanha Bay Municipality ("SBM") or as Saldanha Bay Local Municipality ("SBLM"), not both.

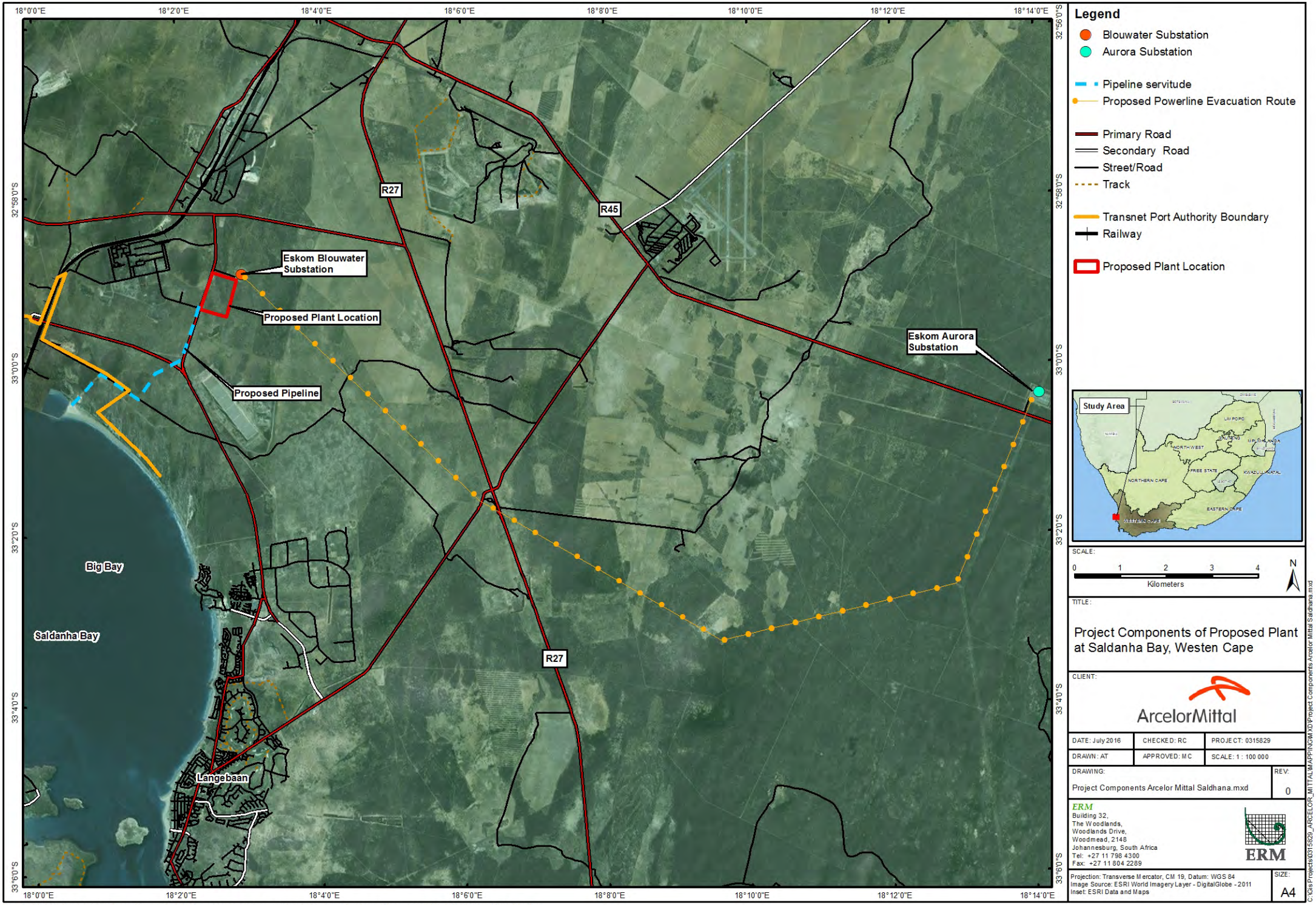
pp: MUNICIPAL MANAGER

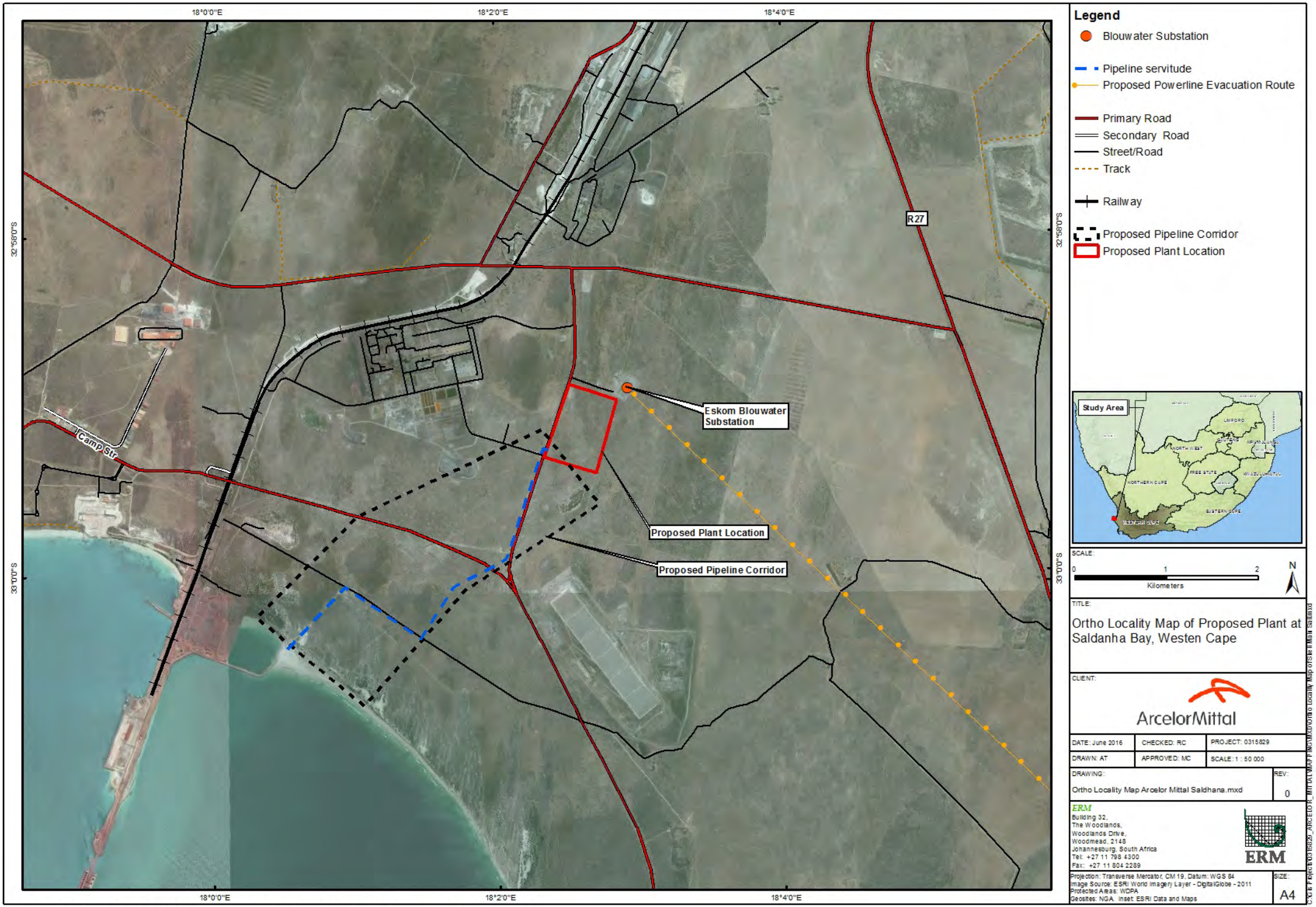
Date: 18/10/16

/em

Annex C

Layout Diagram and Maps





Legend

- Blouwater Substation
- Pipeline servitude
- Proposed Powerline Evacuation Route
- Primary Road
- Secondary Road
- Street/Road
- Track
- Railway
- Proposed Pipeline Corridor
- Proposed Plant Location

SCALE:
0 1 2
Kilometers

N

TITLE:
Ortho Locality Map of Proposed Plant at Saldanha Bay, Westen Cape

CLIENT:
ArcelorMittal

DATE: June 2016	CHECKED: RC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 50 000

DRAWING: Ortho Locality Map Arcelor Mittal Saldhana.mxd
REV: 0

ERM
Building 32,
The Woodlands,
Woodlands Drive,
Woodmead, 2148
Johannesburg, South Africa
Tel: +27 11 798 4300
Fax: +27 11 804 2289

Projection: Transverse Mercator, CM 19, Datum: WGS 84
Image Source: ESRI World Imagery Layer - DigitalGlobe - 2011
Protected Areas: WDPA
Geosites: NGA. Inset: ESRI Data and Maps

SIZE: A4

C:\GIS Projects\0315829_ARCELOR_MITTAL\MXD\Ortho Locality Map of Shell Main Saldanha

Legend

- Blouwater Substation
- Aurora Substation
- 132KV Powerline Points
- Primary Road
- Secondary Road
- Street/Road
- Track
- 132 KV Evacuation to Arcelor Mittal from plant's 132 KV switchyard
- Proposed Powerline Evacuation Route
- Pipeline servitude
- Proposed Plant Layout
- Railway
- Proposed Plant Location

SCALE:

0 500 1 000

Meters

N

TITLE:

132kV feeder transmission line from the power plant to ArcelorMittal Steel Works

CLIENT:

ArcelorMittal

DATE: June 2016	CHECKED: RC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 30 000

DRAWING: Powerline_132KV_Feeder_to_Steelworks.mxd

REV: 0

ERM
Building 32,
The Woodlands,
Woodlands Drive,
Woodmead, 2148
Johannesburg, South Africa
Tel: +27 11 798 4300
Fax: +27 11 804 2289

Projection: Transverse Mercator, CM 19, Datum: WGS 84
Image Source: ESRI World Imagery Layer - DigitalGlobe - 2011
Inset: ESRI Data and Maps

SIZE: A4

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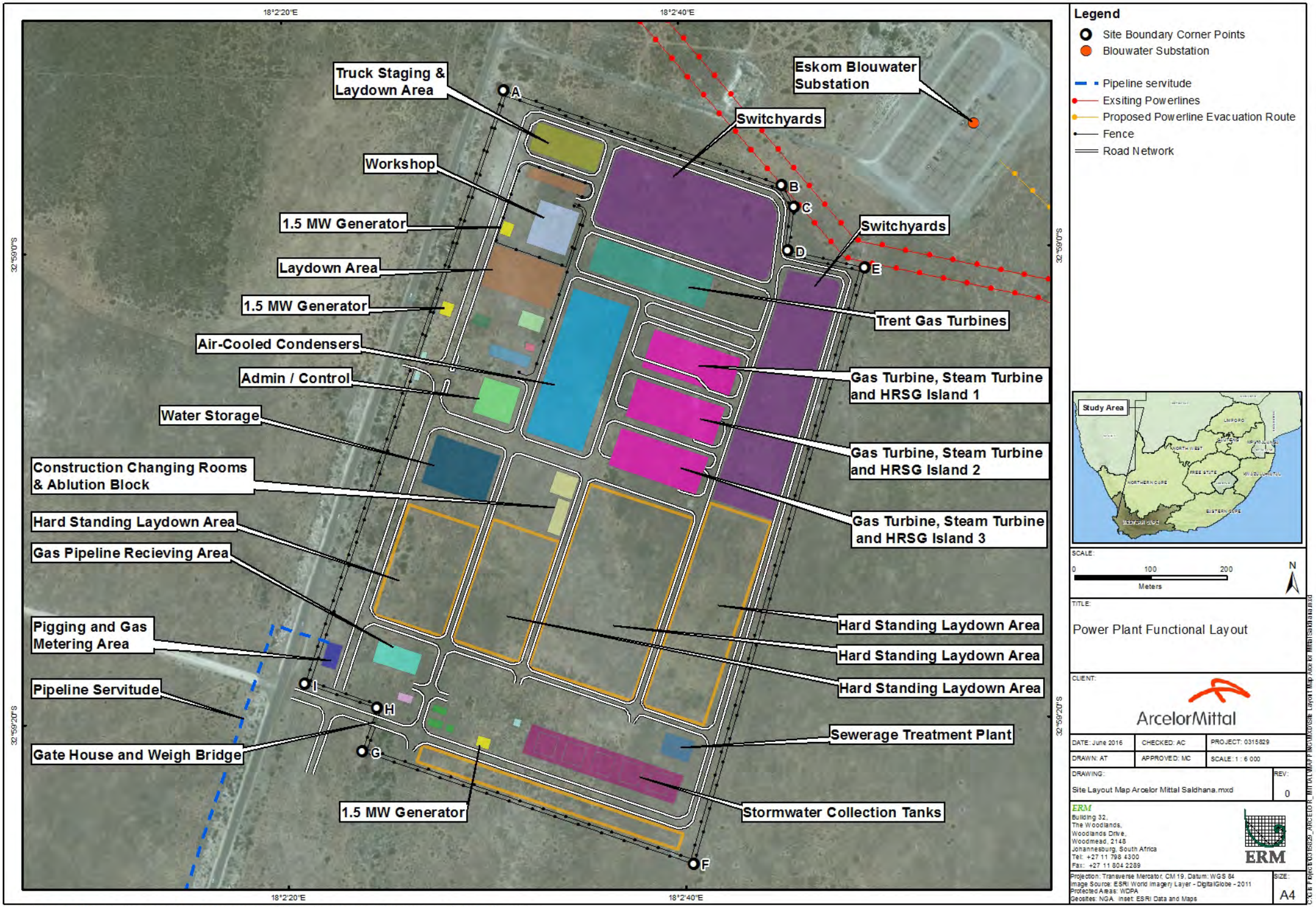

Legend

- Site Boundary Corner Points
- Blouwater Substation
- Pipeline servitude
- Exsiting Powerlines
- Proposed Powerline Evacuation Route
- Fence
- Road Network

SCALE:
0 100 200
Meters
N

TITLE:
Power Plant Functional Layout

CLIENT:
ArcelorMittal

DATE: June 2016	CHECKED: AC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 6 000

DRAWING: Site Layout Map Arcelor Mittal Saldhana.mxd
REV: 0

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Building 32,
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Woodlands Drive,
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Johannesburg, South Africa
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Fax: +27 11 804 2289

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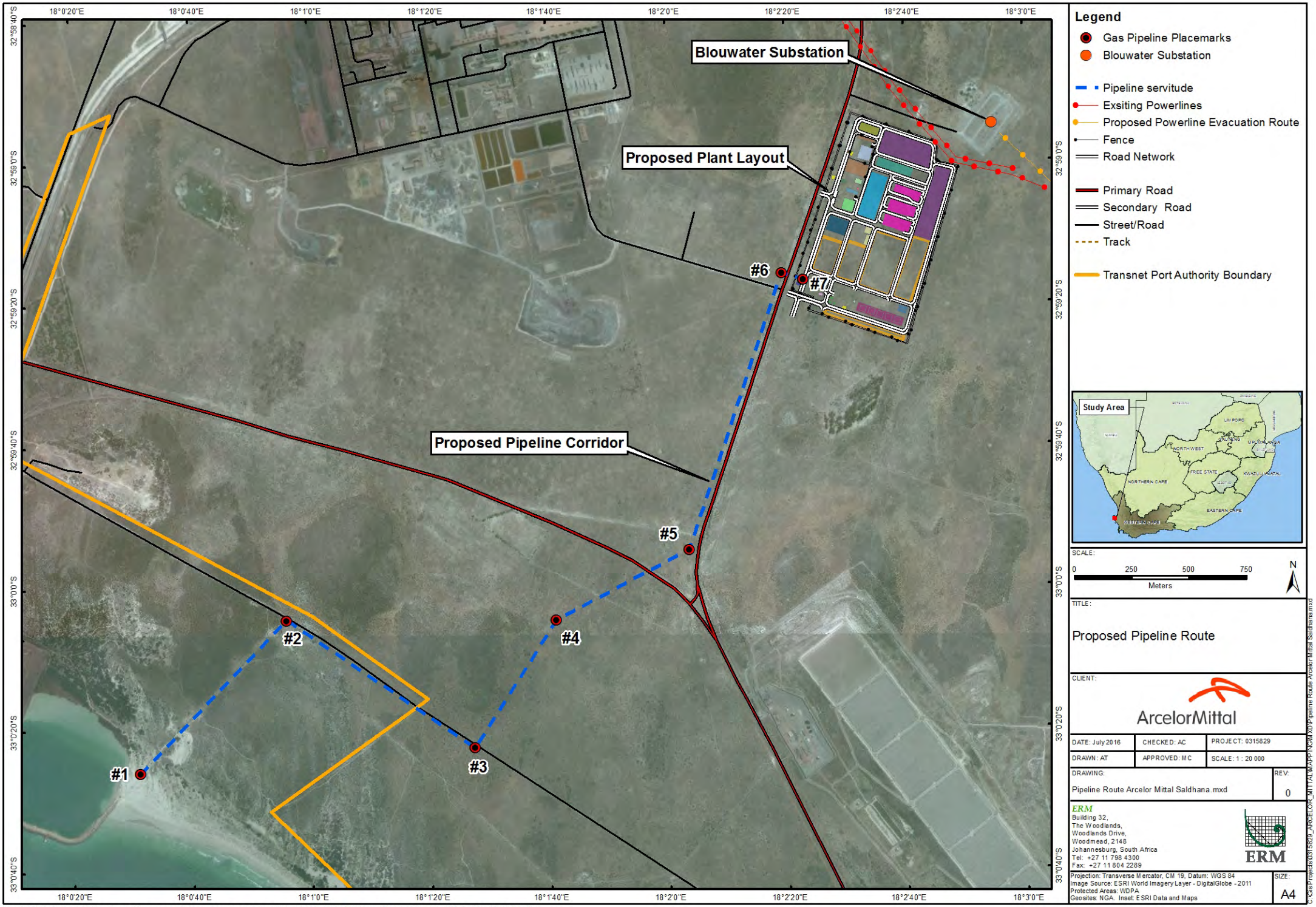

Legend

- Gas Pipeline Placemarks
- Blouwater Substation
- Pipeline servitude
- Exsiting Powerlines
- Proposed Powerline Evacuation Route
- Fence
- Road Network
- Primary Road
- Secondary Road
- Street/Road
- Track
- Transnet Port Authority Boundary

SCALE:

0 250 500 750

Meters

N

TITLE:

Proposed Pipeline Route

CLIENT:

ArcelorMittal

DATE: July 2016	CHECKED: AC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 20 000

DRAWING: Pipeline Route Arcelor Mittal Saldhana.mxd

REV: 0

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Building 32,
The Woodlands,
Woodlands Drive,
Woodmead, 2148
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Tel: +27 11 798 4300
Fax: +27 11 804 2289

Projection: Transverse Mercator; CM 19; Datum: WGS 84
Image Source: ESRI World Imagery Layer - DigitalGlobe - 2011
Protected Areas: WDPA
Geosites: NGA. Inset: ESRI Data and Maps

SIZE: A4

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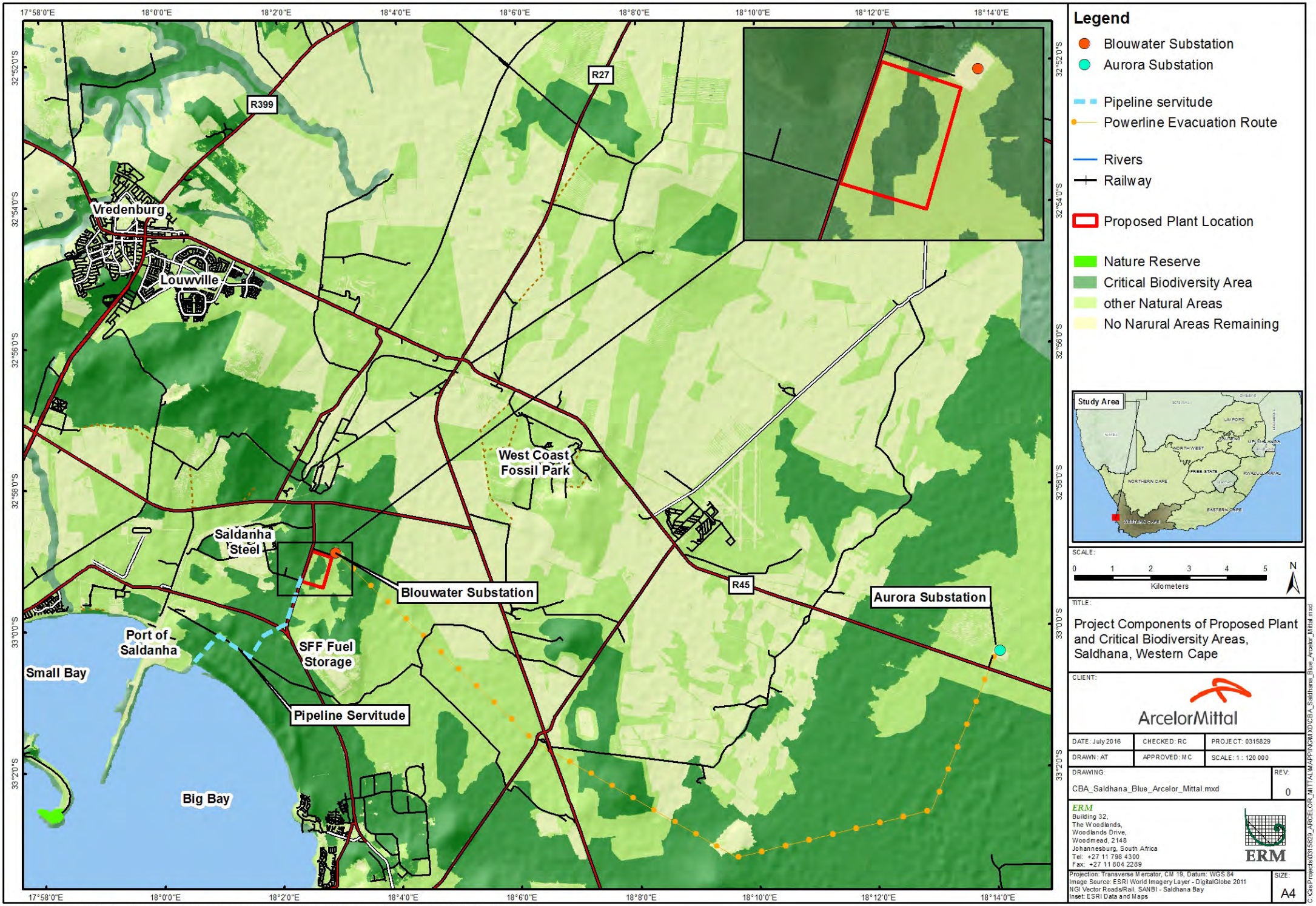

Legend

- Blouwater Substation
- Aurora Substation
- Pipeline servitude
- Powerline Evacuation Route
- Rivers
- Railway
- Proposed Plant Location
- Nature Reserve
- Critical Biodiversity Area
- other Natural Areas
- No Narural Areas Remaining

SCALE:

0 1 2 3 4 5 Kilometers

N

TITLE:

Project Components of Proposed Plant and Critical Biodiversity Areas, Saldhana, Western Cape

CLIENT:

ArcelorMittal

DATE: July 2016	CHECKED: RC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 120 000

DRAWING: CBA_Saldhana_Blue_Arcelor_Mittal.mxd | REV: 0

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Building 32,
The Woodlands,
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Johannesburg, South Africa
Tel: +27 11 798 4300
Fax: +27 11 804 2289

Projection: Transverse Mercator, CM 19, Datum: WGS 84
Image Source: ESRI World Imagery Layer - DigitalGlobe 2011
NGI Vector Roads/Rail, SANBI - Saldhana Bay
Inset: ESRI Data and Maps

SIZE: A4

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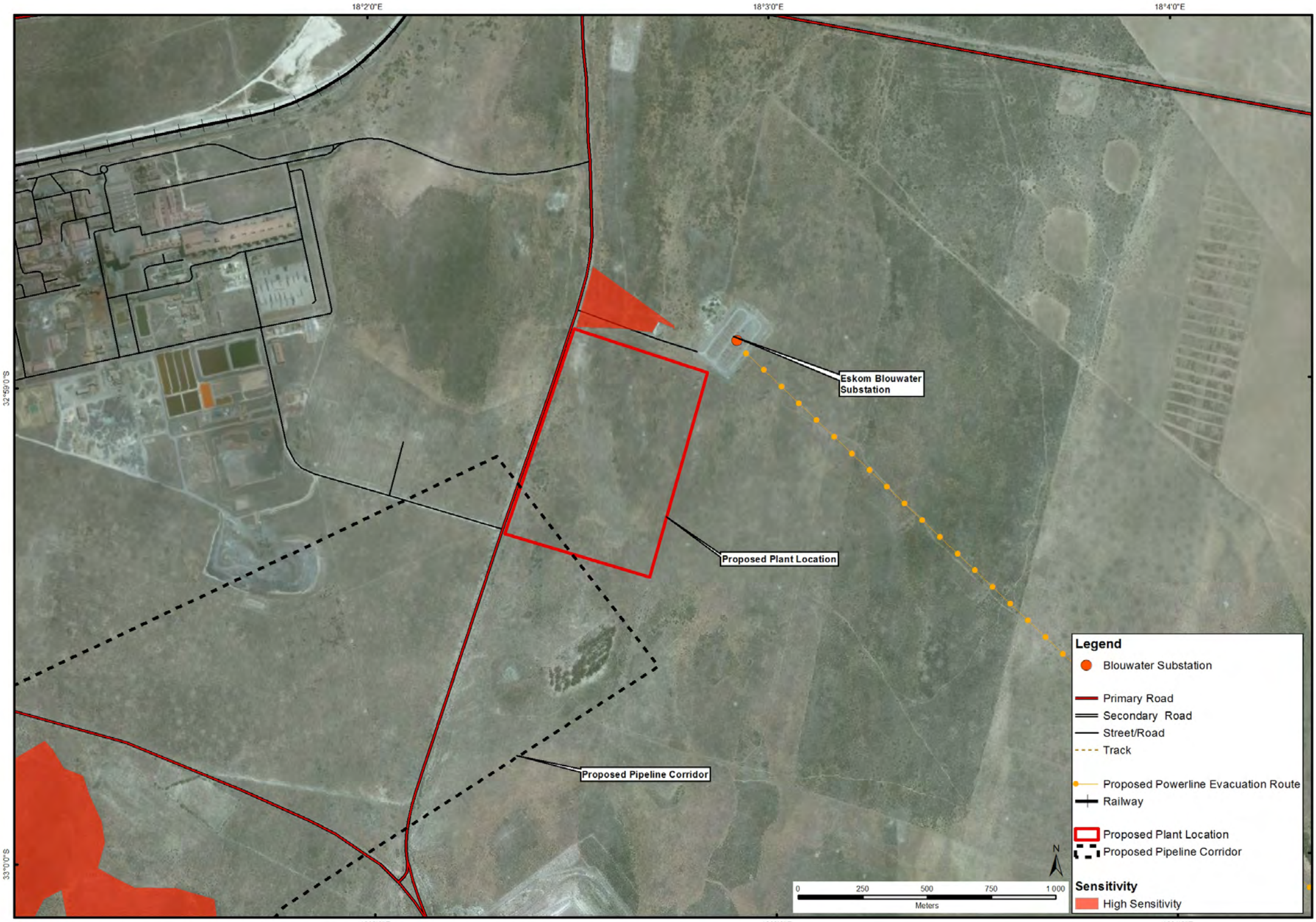
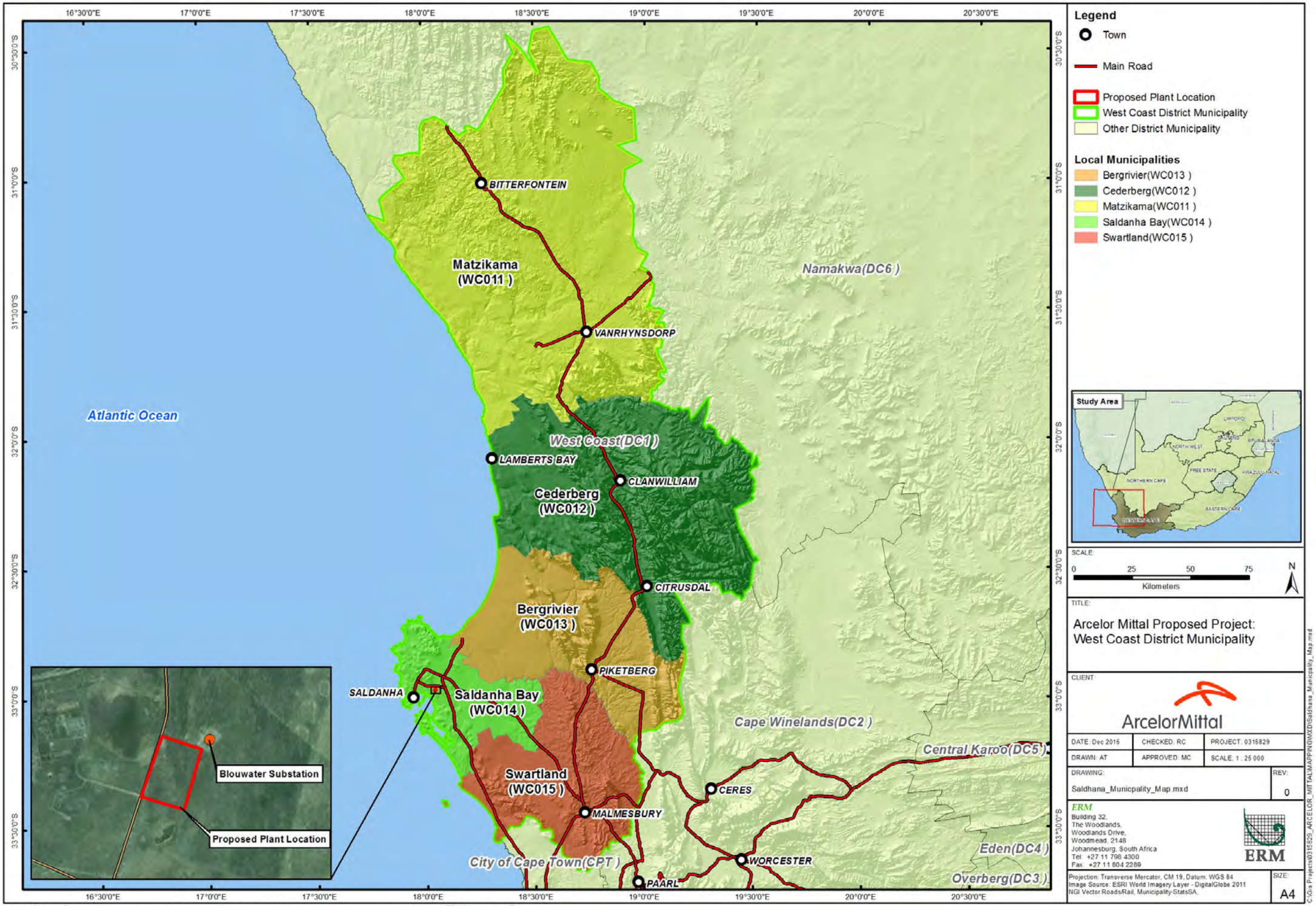



Pipeline Route
Saldanha Ind. Dev.
PCSA P
Legend
132 KV Power Line 1
132KV Powerline 2
Aurora access
Feature 1
High
Med - High
Medium
Pipeline servitude
Plant Access Road
Saldanha Ind. Dev.
Site
Google earth
Image © 2016 CNES / Astrium
© 2016 AfriGIS (Pty) Ltd.
© 2016 Google
N
700 m



Legend

- Town
- Main Road
- Proposed Plant Location
- West Coast District Municipality
- Other District Municipality

Local Municipalities

- Bergrivier(WC013)
- Cederberg(WC012)
- Matzikama(WC011)
- Saldanha Bay(WC014)
- Swartland(WC015)

SCALE:
0 25 50 75
Kilometers

N

TITLE:
Arcelor Mittal Proposed Project:
West Coast District Municipality

CLIENT:
ArcelorMittal

DATE: Dec 2015	CHECKED: RC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 25 000

DRAWING: Saldhana_Municipality_Map.mxd
REV: 0

ERM
Building 32,
The Woodlands,
Woodlands Drive,
Woodmead, 2148
Johannesburg, South Africa
Tel: +27 11 798 4300
Fax: +27 11 804 2289

Projection: Transverse Mercator, CM 19, Datum: WGS 84
Image Source: ESRI World Imagery Layer - DigitalGlobe 2011
NGI Vector Roads/Rail, Municipality-StatsSA,

SIZE: A4

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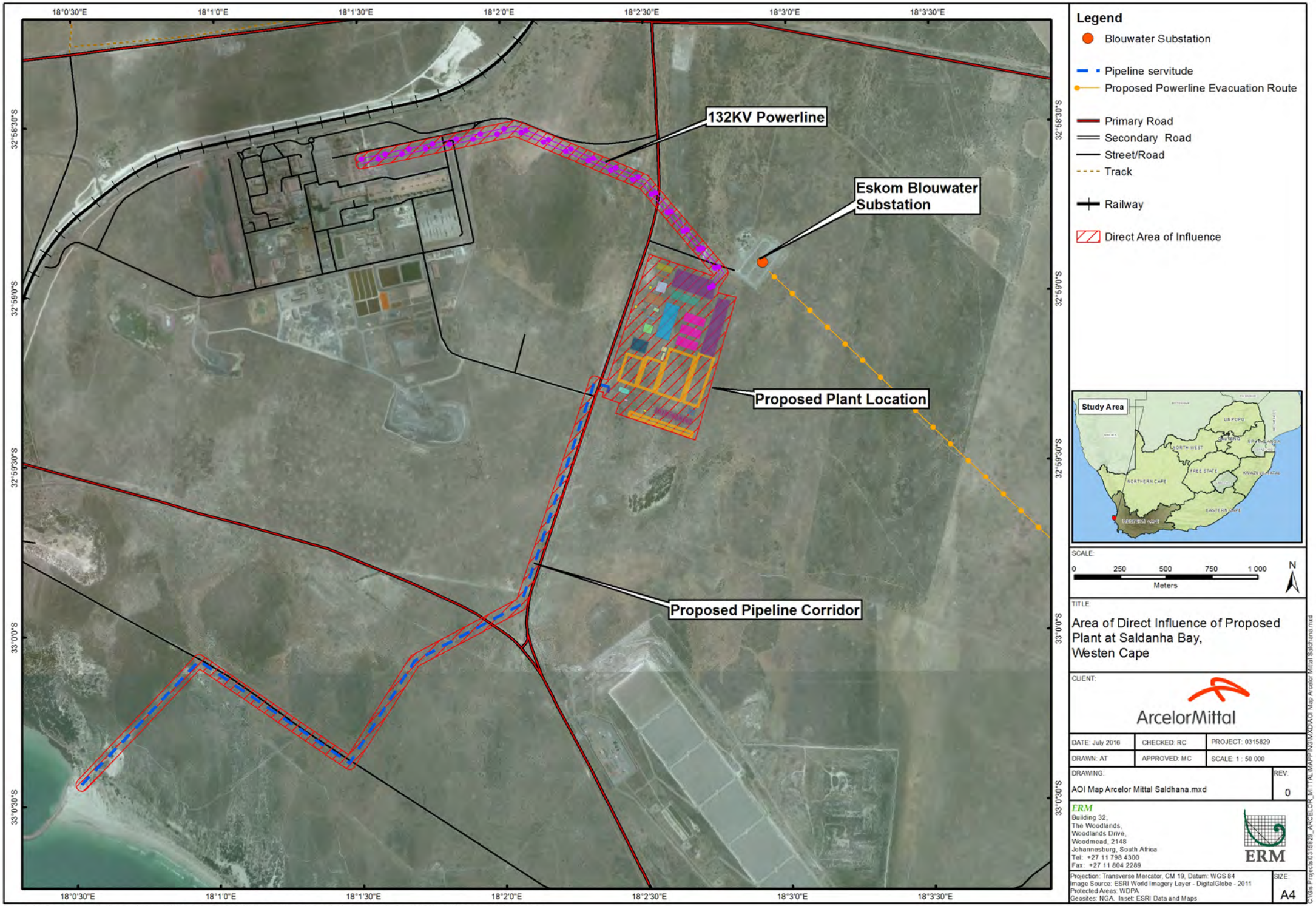

Legend

- Blouwater Substation
- Pipeline servitude
- Proposed Powerline Evacuation Route
- Primary Road
- Secondary Road
- Street/Road
- Track
- Railway
- Direct Area of Influence

SCALE:
0 250 500 750 1 000
Meters

N

TITLE:
Area of Direct Influence of Proposed Plant at Saldanha Bay, Westen Cape

CLIENT:
ArcelorMittal

DATE: July 2016	CHECKED: RC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 50 000

DRAWING: AOI Map Arcelor Mittal Saldhana.mxd
REV: 0

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Building 32,
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Woodlands Drive,
Woodmead, 2148
Johannesburg, South Africa
Tel: +27 11 798 4300
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Projection: Transverse Mercator, CM 19, Datum: WGS 84
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Protected Areas: WDPA
Geosites: NGA. Inset: ESRI Data and Maps

SIZE: A4

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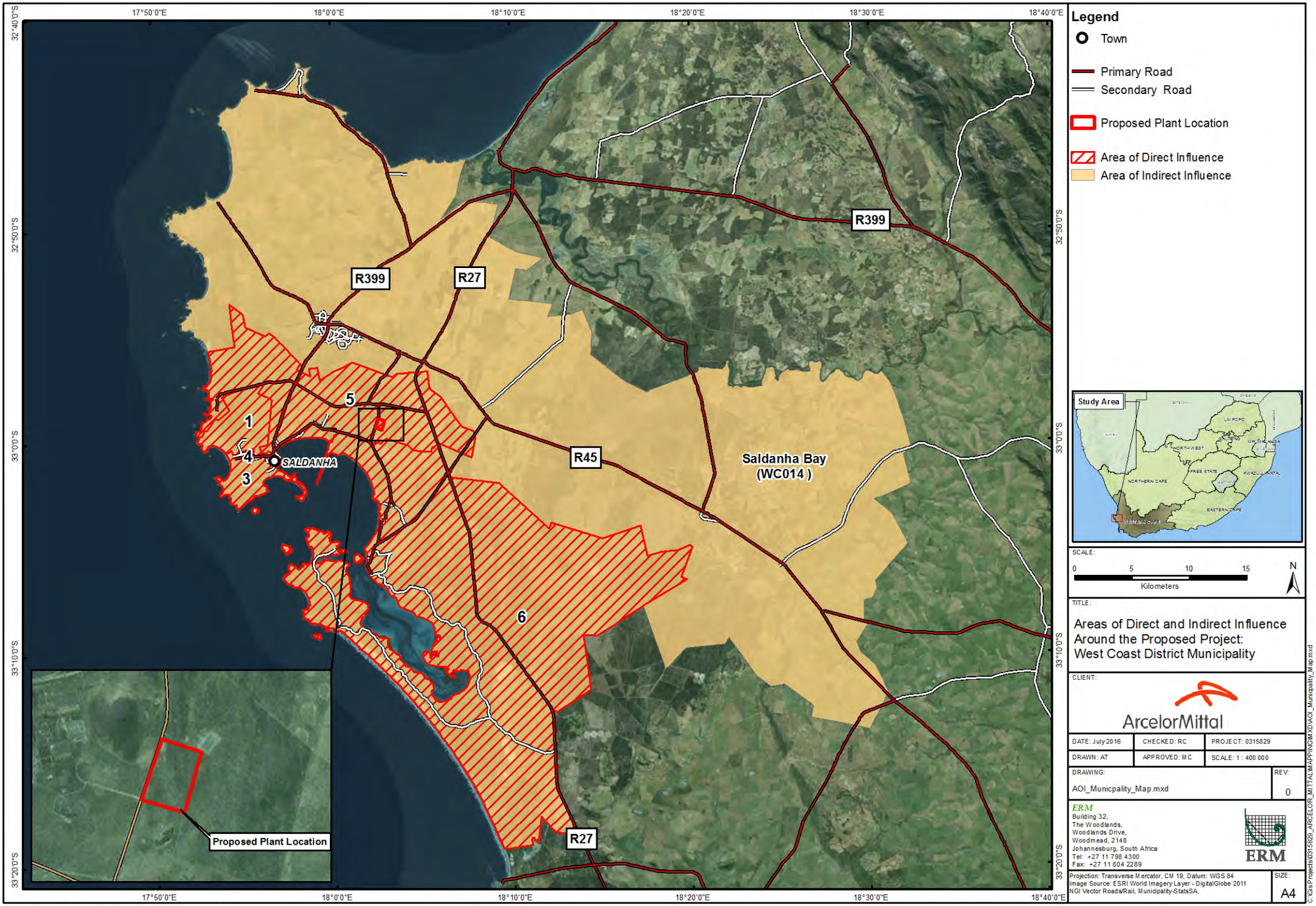

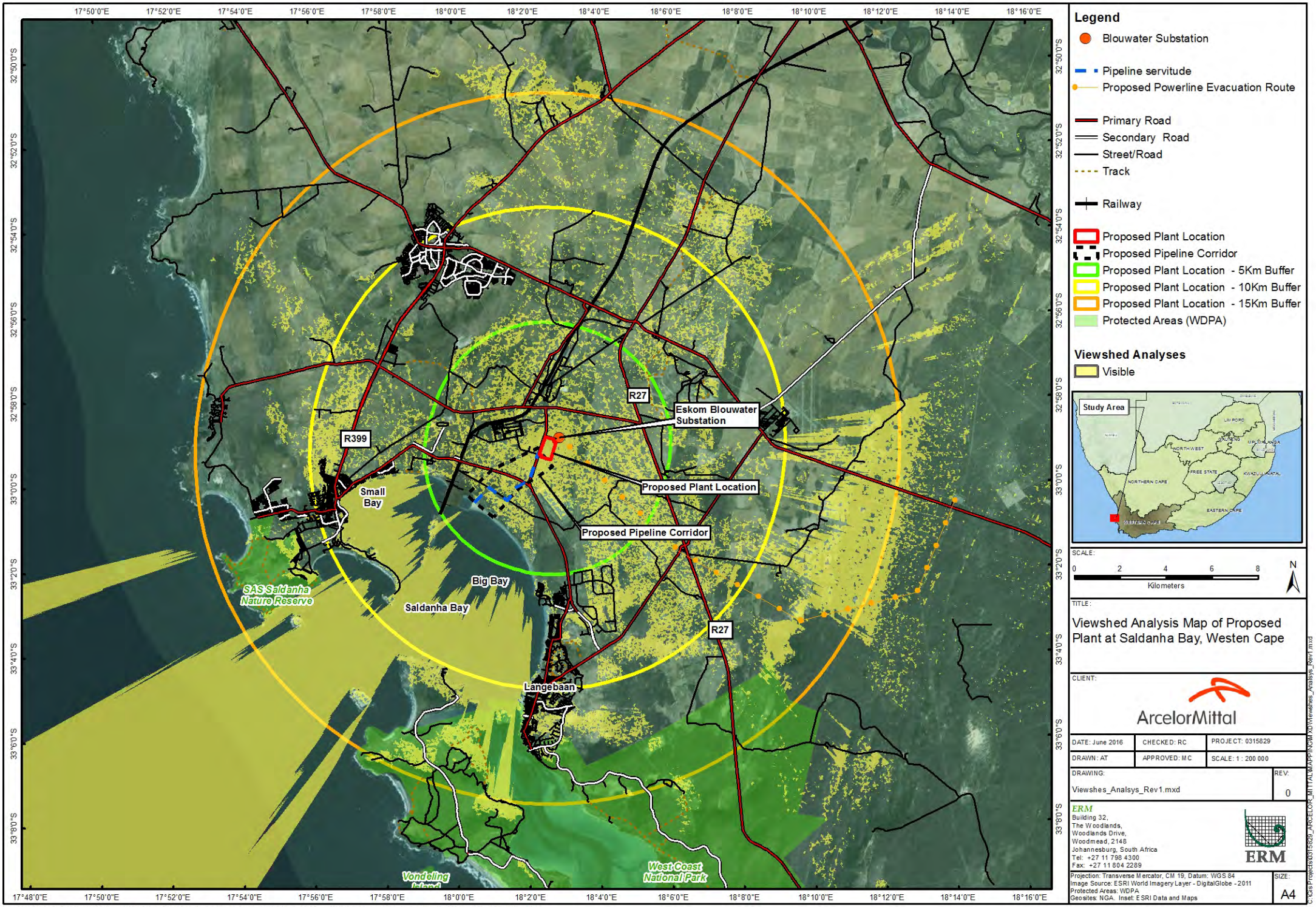

Legend

- Blouwater Substation
- Pipeline servitude
- Proposed Powerline Evacuation Route
- Primary Road
- Secondary Road
- Street/Road
- Track
- Railway
- Proposed Plant Location
- Proposed Pipeline Corridor
- Proposed Plant Location - 5Km Buffer
- Proposed Plant Location - 10Km Buffer
- Proposed Plant Location - 15Km Buffer
- Protected Areas (WDPA)

Viewshed Analyses

- Visible

SCALE:

0 2 4 6 8

Kilometers

N

TITLE:

Viewshed Analysis Map of Proposed Plant at Saldanha Bay, Westen Cape

CLIENT:

ArcelorMittal

DATE: June 2016	CHECKED: RC	PROJECT: 0315829
DRAWN: AT	APPROVED: MC	SCALE: 1 : 200 000

DRAWING: Viewshes_Analsys_Rev1.mxd

REV: 0

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Woodmead, 2148
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Tel: +27 11 798 4300
Fax: +27 11 804 2289

Projection: Transverse Mercator; CM 19; Datum: WGS 84
Image Source: ESRI World Imagery Layer - DigitalGlobe - 2011
Protected Areas: WDPA
Geosites: NGA. Inset: ESRI Data and Maps

SIZE: A4

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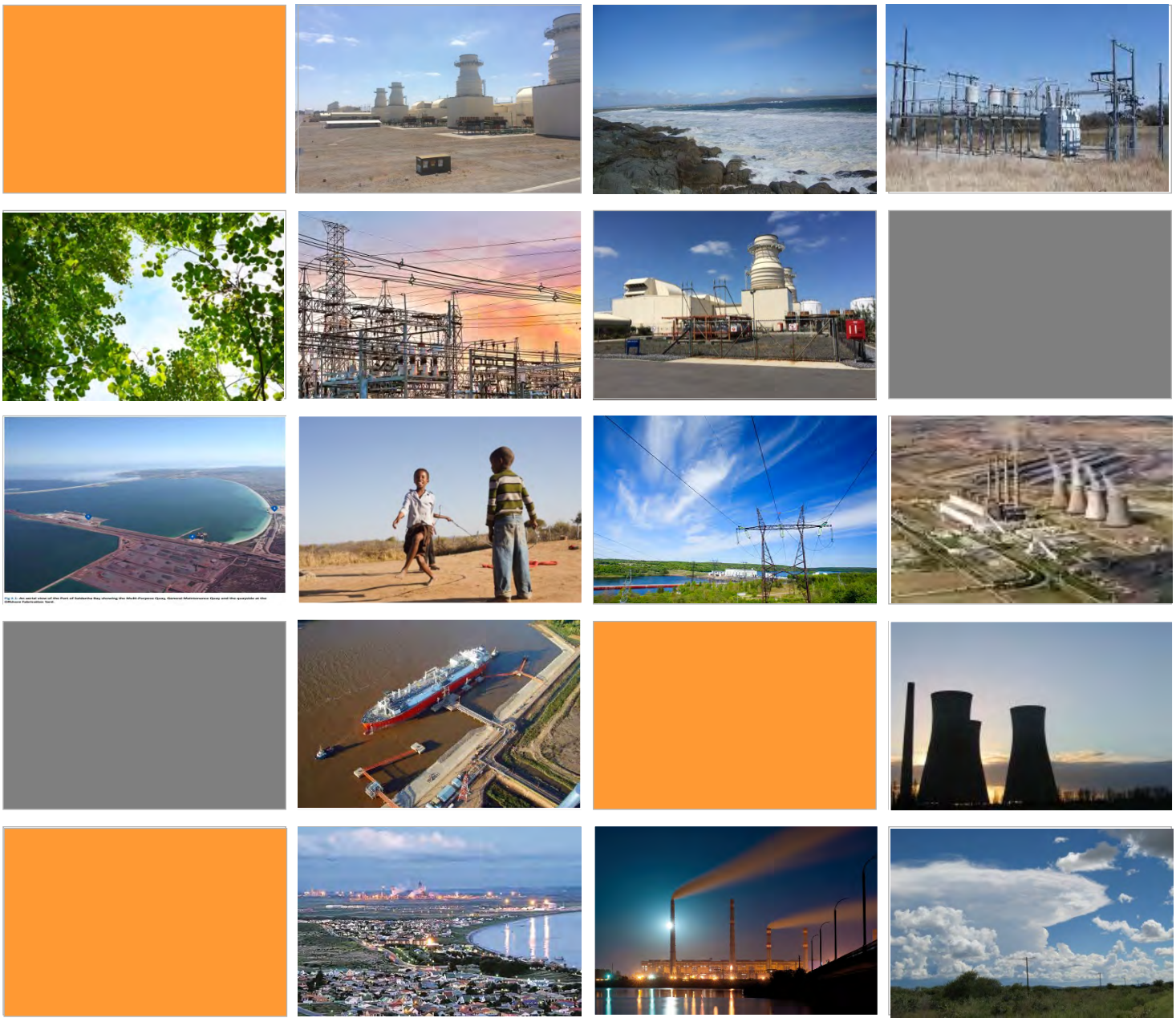


ArcelorMittal

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape V1

Final Report: Annex D - Specialist Reports

ArcelorMittal

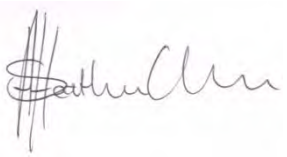
October 2016

www.erm.com

Environmental Impact Assessment Report for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay V1

Environmental Resources Management

Final Report: Annex D - Specialist Reports

Client: ArcelorMittal	Project No: 0315829
Summary and version history: V1 This EIA Report has been compiled as part of the EIA process in accordance with the regulatory requirements stipulated in the EIA Government Notice Regulations (GNR 982/2014) promulgated in terms of Section 24(5) of NEMA. This EIA Report documents the findings of the Specialist Study and Impact Assessment Phases.	Date: October 2016 Approved by: 

1	Final EIA Report
	Compiled by: Claire Alborough, Nadia Mol, Lindsey Bungartz and Stephan van den Berg Reviewed by: Stuart Heather-Clark and Brett Lawson

Distribution: Public

AIR QUALITY SPECIALIST STUDY FOR THE EIA FOR THE PROPOSED ARCELORMITTAL CCGT POWER PLANT AT SALDANHA BAY

Issued by:

uMoya-NILU Consulting (Pty) Ltd
P O Box 20622
Durban North, 4016

Issued to:

ERM Southern Africa (Pty) Ltd
Suite S005, 17 The Boulevard
Westway Office Park
Westville, 3635

Report details

Client:	ERM Southern Africa (Pty) Ltd
Report title:	Air Quality Specialist study for the EIA for the proposed ArcelorMittal CCGT power plant at Saldanha Bay
Project:	uMN033-16
Report number:	uMN060-2016
Version:	Final

Author details

Author:	Mark Zunckel and Sarisha Perumal
Reviewer:	Yegeshni Moodley

When used as a reference this report should be cited as follows:

uMoya-NILU (2016): Air Quality Specialist study for the EIA for the proposed ArcelorMittal CCGT power plant at Saldanha Bay, August 2016, uMN060-2016.

GLOSSARY OF ACRONYMS, TERMS AND UNITS

AEL	Atmospheric Emission License
AIR	Atmospheric Impact Report
CCGT	Combined Cycle Gas Turbine
C_6H_6	Benzene
CH_4	Methane
CNG	Compressed Natural Gas consists mostly of methane and is drawn from gas wells or in conjunction with crude oil production
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
Emission	The direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in an installation into the air, water or land.
HSRG	Heat Recovery Steam Generator
IPCSA	International Power Consortium South Africa
IPP	Independent Power Producer
IDZ	Industrial Development Zone
LP	Low pressure [steam]
LNG	Liquefied Natural Gas is natural gas stored as a super-cooled (cryogenic) liquid
NEM: AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NAAQS	Ambient Air Quality Standards
NO	Nitrogen oxide
NO_2	Nitrogen dioxide
NO_X	Oxides of nitrogen (NO_X = NO + NO_2)
PM_{10}	Particulate matter with a diameter less than 10 microns
$PM_{2.5}$	Particulate matter with a diameter less than 2.5 microns
SAWS	South African Weather Service
SBM	Saldanha Bay Municipality
SO_2	Sulphur dioxide
TNPA	Transnet National Ports Authority
$\mu g/m^3$	Micrograms per cubic meter
VOC	Volatile organic compound
WCDM	West Coast District Municipality

DECLARATION

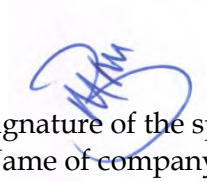
Air Quality Specialist study for the EIA for the proposed ArcelorMittal CCGT power plant at Saldanha Bay

Specialist:	uMoya-NILU Consulting (Pty) Ltd		
Contact person:	Mark Zunckel		
Postal address:	P O Box 20622, Durban North		
Postal code:	4016	Cell:	083 690 2728
Telephone:	031 262 3265	Fax:	031 262 3266
E-mail:	mark@umoya-nilu.co.za		
Professional affiliation	Registered Natural Scientist with South African Council for Natural Scientific Professionals, (400449/04)		
Project Consultant:	uMoya-NILU Consulting (Pty) Ltd		
Contact person:	Mark Zunckel		
Postal address:	P O Box 20622, Durban North		
Postal code:	4016	Cell:	083 690 2728
Telephone:	031 262 3265	Fax:	031 262 3266
E-mail:	mark@umoya-nilu.co.za		

I, MARK ZUNCKEL, declare that –

I act as the independent specialist in this matter;

- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in compiling the Air Quality Specialist Study report;
- That there are no circumstances that may compromise my objectivity in performing the work;
- I have expertise in compiling the Air Quality Specialist Study, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the Air Quality Specialist Study Report by the competent authority;
- All the particulars furnished by me in the Air Quality Specialist Study Report are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.



Signature of the specialist:
Name of company: uMoya-NILU Consulting (Pty) Ltd
Date: August 2016

CONTENTS

1. INTRODUCTION

The International Power Consortium South Africa (IPCSA), have developed a solution to Saldanha Steel's requirement for stable, economical electricity over the long term. This solution consists of a 1 507 MW Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site. Phase 1 of the project will consist of five 48 MW nominal gas turbines in open cycle. Phase 2 will consist of three 435 MW nominal combined cycle turbines.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the completion of the Bankable Feasibility Study.

The ArcelorMittal CCGT power plant will support Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel supply and will consume approximately 76 million Giga Joules (GJ) of natural gas per year. CNG and LNG could be supplied by ship to the Port of Saldanha, where it will be offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha. Discussions have been held with Transnet National Ports Authority (TNPA) in Saldanha in this regard.

The project will supply the power needs of ArcelorMittal Saldanha Steel (approximately 160 MW of base load energy, peaking up to 250 MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

ArcelorMittal have contracted ERM Southern Africa (Pty) Ltd to conduct an Environmental Impact Assessment (EIA) for the project in terms of South African regulations. In turn, ERM has sub-contracted uMoya-NILU Consulting (Pty) Ltd to undertake the air quality impact assessment for the EIA.

1.1 CONTENT OF THE SPECIALIST REPORT CHECKLIST

The content of this report has been prepared in terms of Regulation GNR 982 of 2014, Appendix 6, as shown in Table 1-1.

Table 1-1: Specialist study report checklist

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	Cross-reference in this report
(a) details of— the specialist who prepared the report; and the	Section 1.4 (Page

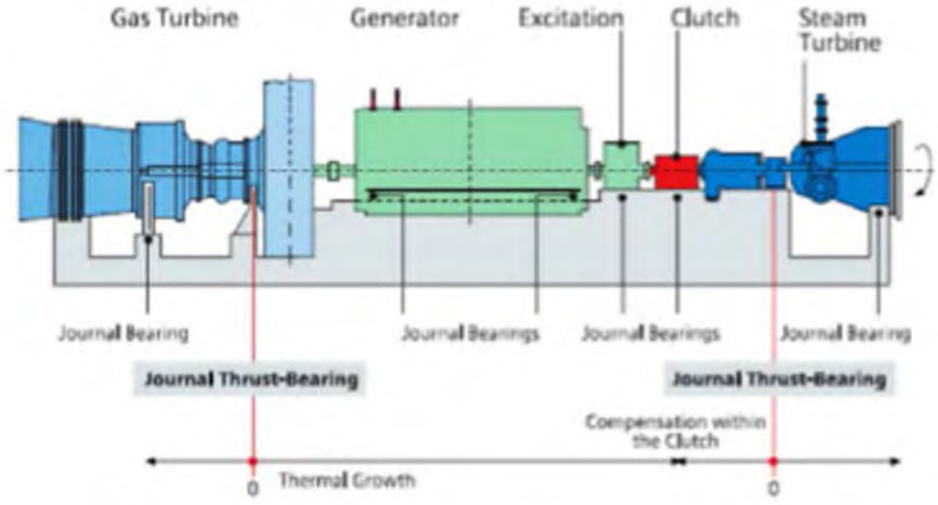
Table 1-1: Specialist study report checklist

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	Cross-reference in this report
expertise of that specialist to compile a specialist report including a curriculum vitae;	4) and Appendix 1
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page iv
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.5 (Page 4)
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 3 (Page 16) and Section 7.2 (Page 27)
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 6 (Page 21)
(g) an identification of any areas to be avoided, including buffers;	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Sections 7.4 for NO_2 and Section 7.5 for CO
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7.2.2, see model accuracy (Page 32)
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 7.6 (Page 37)
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 5.2 (Page 20)
(p) any other information requested by the competent authority.	N/A

1.2 OVERVIEW OF THE PROJECT

The proposed ArcelorMittal CCGT power plant is a 1 507 MW Combined Cycle Gas Turbine (CCGT) power plant. It will consist of eight air cooled gas turbines which are coupled to an alternator, which in turn, is coupled to a steam turbine in a single straight line shaft configuration (Figure 1.1). Natural gas fuel at -20 ˚C will be piped to the power plant. The gas pressure is reduced (or the gas is compressed) to meet the required feed in pressure of the gas turbines. The waste heat from the exhaust gas exits the gas turbines into a heat recovery steam generator (HRSG). The HRSGs capture heat from the high temperature exhaust gases to produce high temperature and high pressure dry steam, which is then supplied to a steam turbine to generate additional electric power.

Figure 1-1 Combined gas turbine process flow (ERM, 2015)



The high temperature exhaust gases are captured at the outlet exhaust of each gas turbine. This is fed into each HRSG via a short section of ductwork at the exhaust outlet point. The HRSG is a triple pressure boiler comprising a high pressure steam system, a reheat/medium pressure steam system and a low pressure steam system. The hot exhaust gases will then transfer heat to water in the HRSG, creating steam in the form of superheated high pressure (HP) steam, reheat/medium pressure and low pressure (LP) steam. Steam from each pressure level will be admitted to the steam turbine. A condenser will convert exhaust steam from the steam turbines back into water. The plant will have an air cooled condenser system behind each steam turbine.

Compressed Natural Gas (CNG) and Liquid Natural Gas (LNG) can be used. CNG and LNG will be supplied by ship to the Port of Saldanha where it will be off-loaded via a submersible pipeline either from a mooring located off shore or a berthing location in the Port of Saldanha. The gas pipeline of approximately 3900 m in length will be buried to a depth of 3 to 4 m.

The feeder power line for the initial 160 MW base load (peaking to 250 MW) from the power plant to the ArcelorMittal Steel Works will be the first priority. This 132 kV feeder line will be sized for a capacity of 400 MW. The additional 1 103 MW of power generated at the plant will be evacuated through the construction of a new 22 km High Voltage 400 kV line from the switch yard at the power plant to the existing Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude.

1.3 ENTERPRISE DETAILS

Entity details for ArcelorMittal South Africa Saldanha Works t/a Saldanha Steel Pty Ltd are listed in Table 1-1.

Table 1-2: Entity details

Entity Name:	ArcelorMittal South Africa Saldanha Works
Trading as:	Saldanha Steel Pty Ltd
Type of Entity, e.g. Company/Close Corporation/Trust, etc.:	Company
Company/Close Corporation/Trust Registration Number (Registration Numbers if Joint Venture):	1995/00628/07
Registered Address:	Private Bag X11 Saldanha 7395
Postal Address:	Private Bag X11 Saldanha 7395
Telephone Number (General):	022 709 4000
Fax Number (General):	022 709 4296
Company Website:	http://southafrica.arcelormittal.com/
Industry Type/Nature of Trade:	Power generation
Name of the Landowner/s or Landlord/s:	ArcelorMittal
Name of Mortgage Bondholder/s (if any):	N/A
Deeds Office Registration Number of Mortgage Bond:	N/A
Land Use Zoning as per Town Planning Scheme:	Industrial Development Zone
Land Use Rights if outside Town Planning Scheme:	N/A

1.4 MODELLING CONTRACTOR

The dispersion modelling for the AIR for the proposed Vopak Growth 4 project is conducted by:

Company: uMoya-NILU Consulting (Pty) Ltd
Modellers: Dr Mark Zunckel, Atham Raghunandan and Sarisha Perumal
Contact details: Tel: 031 266 7375
Cell: 083 690 2728
Email: mark@umoya-nilu.co.za or atham@umoya-nilu.co.za

Dr Zunckel's curriculum Vitae are included in Appendix 1.

1.5 IMPACT ASSESSMENT OBJECTIVES AND SCOPE

The objective of this air quality specialist study is to determine the potential impact on ambient air quality arising from proposed activities associated with the construction and operation of the proposed ArcelorMittal CCGT power plant and to advise on mitigation measures for identified significant risks/impacts and measures to enhance positive opportunities/impacts of the project.

1.6 REPORT STRUCTURE

This air quality impact assessment report is structured in the following manner. A description of the project is provided in Chapter 2 with an emphasis on identification of the sources of emission to the atmosphere and the pollutants of concern. Chapter 3 provides an overview of the administrative or legal context and includes, licensing, relevant emission standards and ambient air quality standards. The impact assessment methodology is defined in Chapter 4. The outcomes of the scoping study are included in Chapter 5. Chapter 6 includes the baseline or air quality status quo, including a description of Saldanha Bay climate information and ambient monitoring in Saldanha Bay. The air quality impact assessment in included in Chapter 7 including the assessment methodology, the assessment of impacts and recommendation for impact mitigation. The environmental management considerations are included in Chapter 8, with input to the Environmental Management Plan (EMP). A summary of impacts are presented in Chapter 9 with conclusions and recommendations in Chapter 10.

1.7 PROJECT DESCRIPTION

1.7.1 Construction phase

The construction phase will last approximately 28 months. Site clearance activities include clearing the land of vegetation, fencing the project boundary and site levelling. Internal site roads will be constructed as the site levelling will require a number of heavy trucks to bring infill to the site and remove unnecessary material. Site roads constructed during the site preparation phase will be used to transport the heavy plant equipment required during the construction phase. The construction phase will be initiated following the completion of site preparation activities. Earthworks will include the excavations and the backfilling. Piling of the foundations for the gas turbines and large main equipment items will take place followed by the construction of concrete and turbine pedestals constructed. The construction of buildings will also take place. Pipelines will be installed underground which involves the opening of a working strip along the right of way of the pipeline. The servitude is expected to be between 15 to 20 m wide.

1.7.2 Commissioning phase

In Phase 1 six Siemens Industrial Trent 60 open-cycle gas turbine units will be commissioned, delivering approximately 288 MW. In Phase 2 of commissioning of three Siemens SGT5-4000F combined-cycle units will, with Phase 1, collectively deliver 1 507 MW of electricity.

1.7.3 Operational phase

The completed project a 1 507 MW Combined Cycle Gas Turbine (CCGT) power plant using LNG or CNG as the fuel. It will consist of eight air cooled gas turbines each coupled to alternator, and in turn, coupled to a steam turbine in a single straight line shaft configuration. The waste heat from the exhaust gas exits the gas turbines into heat recovery steam generators (HRSG) which produce high temperature and high pressure dry steam, which is then supplied to a steam turbine to generate additional electric power. Power generated at the plant will be evacuated via the switch yard at the power plant to the existing Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude. A summary of the different unit process is provided in Table 1-2 for Phase 1 and for Phase 2. A schematic of process flow is illustrated in Figure 2-1 and relative location of the process units is shown in Figure 1-2.

Table 1-3: **Unit processes for the ArcelorMittal power plant for Phase 1 and 2**

Unit Process	Function of Unit Process	Batch/Continuous Process
	Phase 1	
Open Cycle Gas Turbine (T1)	Electricity generation	Continuous
Open Cycle Gas Turbine (T2)	Electricity generation	Continuous
Open Cycle Gas Turbine (T3)	Electricity generation	Continuous
Open Cycle Gas Turbine (T4)	Electricity generation	Continuous
Open Cycle Gas Turbine (T5)	Electricity generation	Continuous
	Phase 2	
Combined Cycle Gas Turbine (UNIT 1)	Electricity generation	Continuous
Combined Cycle Gas Turbine (UNIT 2)	Electricity generation	Continuous
Combined Cycle Gas Turbine (UNIT 3)	Electricity generation	Continuous

Figure 1-2: A basic block flow diagram for the operation at the ArcelorMittal power plant

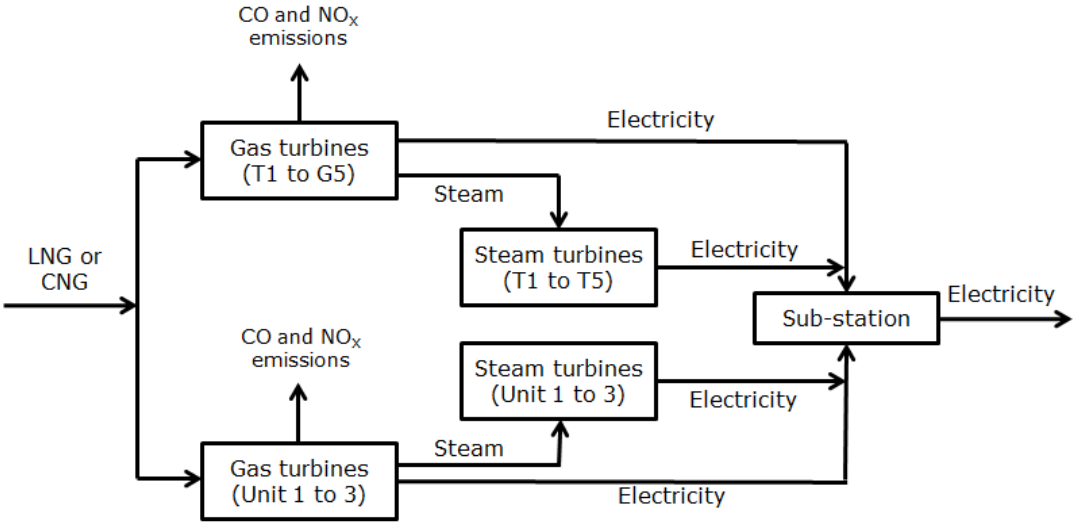
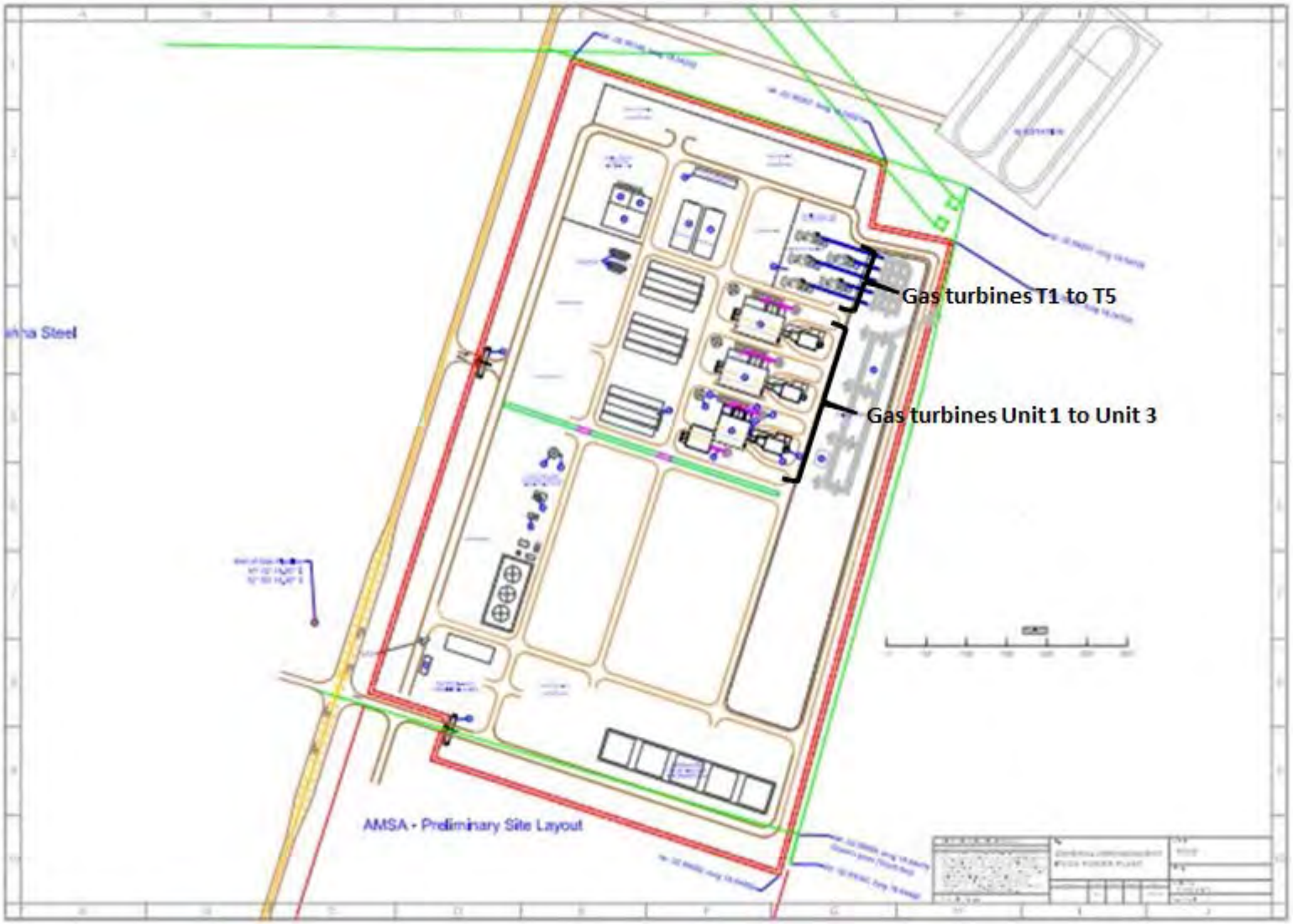


Figure 1-3: Proposed site layout of the ArcelorMittal power plant showing the relative location of the eight gas turbines (adapted from Savannah, 2016)



1.8 RAW MATERIALS AND PRODUCTS

The raw materials consumption rate at the ArcelorMittal CCGT are listed in Tables 1-3 to 1-5.

Table 1-4: Raw material used at the ArcelorMittal power plant

Raw material	Maximum consumption rate	Units
CNG/LNG	76 000 000	GJ/annum

Table 1-5: Production rates at the ArcelorMittal power plant

Product	**Maximum production capacity**	**Units**
Trent 60 DLE (T1)	48	MWe at MCR
Trent 60 DLE (T2)	48	MWe at MCR
Trent 60 DLE (T3)	48	MWe at MCR
Trent 60 DLE (T4)	48	MWe at MCR
Trent 60 DLE (T5)	48	MWe at MCR
SGT5-400F (UNIT 1)	435	MWe at MCR
SGT5-400F (UNIT 2)	435	MWe at MCR
SGT5-400F (UNIT 3)	435	MWe at MCR

MCR: Maximum Continuous Rating

Table 1-6: Energy sources used at the ArcelorMittal power plant

Energy source	**Sulphur content of fuel (%)**	**Ash content of fuel (%)**	**Maximum permitted consumption rate**	**Units**
CNG/LNG	0	0	76 000 000 1 461 000	GJ/annum Tonnes/annum

1 GJ = 1.923 x 10^{-8} Mt LNG

1.9 ATMOSPHERIC EMISSIONS

The physical data for the stacks at the ArcelorMittal power plant are listed in Table 1-6. Emission concentrations and emission rates for maximum generation using LNG are shown in Table 1-7.

Table 1-7: Point source characteristics at the ArcelorMittal power plant

Source ID	Stack height (m)	Stack diameter (m)	Stack base-height (m asl)	Emission release temperature (K)	Emission exit velocity (m/s)	Gas flow rate (kg/h)
T1	22	3.1	21-22	717	50	547 200
T2	22	3.1	21-22	717	50	547 200
T3	22	3.1	21-22	717	50	547 200
T4	22	3.1	21-22	717	50	547 200
T5	22	3.1	21-22	717	50	547 200
UNIT 1	45	7.1	21-22	368	25	2 430 000
UNIT 2	45	7.1	21-22	368	25	2 430 000
UNIT 3	45	7.1	21-22	368	25	2 430 000

Table 1-8: Emission rates and concentrations for the turbine stacks at the ArcelorMittal power plant

NO_X		CO	
Rate (t/a)	[1]Conc. (mg/Nm^3)	Rate (t/a)	[1]Conc. (mg/Nm^3)
169.2	13.7	28.9	2.4
169.2	13.7	28.9	2.4
169.2	13.7	28.9	2.4
169.2	13.7	28.9	2.4
169.2	13.7	28.9	2.4
1 021	32.7	248.8	20.8
1 021	32.7	248.8	20.8
1 021	32.7	248.8	20.8

1: Calculated from emission rate, stack diameter and exit velocity

1.10 PROJECT LOCATION

The ArcelorMittal CCGT power plant is to be developed on a green field site owned by ArcelorMittal within the IDZ of Saldanha Port (Figure 2-3). The site is located less than 1 km to the east of the existing ArcelorMittal Steelworks, immediately adjacent to the Blouwater substation. The site is located within an area identified for industrial development according the Saldanha Bay Municipal Spatial Development Framework (Saldanha Bay Municipality, 2011). The two properties on which the proposed site is located are the remaining extent of Portion 129 of Yzervarkensrug and parcel number 2 of Portion 195 of Jackels Kloof. Site information is provided in Table 1-8. Receptors in the vicinity of the proposed power plant are shown in Figure 1-4.

Figure 1-4: The location of the ArcelorMittal CCGT power plant and key components (ERM, 2015)

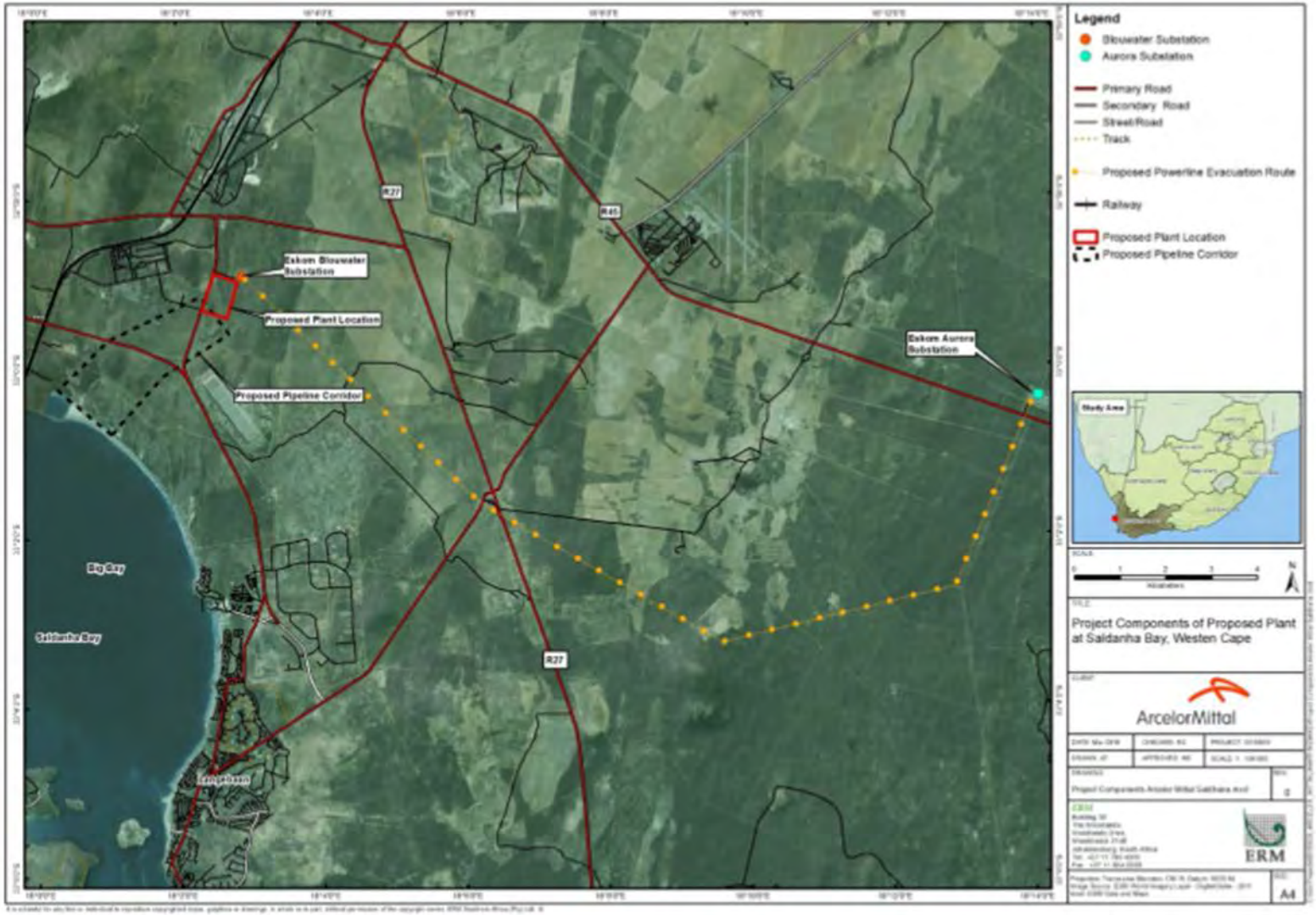


Table 1-9: Site information

Physical Address of the Licenced Premises:	
Description of Site (Where No Street Address):	Portion 129 of Yzervarkensrug and parcel number 2 of Portion 195 of Jackels Kloof
Property Registration Number (Surveyor-General Code):	N/A
Coordinates (latitude, longitude) of Approximate Centre of Operations (Decimal Degrees):	32˚ 59.1′ S 18˚ 02.5′ E
Coordinates (UTM) of Approximate Centre of Operations:	6346413 m S 34H 223588 m E 34H
Extent (km²):	1 000 m X 600 m
Elevation Above Mean Sea Level (m)	22
Province:	Western Cape
District/Metropolitan Municipality:	West Coast District Municipality
Local Municipality:	Saldanha Bay Local Municipality
Designated Priority Area (if applicable):	N/A

2 ADMINISTRATIVE FRAMEWORK

2.1 INTRODUCTION

In South Africa ambient air quality is regulated in terms of the National Environmental Management: Air Quality Act (No. 39 0f 2004) (NEM: AQA), the Air Quality Amendment Act (Act No. 20 of 2014) and supporting regulations.

Air quality objectives defines in Provincial and Municipal Air Quality Management Plans (AQMP) are achieved to a large extent through the enforcement of regulations supporting the NEM: AQA and through municipal by-laws. The legal requirements regarding the operation of the ArcelorMittal power plant in Saldanha Bay are discussed in the following sections.

2.2 NATIONAL ADMINISTRATIVE REQUIREMENTS

2.2.1 Listed Activities

Section 21 of the NEM: AQA requires that the Minister publishes a list of activities which result in atmospheric emissions which the Minister believes have or may have a significant detrimental effect on the environment, including health, social conditions, economic

conditions, ecological conditions or cultural heritage, so-called Listed Activities. The first list was published in Government Notice No. 248 of 31 March 2010 (DEA, 2010), and a revised list followed on 22 November 2013 (DEA, 2013a).

Combustion facilities using liquid fuels or gas primarily for steam raising for electricity generation are classified as Listed Activity in terms of Section 21 of the NEM: AQA and GN 893, if the design capacity of the individual generating units is equal to or greater than 50 MW heat input (Category 1, sub-category 1.2 (liquid), sub-category 1.4 (gas)). Listed Activities require an Atmospheric Emission Licence (AEL) in order to operate. The proposed generation capacity of UNIT 1, UNIT 2 and UNIT 3 exceed this threshold and they are therefore Listed Activities. Minimum emission standards are defined for existing and new plants (Table 2-1).

Table 2-1: **Minimum emission standards in mg/Nm^3 for gaseous fuels (sub-category 1-4, DEA, 2013a)) used in combustion installations, measured at 3% O_2 at 273 K and 101.3 kPa**

Particulate matter	10
Sulphur dioxide (SO_2)	400
Oxides of nitrogen (NO_x expressed and NO_2)	50

2.2.2 Atmospheric Emission Licence

The consequence of listing an activity is described in Section 22 of the NEM: AQA, i.e. that no person may conduct a Listed Activity without a provisional Atmospheric Emission License or and Atmospheric Emission License (AEL).

The application process for an AEL is described in Section 37 of the NEM: AQA. The application should be lodged to the licensing authority with the prescribed licensing fee and documentation required by the licensing authority. In the case of strategic projects or projects of national importance, the licensing authority is the National Air Quality Officer, Dr Thuli Mdluli.

Regulations prescribing the AEL processing fee were gazetted on 11 March 2016 (DEA, 2016). The processing fee for new Listed Activities of R10 000 per Listed Activity should be paid on or before the date of the submission of the application.

2.2.3 Atmospheric Impact Report

The application for an AEL is a fundamental component of the environmental authorisation process. It is supported by an air quality specialist study in the form of an Atmospheric Impact Report (AIR) (Section 30 of the NEM: AQA).

The format of the AIR is defined in regulations published on 11 October 2013 (DEA, 2013b). The methodology and level of the assessment required is defined in the DEA's guideline for dispersion modelling (DEA, 2014). All the requirements of an AIR are addressed through this air quality impact report.

2.2.4 Ambient air quality standards and guidelines

The effects of air pollutants on human health occur in a number of ways with short-term, or acute effects, and chronic, or long-term, effects. Different groups of people are affected differently, depending on their level of sensitivity, with the elderly and young children being more susceptible. The factors that link the concentration of an air pollutant to an observed health effect are the level and the duration of exposure to that particular air pollutant.

The national ambient air quality standard (NAAQS) consists of a limit value and a permitted frequency of exceedance. The limit value is the fixed concentration level aimed at reducing the harmful effects of a pollutant. The permitted frequency of exceedance represents the tolerated exceedance of the limit value annually and accounts for high concentrations as a result of process upsets and meteorological variation. Compliance with the ambient standard implies that the frequency of exceedance does not exceed the permitted tolerance. The NAAQS are shown in Table 2-2.

Table 2-2: NAAQS for SO_2, NO_2, CO, O_3, benzene and PM_{10} (DEA, 2009) and $PM_{2.5}$ (DEA, 2012)

Pollutant	Averaging period	Limit value ($\mu g/m^3$)	Tolerance	Compliance date
SO_2	1 hour	350	88	
	24 hours	125	4	
	1 year	50	0	
NO_2	1 hour	200	88	
	1 year	40	0	
CO	1-hour	30 000	88	
	8-hr running mean	10 000	11	
O_3	8-hr running mean	120	11	
PM_{10}	24 hours	75	4	
	1 year	40	0	
$PM_{2.5}$	24 hours	65	4	
		40	4	1 Jan 2016 to 31 Dec 2029

		25	4	1 Jan 2030
	1 year	25	0	
		20	0	1 Jan 2016 to 31 Dec 2029
		15	0	1 Jan 2030
Benzene	1 year	5	0	

The National Dust Control Regulations were published on 1 November 2013 (DEA, 2013c). It provides acceptable dustfall rates for residential and non-residential areas (Table 2-3).

Table 2-3: National limit values for dustfall rates in mg/m²/day as 30-day average (DEA, 2013c)

Area	Dustfall rate (D)	Permitted frequency of exceedance
Residential	D < 600	Two within a year, not in sequential months
Non-residential	600 < D < 1 200	Two within a year, not in sequential months

2.3 AQMP FOR THE WEST COAST DM

The AQMP for the West Coast District Municipality (WCDM) was developed in 2011 (Gondwana, 2011). The vision driving the AQMP is for *attainment and maintenance of good air quality for the benefit of all inhabitants and natural environmental ecosystems within the West Coast District Municipality.*

The vision is supported by a five point mission statement, i.e.:

- To ensure the maintenance of good air quality through proactive and effective management principles that take into account the need for sustainable development into the future.
- To work in partnership with communities and stakeholders to ensure the air is healthy to breathe and is not detrimental to the well-being of persons in the District.
- To ensure that future developments (transportation, housing, etc.) incorporate strategies to minimise air quality impacts.
- To reduce the potential for damage to sensitive natural environmental systems from air pollution, both in the short and long-term.
- To facilitate intergovernmental communication at the Local, Provincial and National levels in order to ensure effective air quality management and control in the WCDM.

The WCDM AQMP includes nine goals that focus on the implementation of the plan. Goals that are specific to the ArcelorMittal CCGT project are the maintenance of good air quality within the boundaries of the West Coast District, and compliance monitoring and enforcement of air quality legislation, policies and regulations in the District.

2.4 AQMP FOR THE SALDANHA BAY MUNICIPALITY

The vision driving the AQMP for the Saldanha Bay Municipality is the *attainment and maintenance of good air quality for the benefit of all inhabitants and natural environmental*

ecosystems within the West Coast District Municipality and Saldanha Bay Local Municipality (Gondwana, 2013). The vision is supported by the following mission statement:

To ensure the maintenance of good air quality through proactive and effective management principles that take into account the need for sustainable development into the future.

- To work in partnership with communities and stakeholders to ensure the air is healthy to breathe and is not detrimental to the well-being of persons in the District.
- To ensure that future developments (transportation, housing etc.) incorporate strategies to minimise air quality impacts.
- To reduce the potential for damage to sensitive natural environmental systems from air pollution both in the short and long-term.
- To facilitate intergovernmental communication at the Local, Provincial and National levels in order to ensure effective air quality management and control in the WCDM.

The Saldanha Bay Municipality AQMP includes nine goals and objectives. Goals that are specific to the ArcelorMittal CCGT project are the maintenance of good air quality within the boundaries of the municipality, and compliance monitoring and enforcement of air quality legislation in the municipality.

3 IMPACT ASSESSMENT METHODOLOGY

Predicted impacts relating to air quality are described according to relevant characteristics, i.e., impact type, scale of impact, impact duration, frequency of occurrence, and extent of impact. The terminology used to describe impact characteristics is shown in Table 3-1.

Table 3-1: Impact characteristic terminology

Characteristic	Definition	Designation
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	Direct Indirect Induced
Extent	The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc.)	Local Regional International
Duration	The time period over which a resource / receptor is affected	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	Numerical value relates to intensity

Frequency	A measure of the constancy or periodicity of the impact.	Numerical value relates to frequency

The definitions for the impact *type* designations are shown in Table 3-2.

Table 3-2: Impact type definitions

Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected)
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).

The characteristics and definitions in Table 3-1 apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is *likelihood*. The *likelihood* of an unplanned event occurring is designated using a qualitative scale (Table 3-3).

Table 3-3: Definitions for likelihood designation

Unlikely	The event is unlikely but may occur at some time during normal operating conditions
Possible	The event is likely to occur at some time during normal operating conditions
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable)

The definitions for the impact *extent* designations are shown in Table 3-4.

Table 3-4: Impact extent definitions

Local	Limited to the Project site and the boundaries of the Saldanha Bay Municipality
Regional	Extends beyond the boundaries of the Saldanha Bay Municipality
International	Extends beyond the boundaries of South Africa

The definitions for the impact *duration* designations are shown in Table 3-5.

Table 3-5: Impact duration definitions

Temporary	Acute impact as a result of operational upset condition
Short-term	Acute (hours to days) impact as a result of normal project operations
Long-term	Chronic (years) impact as a result of normal project activities
Permanent	Permanent (lifetime) impact as a result of normal project

	activities

The definitions for the impact *scale* designations are shown in Table 3-6.

Table 3-6: Impact scale definitions

Rank	Score	Definition
High	3	Exceedances of the limit value of the NAAQS at sensitive receptors
Medium	2	Exceedances of the limit value of the NAAQS at non-sensitive receptors
Low	1	No exceedances of the limit value of the NAAQS

The definitions for the impact *frequency* designations are shown in Table 3-7.

Table 3-7: Impact frequency definitions

Rank	Score	Definition
High	3	Exceedances of the tolerance of the NAAQS at sensitive receptors
Medium	2	Exceedances of the tolerance of the NAAQS at non-sensitive receptors
Low	1	No exceedances of the tolerance of the NAAQS

Once an impact's characteristics are defined, magnitude is to assign each impact. Magnitude is a function of extent, duration, scale and frequency. For unplanned events only, magnitude incorporates the 'likelihood' factor discussed above.

Magnitude describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. The magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

The other principal impact evaluation step is definition of the sensitivity/vulnerability/importance of the impacted resource/receptor. Factors considered include physical, biological, cultural or human and legal protection, government policy, stakeholder views and economic value. Sensitivity/vulnerability/importance designations themselves universally consistent, i.e. low, medium and high, but the definitions vary on a resource/receptor basis (Table 3-8).

Table 3-8: ***Impact duration definitions***

Low	Unpopulated areas
Medium	Commercial or industrialised areas
High	Residential areas

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterized, the significance can be assigned for each impact using the matrix in Figure 3-1. The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors.

Figure 3-1: ***Impact significance***

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

An impact of **negligible** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of **minor** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of **moderate** significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit.

An impact of **major** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors.

Once the significance of an impact has been characterized, the next step is to evaluate what mitigation and enhancement measures are warranted. Considering emission to the atmosphere and resultant impacts, the following mitigation applies:

Avoid at Source, Reduce at Source: avoiding or reducing at source through the design of the Project.

Abate on Site: add something to the design to abate the impact.

4 SCREENING AND SCOPING

4.1 OUTCOME OF SCREENING

Power generation using liquid or gaseous fuels is a Listed Activity in terms of Section 21 of the NEM: AQA as first published in Government Notice No. 248 of 31 March 2010 (DEA, 2010), and revised in Government Notice 893 published on 22 November 2013 (DEA, 2013a).

Section 22A of the NEM: AQA refers to the requirement for environmental authorisation for Listed Activities defined in the NEM: AQA according to Section 24G of the National Environmental Management Act (Act No. 107 of 1998). In other words, as a Listed Activity in terms of the NEM: AQA an EIA is required for the ArcelorMittal CCGT power plant project. In addition, an AEL is required from the licensing authority as part of the environmental authorisation.

5.2 SCOPING

Scoping defines the content and extent of the information required by the decision making authority. The scope and extent of the air quality specialist study in the regulations prescribes the format of the Atmospheric Impact Report (AIR) (DEA, 2013b). The AIR should include, amongst others, the following information:

- The location and extent of the proposed ArcelorMittal CCGT power plant
- A description of the proposed process
- Information of raw materials
- Emission control and abatement technology that will be installed and operated
- A comprehensive emission inventory including point and fugitive emissions
- An analysis of the impact of emissions on human health and other environmental receptors
- Planned air quality management

6 BASELINE CONDITIONS

6.1 INTRODUCTION

Saldanha Bay is located on the west coast of South Africa, approximately 100 km north of Cape Town. The Saldanha Bay Municipality includes the towns of Langebaan, Vredenburg and Saldanha Bay and has a population of approximately 72 000 people. The Port of Saldanha Bay is a key feature of the Saldanha Bay growing Industrial Development Zone (IDZ). Being a deep port was ideal for the establishment of South Africa's iron ore export terminal and accommodating large ore carriers. The IDZ also includes the Strategic Fuel Fund crude oil storage facility, and industries such as ArcelorMittal's Saldanha Steel and Tronox Namakwa Sands and smaller manufacturing industries. Saldanha Bay is also a popular holiday and retirement destination.

For this air quality assessment the baseline conditions include a description of the climate and meteorology, existing sources of atmospheric emissions and the current state of ambient air quality.

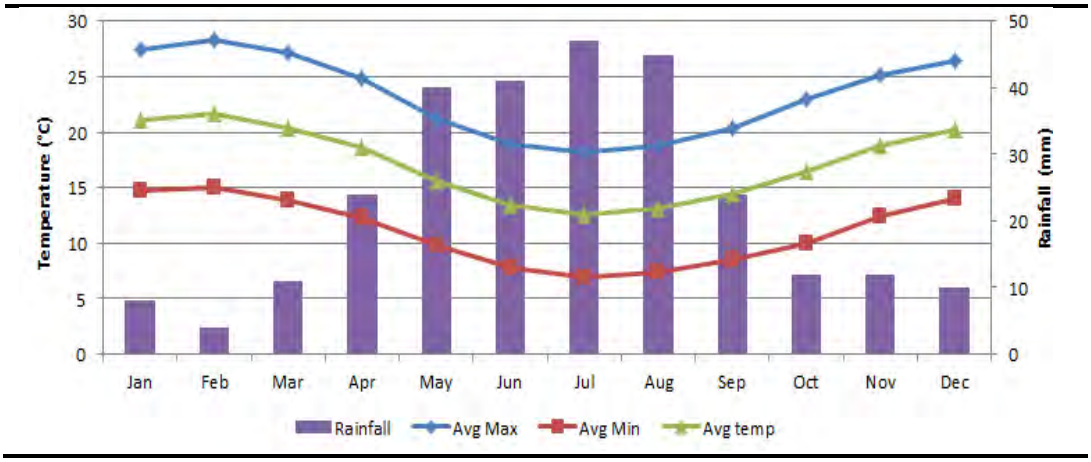
6.2 CLIMATE AND METEOROLOGY

The Saldanha Bay area is characterised by a semi-arid Mediterranean climate that is influenced by the cold Benguela Current and the relative position and strength of the Atlantic Ocean Anticyclone. The most climatologically representative data for the Saldanha Bay area is the South African Weather Service (SAWS) station at Langebaanweg.

Average daily temperatures at nearby Langebaanweg range from 21 °C in summer to 12 °C in winter, with summer maximums reaching 28 °C in February and winter minimums reaching 7 °C (Figure 6-1). The average annual rainfall at Langebaanweg is 278 mm. Although rainfall occurs throughout the year the majority occurs in winter between May and August.

The relative temperature difference between the relatively cold Atlantic Ocean, the overlying moist air mass and the warmer adjacent landmass results in a high occurrence of fog on the coast. On average 78 fog days occur, with the highest frequency of between 7 and 10 fog days between March and August.

Figure 6-1: Average monthly maximum, minimum and daily temperature at Langebaan and the average monthly rainfall in mm (SAWB, 1998)

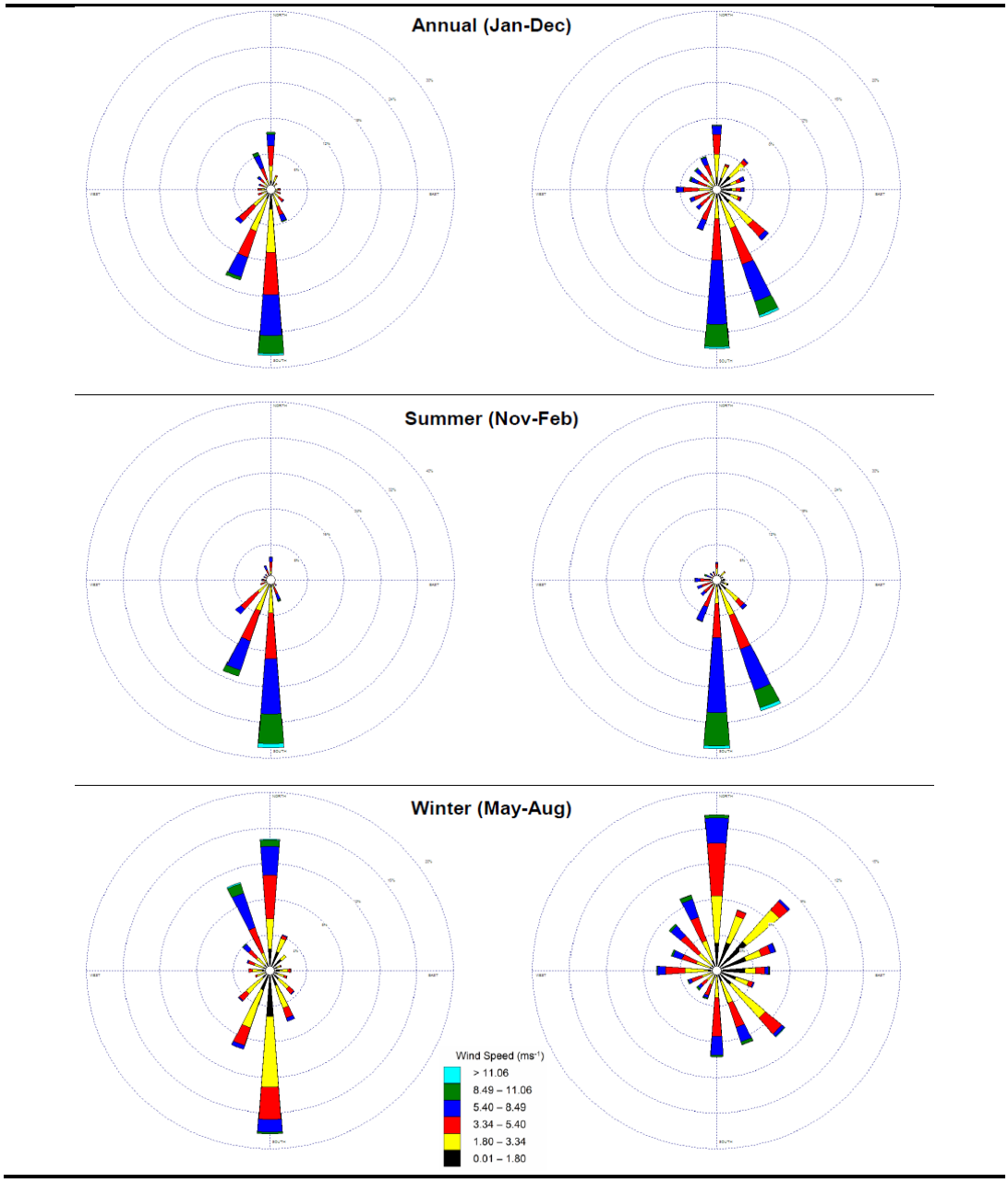


The SAWS stations at Langebaanweg and Geelbek provide a good indication of the prevailing wind direction across the Saldanha Bay region. The wind data at these two stations are depicted as windroses in Figure 6-2. Wind roses simultaneously depict the frequency of occurrence of wind from the 16 cardinal wind directions and wind speed classes, for a single site. Wind direction is given as the direction from which the wind blows, i.e., southwesterly winds blow from the southwest. Wind speed is given in m/s, and each arc represents a percentage frequency of occurrence (5% in this case).

The annual wind roses at Langebaanweg and Geelbek (Figure 6-2, top panels) indicate a dominant southerly wind, varying from southerly to southwesterly at Langebaanweg and southerly to south-southeasterly at Geelbek.

The prevailing winds at Langebaanweg and Geelbek shown by the annual wind roses in Figure 6-22 are very similar despite Langebaanweg being more than 12 km from the coast and the coastal location of Geelbek. Southerly winds dominate at both stations, tending to the southeast on the coast and veering to the southwest to the inland site and reaching more than 8.5 m/s. Northerly winds are also evident in the annual wind roses. In summer the southerly winds occur almost exclusively across the Saldanha Bay region. In winter the north-northwesterly to northerly winds are most frequent at both sites and also reach speeds of more than 8.5 m/s.

Figure 6-2: Wind roses for Langebaanweg (left panels) and Geelbek (right panels), with annual (top), summer (centre) and winter (bottom) (SAWS, 2012)



The atmospheric dispersion potential of an area relates to the stability (or instability) of the atmosphere, which in turn, is a function of wind speed and insolation (solar radiation). Stable conditions relate to poor atmospheric dispersion and generally coincide with low wind speeds and no insolation (night) or weak insolation due to overcast conditions which limits dilution of pollutants. Conversely, unstable conditions are conducive to good dispersion potential and occur with moderate winds and strong insolation. The wind disperses pollutants horizontally and unstable conditions dilute pollutants in a deeper layer of the atmosphere. The relationship between stability and wind speed and insolation is

commonly conveyed through the Pasquill-Gifford stability classes from A to F, shown in Table 6-1.

The atmospheric dispersion potential in Saldanha Bay is expected to be effective for a lot of the time due to the frequent moderate to strong winds. Poor dispersion conditions are most likely to occur at night when cool temperatures coincide with light or calm winds. The poorest dispersion conditions are likely to occur between May and August when the coldest night time temperatures occur.

Table 6-1: Pasquill-Gifford stability classes

Stability classification	*Stability class*	*Atmospheric conditions*
A	Very stable	Calm wind, clear and hot daytime conditions
B	Moderately stable	Light wind, clear and hot daytime conditions
C	Unstable	Moderate wind, cloudy daytime conditions
D	Neutral	Strong wind, cloudy skies and at night
E	Stable	Moderate wind, cloudy and at night
F	Very stable	Low wind, clear skies, cold night time conditions

6.3 AMBIENT AIR QUALITY

The West Coast is sparsely vegetated and is relatively dry receiving an average annual rainfall of only 278 mm. It is naturally dusty, particularly during the drier summer months and prior to the winter rains when ploughing takes place in preparation for winter crops.

Ambient air quality in Saldanha Bay is also influenced by a number of anthropogenic sources of air pollution. These include industrial processing facilities such as ArcelorMittal's Saldanha Steel and Tronox Namakwa Sands and smaller manufacturing industries such as Duferco. Emissions from these facilities include SO_2, NO_X and particulate matter. Transnet Port Terminals operations at the Port of Saldanha include the iron ore export terminal which is a source of particulates. Other activities at the port include the handling of break bulk cargo and petroleum products which emit particulates and volatile organic compounds. Emissions from shipping and port side vehicles and equipment are also sources of particulates and volatile organic compounds (VOCs). The Strategic Fuel Fund (SFF) crude storage facility is a source of VOCs and H_2S. The Saldanha quarry and the unpaved access roads are a source of particulates.

The effect of these emissions on ambient air quality is determined through ambient air quality monitoring. Saldanha Bay Municipality (SBM) and industry conduct ambient air quality monitoring (Table 7-2). Data collected by SBM is reported monthly to the South African Ambient Air Quality Information System (SAAQIS) which is hosted and managed by SAWS. This data and that collected by industry are reported quarterly to the West Coast Air Quality Working Group which is chaired by the West Coast District Municipality's Air Quality Officer (AQO).

Table 6-2: ***Ambient monitoring in Saldanha Bay Municipality***

Facility	Methodology	Sites	Parameters
Saldanha Bay Municipality	Continuous monitoring	Saldanha Bay Verdenburg	SO_2, NO, NO_2, NO_X, O_3, PM_{10}, $PM_{2.5}$ and meteorology
	Dust monitoring	Saldanha Bay Verdenburg	Dust fallout
TPT	Continuous monitoring	Saldanha Bay	PM_{10} and meteorology
	Dust monitoring	Saldanha Bay Verdenburg Langebaan	Dust fallout
SFF	Passive sampling	Saldanha Bay	BTEX
ArcelorMittal	Continuous monitoring	Saldanha Bay	PM_{10} and meteorology

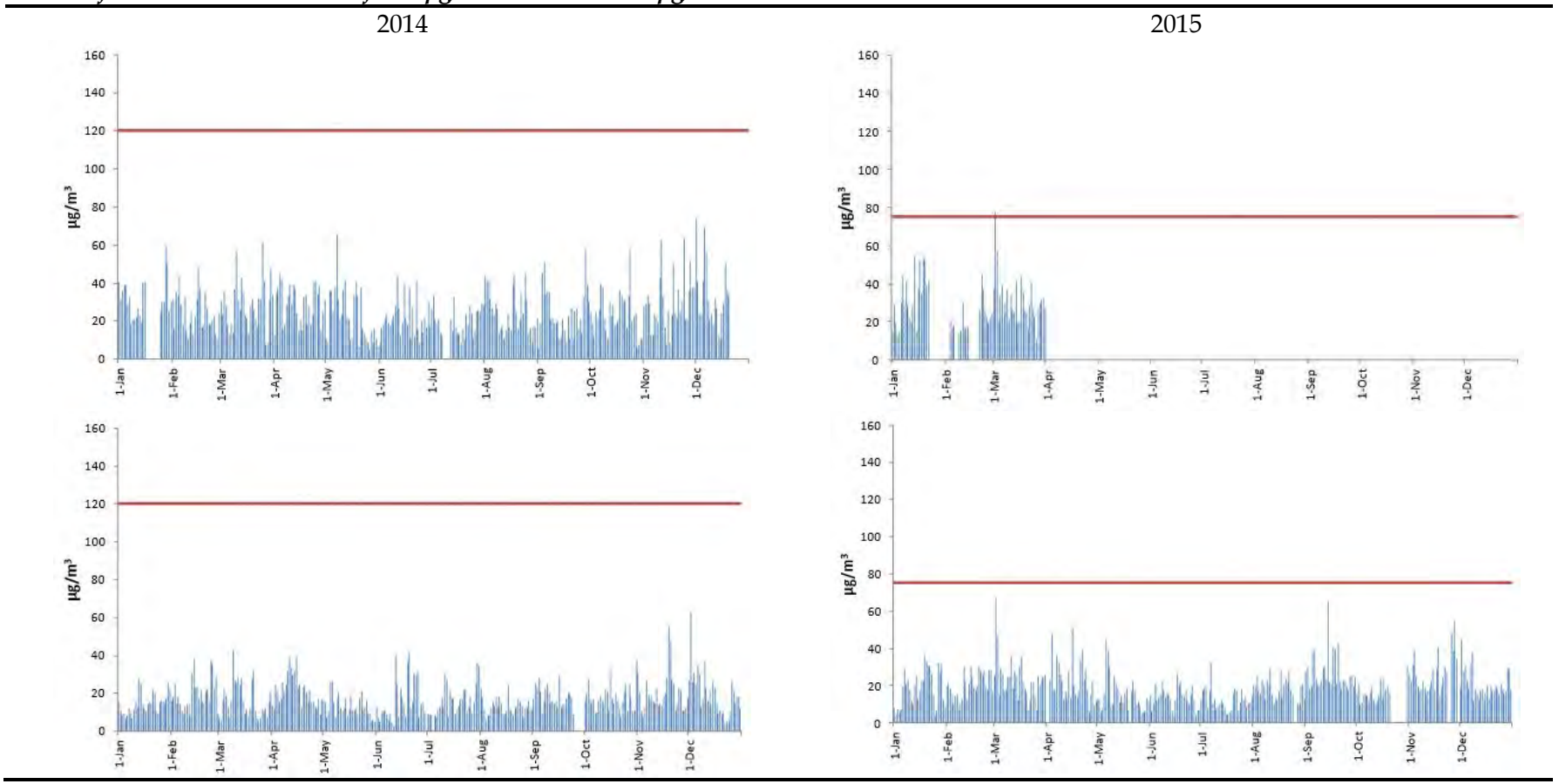
Despite the number of sources of air pollution in Saldanha Bay, ambient monitoring data from the SBM has shown that ambient concentrations of all pollutants are consistently below the NAAQS. Ambient monitoring by the SBM commenced in July 2014 and has continued reliably since then. Data was reported monthly with quarterly summary reports (uMoya-NILU, 2014a, 2014b; SGS, 2015a, 2015b). The monitoring station was initially located at the electrical sub-station, 200 m northwest of the yacht basin at Saldanha Bay Harbour, but moved to an electrical sub-station in the town of Saldanha Bay in August 2014.

Without any major coal burning facilities the ambient hourly SO_2 concentrations are very low relative to the NAAQS of 350 µg/m^3 (Table 6-2), and hourly average concentrations are consistently below 5 µg/m^3. Hourly ambient NO_2 concentrations are also very low relative to the NAAQS of 200 µg/m^3 (Table 6-2), and hourly average concentrations are consistently below 10 µg/m^3.

Daily average PM_{10} concentrations are also relatively low compared to NAAQS of 75 µg/m^3, ranging between 22 and 30 µg/m^3. The maximum 24-hour average PM_{10} concentration of 69 µg/m^3 was recorded in March 2015. Ozone (O_3) is not emitted by any particular source, but is formed in a photochemical reaction involving NO_2 and volatile organic compounds. O_3 is considered to be a regional pollutant. Ambient O_3 concentrations are relatively high compared with other pollutants in Saldanha Bay, but they are well below the 8-hour NAAQS of 120 µg/m^3. Typically hourly O_3 concentrations range between 20 and 30 µg/m^3.

As for other facilities monitoring ambient air quality in the area, the daily average PM_{10} concentrations measured by TPT at the NPA Offices in Saldanha Bay and at the Vredenburg reservoir are low relative to the NAAQS. The hourly data for 2014 and 2015 are shown in Figure 6-3.

Figure 6.3: Daily PM_{10} concentrations in µg/m³ at Saldanha Bay (top) and Vredenburg (bottom) in 2014 and 2015 (SGS, 2014 and 2016). The limit value of the ambient standard f 120 µg/m³in 2014 and 74 µg/m³ in 2015 is shown.



7 AIR QUALITY IMPACT ASSESSMENT & MITIGATION/ENHANCEMENT MEASURES

7.1 INTRODUCTION

Emissions of air pollutants from the ArcerlorMittal CCGT power plant will result during construction and operations. Construction activities generate dust while during operations the combustion of LNG or CNG result in NO_X, CO and CO_2 emissions and some methane (CH_4). The assessment of impacts associated with the construction of the ArcelorMittal CCGT power plant is done qualitatively. The assessment of impacts associated with operations is quantitatively using dispersion modelling.

7.2 ASSESSMENT METHODOLOGY

7.2.1 Emission inventory

Emissions of CO and NO_X information for the gas turbines at the ArcelorMittal CCGT power plant are provide by the developer based on design specification, fuel composition, fuel consumption and appropriate emission factors. Two operational scenarios are assessed, for Phase 1 generating 240 MW and for Phase 2 generation 1 507 MW.

An emissions factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant (US EPA, 2015). These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., kg of particulate emitted per ton of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (US EPA, 2015).

The general equation for emissions estimation is: $E = A \times EF \times (1-ER/100)$, where:
E = emissions;
A = activity rate;
EF = emission factor; and
ER = overall emission reduction efficiency (%)

7.2.2 Dispersion modelling

The approach to the dispersion modelling in this assessment is based on the requirements of the DEA guideline for dispersion modelling (DEA, 2014). An overview of the dispersion modelling approach for the FPP Project is provided here.

Models used

This assessment is considered a Level 2 assessment, according to the definition on the dispersion modelling guideline (DEA, 2014). The CALPUFF suite of models (http://www.src.com/calpuff/calpuff1.htm) was therefore used. CALPUFF is a multi-layer, multi-species non-steady-state puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation and removal. CALPUFF can be applied on scales of tens to hundreds of kilometres. It includes algorithms for sub-grid scale effects (such as terrain impingement), as well as longer range effects (such as pollutant removal due to wet scavenging and dry deposition, chemical transformation, and visibility effects of particulate matter concentrations).

The Air Pollution Model (TAPM) (Hurley, 2000; Hurley et al., 2001; Hurley et al., 2002) is used to model surface and upper air metrological data for the study domain. TAPM uses global gridded synoptic-scale meteorological data with observed surface data to simulate surface and upper air meteorology at given locations in the domain, taking the underlying topography and land cover into account. The global gridded data sets that are used are developed from surface and upper air data that are submitted routinely by all meteorological observing stations to the Global Telecommunication System of the World Meteorological Organisation. TAPM has been used successfully in Australia where it was developed (Hurley, 2000; Hurley et al., 2001; Hurley et al., 2002), and in South Africa (Raghunandan et al., 2007). It is considered to be an ideal tool for modelling applications where meteorological data does not adequately meet requirements for dispersion modelling. TAPM modelled output data is therefore used to augment the site specific surface meteorological data for input to CALPUFF.

TAPM and CALPUFF parameterisation

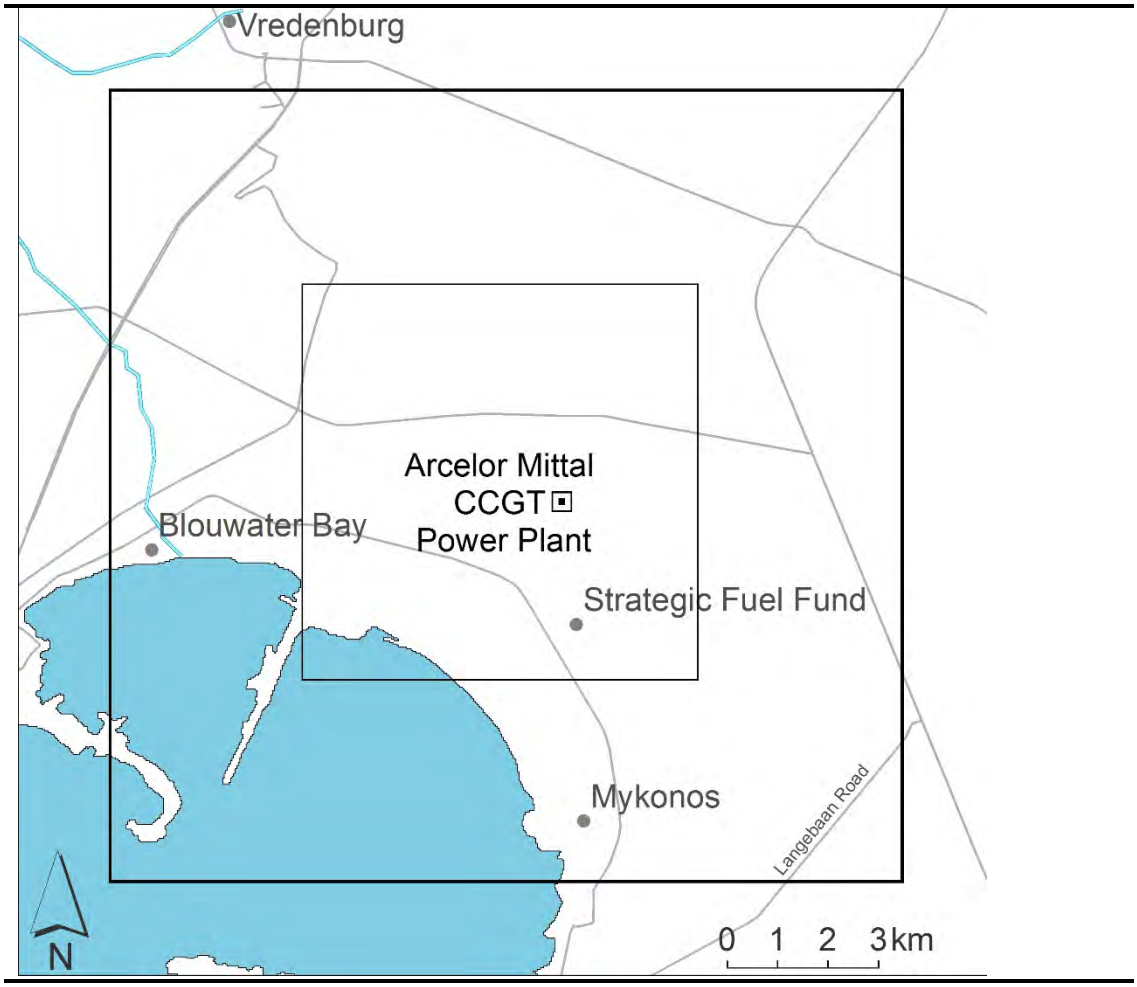
In Saldanha Bay TAPM is set-up in a nested configuration of three domains, centred on the Port of Saldanha Bay. The outer domain is 480 km by 480 km with a 24 km grid resolution, the middle domain is 240 km by 240 km with a 12 km grid resolution and the inner domain is 60 km by 60 km with a 3 km grid resolution (Figure 7.1). Three years (2012-2014) of hourly observed meteorological data from the SAWS station at Geelbek are used to 'nudge' the modelled meteorology towards the observations. The nesting configuration ensures that topographical effects on meteorology are captured and that meteorology is well resolved and characterised across the boundaries of the inner domain. Twenty seven vertical levels are modelled in each nest from 10 m to 5 000 m, with a finer resolution in the lowest 1 000 m. The 27 vertical levels are 10, 25, 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 750, 1000, 1250, 1500, 1750, 2000, 2250, 2500, 3000, 3500, 4000, 4500 and 5000 m.

The 3-dimensional TAPM meteorological output on the inner grid includes hourly wind speed and direction, temperature, relative humidity, total solar radiation, net radiation, sensible heat flux, evaporative heat flux, convective velocity scale, precipitation, mixing height, friction velocity and Obukhov length. The spatially and temporally resolved TAPM surface and upper air meteorological data is used as input to the CALPUFF meteorological pre-processor, CALMET.

A CALPUFF modelling domain of 900 km^2 is 30 km (west-east) by 30 km (north-south) and is centred on the Port of Saldanha Bay (Figure 7-1). It consists of a uniformly spaced receptor grid with 0.25 km spacing, giving 14 400 grid cells (120 X 120 grid cells).

The topographical and land use data for the respective modelling domains is obtained from the dataset accompanying the CSIRO's TAPM modelling package. This dataset includes global terrain elevation and land use classification data on a longitude/latitude grid at 30-second grid spacing from the US Geological Survey, Earth Resources Observation Systems (EROS) Data Centre Distributed Active Archive Centre (EDC DAAC).

Figure 7-1: TAPM and CALPUFF modelling domains (indicated by the thick and thin lines respectively)



The parameterisation of key variables that are applied in CALMET and CALPUFF are indicated in Table 7-1 and 7-2, respectively.

Table 7-1: Parameterisation of key variables for CALMET

Parameter	Model value
12 vertical cell face heights (m)	0, 20, 40, 80, 160, 320, 640, 1000, 1500, 2000, 2500, 3000, 4000
Coriolis parameter (per second)	0.0001
Empirical constants for mixing height equation	Neutral, mechanical: 1.41 Convective: 0.15 Stable: 2400 Overwater, mechanical: 0.12
Minimum potential temperature lapse rate (K/m)	0.001
Depth of layer above convective mixing height through which lapse rate is computed (m)	200
Wind field model	Diagnostic wind module
Surface wind extrapolation	Similarity theory
Restrictions on extrapolation of surface data	No extrapolation as modelled upper air data field is applied

Table 7-1: Parameterisation of key variables for CALMET

Parameter	Model value
Radius of influence of terrain features (km)	5
Radius of influence of surface stations (km)	Not used as continuous surface data field is applied

Table 7-2: Parameterisation of key variables for CALPUFF

Parameter	Model value
Chemical transformation	Default NO_2 conversion factor of 0.75 is applied (DEA, 2014).
Wind speed profile	Rural
Calm conditions	Wind speed < 0.5 m/s
Plume rise	Transitional plume rise, stack tip downwash, and partial plume penetration is modelled
Dispersion	CALPUFF used in PUFF mode
Dispersion option	Dispersion coefficients use turbulence computed from micrometeorology
Terrain adjustment method	Partial plume path adjustment

Model accuracy

Air quality models attempt to predict ambient concentrations based on "known" or measured parameters, such as wind speed, temperature profiles, solar radiation and emissions. There are however, variations in the parameters that are not measured, the so-called "unknown" parameters as well as unresolved details of atmospheric turbulent flow. Variations in these "unknown" parameters can result in deviations of the predicted concentrations of the same event, even though the "known" parameters are fixed.

There are also "reducible" uncertainties that result from inaccuracies in the model, errors in input values and errors in the measured concentrations. These might include poor quality or unrepresentative meteorological, geophysical and source emission data, errors in the measured concentrations that are used to compare with model predictions and inadequate model physics and formulation used to predict the concentrations. "Reducible" uncertainties can be controlled or minimised. This is achieved by making use of the most appropriate input data, preparing the input files correctly, checking and re-checking for errors, correcting for odd model behaviour, ensuring that the errors in the measured data are minimised and applying appropriate model physics.

Models recommended in the DEA dispersion modelling guideline (DEA, 2014) have been evaluated using a range of modelling test kits (http://www.epa.gov./scram001). It is therefore not mandatory to perform any modelling evaluations. Rather the accuracy of the modelling in this assessment is enhanced by every effort to minimise the "reducible" uncertainties in input data and model parameterisation.

For the FPP Project the reducible uncertainty in CALMET and CALPUFF is minimised by:

- Using representative quality controlled observed hourly meteorological data to nudge the meteorological processor to the actual values;
- Using 3-years of spatially and temporally continuous surface and upper air meteorological data fields for the modelling domain;
- Appropriate parameterisation of both models (Tables 7.2 and 7.3);
- Using representative emission data;
- Applying representative background concentrations to include the contribution of other sources; and
- Using a competent modelling team with considerable experience using CALPUFF.

7.2.3 *Assessment scenarios*

Most construction and decommissioning activities generate dust; and the emission of particulates into the atmosphere is through vehicle dust entrainment, demolition, excavation, ground levelling, etc. The main environmental problem with dust that is generated from these activities is that it settles on surrounding properties and land which is often more of a nuisance problem than a health issue. The dust is generally coarse, but may include fine respirable particles (PM_{10}) and these are known to be a risk to human health. Exhaust emissions from construction vehicles and equipment typically include particulates

(including PM_{10}), carbon monoxide (CO), nitrogen oxides (NO_X), sulphur dioxide (SO_2) and volatile organic compounds (VOCs) including benzene. The construction and decommissioning activities are typically short lived and the pollutants are released close to ground level with little or no buoyancy which limits their dispersion and the potential impacts to the site. Emissions from construction and decommissioning are not quantified hence the assessment is qualitative.

Two operational scenarios are assessed using dispersion modelling to predict the ambient concentrations of NO_2 and CO resulting from emissions from the CCGT. Scenario 1 considers Phase 1 of the project for the five 48 MW open cycle units. Scenario 2 for considers the final configuration of the five open cycle units and the three combined cycle units collectively generating 1 507 MW (Table 7-3).

Table 7-3: Production rates at the ArcelorMittal power plant

Product	Maximum production capacity	Units
	Scenario 1	
Trent 60 DLE (T1)	48	MWe at MCR
Trent 60 DLE (T2)	48	MWe at MCR
Trent 60 DLE (T3)	48	MWe at MCR
Trent 60 DLE (T4)	48	MWe at MCR
Trent 60 DLE (T5)	48	MWe at MCR
	Scenario 2	
Trent 60 DLE (T1)	48	MWe at MCR
Trent 60 DLE (T2)	48	MWe at MCR
Trent 60 DLE (T3)	48	MWe at MCR
Trent 60 DLE (T4)	48	MWe at MCR
Trent 60 DLE (T5)	48	MWe at MCR
SGT5-400F (UNIT 1)	435	MWe at MCR
SGT5-400F (UNIT 2)	435	MWe at MCR
SGT5-400F (UNIT 3)	435	MWe at MCR

MCR: Maximum Continuous Rating

The 99th percentile predicted ambient NO_2 and CO concentrations from the dispersion modelling for Emission Scenarios 1 and 2 are presented as isopleth maps over the modelling domain. Isopleth maps for benzene are not presented. The DEA (2014) recommend the 99th percentile concentrations for short-term assessment with the NAAQS since the highest predicted ground-level concentrations can be considered outliers due to complex variability of meteorological processes. In addition, the limit value in the NAAQS is the 99th percentile.

The impact assessment therefore compares the predicted 99th percentile concentrations with the respective ambient air quality standards (limit values and the permitted frequency of exceedance) for Scenarios 1 and 2, with consideration of populated areas in the modelling domain.

7.3 PREDICTED ANNUAL AND 99TH PERCENTILE CONCENTRATIONS

The predicted annual average NO_2 concentration and the 99th percentile of the 1-hour concentrations at the points of predicted highest ground-level concentration are presented in Table 7-4 for Scenarios 1 and 2.

Table 7-4: Annual average NO_2 concentration and the 99th percentile at the points of predicted maximum ground-level concentration in µg/m³

Averaging period	Scenario 1	Scenario 2
Annual	0.3	1.1
1-hour	7.5	40.7

7.4 PREDICTED NO_2 CONCENTRATIONS

Ambient concentrations of NO_2 are predicted from emissions of NO_X (NO_X=NO+NO_2). Emissions from combustion processes are dominated by NO_2, and furthermore, NO converts rapidly to NO_2 in the presence of N in the atmosphere. Comparing the predicted concentrations of NO_2 to the NAAQS is therefore somewhat conservative.

Predicted annual average NO_2 concentrations for Scenarios 1 and 2 are shown as isopleths in Figure 7-2 for the open cycle and combined cycle NO_X emissions cases respectively; and compared to the NAAQS of 40 µg/m³. The 99th percentile of the predicted 1-hour NO_2 concentrations are also presented as isopleths in Figure 7-3 for Scenarios 1 and 2; and compared with the NAAQS of 200 µg/m³.

Annual average NO_2 – Scenario 1 NO_X emissions (Figure 7-2)
In the case of NO_X emissions, the predicted annual average NO_2 concentrations are well below the NAAQS for Scenarios 1. The NO_2 concentrations predicted in Scenario 1 has a maximum concentration of 0.03 µg/m³. The maximum concentration in this scenario occurs in the immediate vicinity of the facility and approximately 4 km northwest of the facility.

Annual average NO_2 – Scenario 2 NO_X emissions (Figure 7-2)
The predicted concentrations are comparatively higher for Scenario 2. The predicted annual average NO_2 concentrations are well below the NAAQS. The NO_2 concentrations predicted in Scenario 2 are similar, with a maximum concentration of 1.1 µg/m³. The maximum concentrations in Scenario 2 occurs in the immediate vicinity of the facility

Figure 7-2: Predicted annual average NO_2 concentrations (µg/m³) resulting from emissions from ArcelorMittal CCGT power plant for Scenario 1 (left) and Scenario 2 (right)

1-hour NO_2 – Scenario 1 NO_X emissions (Figure 7-3)

The 99th percentile of the predicted 1-hour NO_2 concentrations for Scenario 1 do not exceed the NAAQS of 200 µg/m³ with a maximum predicted concentration of 7.5 µg/m³. The maximum concentration occurs close to the ArcelorMittal CCGT power plant Site.

1-hour NO_2 – Scenario 2 NO_X emissions (Figure 7-3)

The 99th percentile of the predicted 1-hour NO_2 concentrations for Scenario 2 are higher than in Scenario 1, but do not exceed the NAAQS. The predicted maximum concentration is 2.1 µg/m³ which occurs close to the ArcelorMittal CCGT power plant Site.

Figure 7-3: 99th percentile of the predicted 1-hour NO_2 concentrations (µg/m³) resulting from emissions from ArcelorMittal CCGT power plant for Scenario 1 (left) and Scenario 2 (right)

7.5 PREDICTED CO CONCENTRATIONS

Predicted 8-hour average and 1-hour average CO concentrations resulting from LNG or CNG combustion in both Scenarios 1 and 2 are very low and several orders of magnitude below the respective NAAQS. The concentrations at the points of predicted highest ground-level concentration are presented in Table 7-5 for Scenarios 1 and 2. The concentrations for Scenario 2 and somewhat higher than for Scenario 1.

Table 7-5: Maximum predicted CO concentrations in µg/m3

Averaging period	Scenario 1	Scenario 2
8-hour	0.97	6.1
1-hour	1.6	12.0

The isopleth plots of the 8-hour average concentrations for the both scenarios are shown in Figure 7.4 and for the 99-th percentile of predicted 1-hour concentrations in Figure 7.5. Similarly the predicted concentration for the full generation capacity (Scenario 2) are higher than for Scenario 1.

Figure 7-4: Predicted 8-hour average CO concentrations (µg/m³) resulting from emissions from ArcelorMittal CCGT power plant for Scenario 1 (left) and Scenario 2 (right)

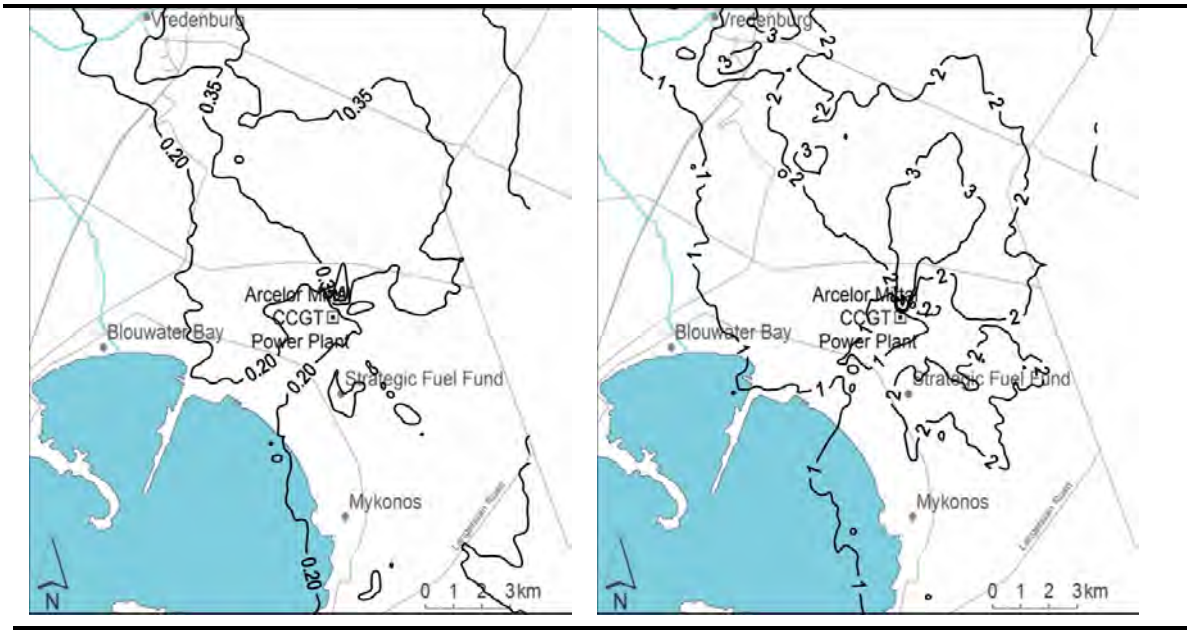
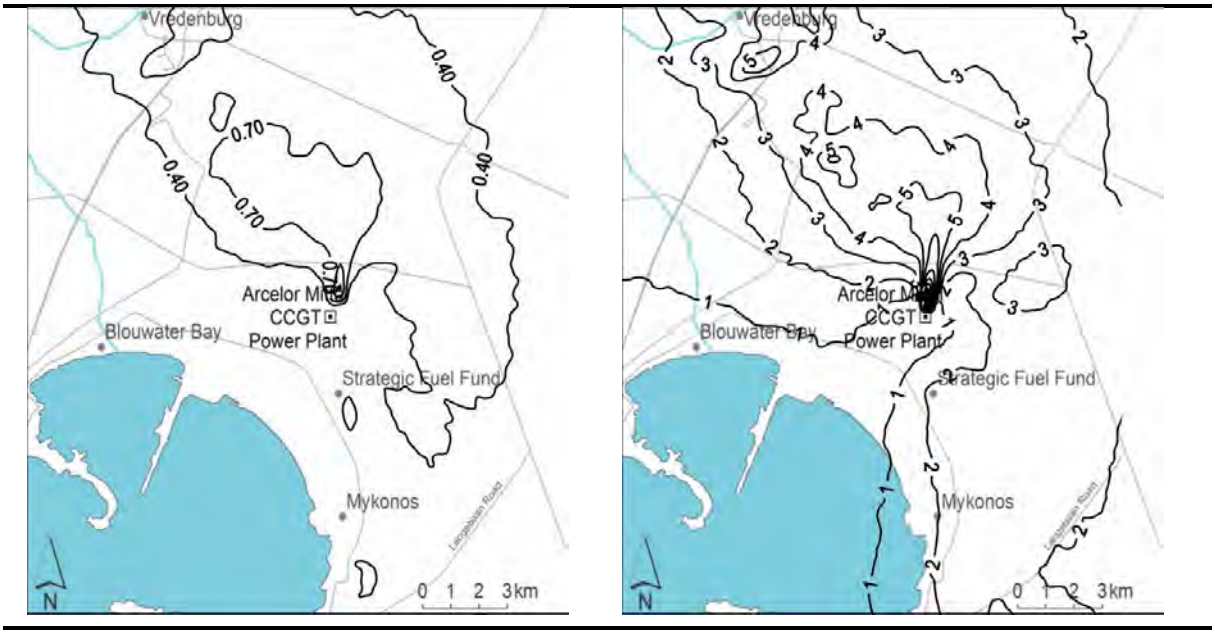


Figure 7-5: 99th percentile of the predicted 1-hour CO concentrations (µg/m³) resulting from emissions from ArcelorMittal CCGT power plant for Scenario 1 (left) and Scenario 2) (right)



7.6 IMPACT ASSESSMENT

The air quality impacts associated with dust and vehicle exhaust emissions during construction and decommissioning are assessed qualitatively in Table 7-6 and the assessment of air quality impacts during operations is based on the predicted ambient

concentrations for Scenario 1 and Scenario 2 (1 507 MW) in Table 7-7 and 7-8 according to the assessment methodology presented in Chapter 4.

Table 7-6: Impact Assessment Table for emissions of dust and exhaust emissions during construction and decommissioning activities

Criterion	Rating	Comment
Impact – Emissions of dust and exhaust emissions during construction and decommissioning activities		
Nature	Negative	These impacts are expected to cause an increase in ambient concentrations of dust and construction vehicle and construction equipment exhaust emissions such as SO_2, NO_2, PM_{10}, CO and benzene in the environment.
Type	Direct	The impacts associated with construction and decommissioning activities are a direct consequence of emissions of pollutants into the atmosphere during these phases of the project. The impacts manifest as a nuisance with respect to dust and a risk of exposure through inhalation of the other pollutants.
Duration	Short-term	The duration of the impact will be limited to the construction and decommissioning phase of the project, which is short-term.
Extent	Local	The impacts are predicted to be of *local* extent for all pollutants since they are released close to ground level with little or no buoyancy which limits their dispersion and the potential impacts to the site.
Scale	Low	The scale of the impact is related to whether the predicted ambient concentrations of the pollutants exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. In the case of dust, SO_2, NO_2, PM_{10}, CO and benzene the ambient concentrations are expected to be well below the respective NAAQS. The scale of the impact is therefore scored **low** with a value of 1.
Frequency	Low	The frequency of the impact is related to whether the predicted exceedances of the limit values exceed the permitted number of exceedances provided in the NAAQS, i.e. the tolerance. In the case of dust, SO_2, NO_2, PM_{10}, CO and benzene, no exceedances of the NAAQS are expected and the frequency of the impact is scored **low** with a value of 1.
Magnitude	Low	Magnitude describes the intensity of the change in air quality that is predicted to occur. For dust, SO_2, NO_2, PM_{10}, CO and benzene it is expected that ambient concentrations will be low and are not likely to add to or significantly change the existing state of the environment. The magnitude of the change is predicted to be **low** with a score of 1.

Receptor Sensitivity	Low	Sensitive receptors include, but are not limited to, schools, churches, residences, apartments, hospitals, day care facilities, elderly care facilities and nursing homes. These are areas where the occupants are more susceptible to the adverse effects of exposure to pollutants and contaminants. Extra care must be taken when dealing with contaminants and pollutants in close proximity to areas recognised as sensitive receptors. Ambient concentrations of dust, SO_2, NO_2, PM_{10}, CO and benzene are predicted to be low throughout the study area and there no sensitive receptors in the vicinity of the site. The receptor sensitivity is therefore predicted to be **low**.
Significance	Minor	The significance of the impact combines the magnitude with the sensitivity of the environment. With a low magnitude expected for dust, SO_2, NO_2, PM_{10}, CO and benzene concentrations resulting from emissions from the construction and decommissioning phase and with a low sensitivity, the significance is predicted to be **minor** or **negligible**.

Table 7-7: Impact assessment for Scenario 1 for NO_2 and CO

Criterion	Rating	Comment
Impact – Emission of NO_2 and CO resulting from gas turbines combusting LNG		
Nature	Negative	This impact will cause an increase in ambient concentrations of NO_2 and CO in the environment.
Type	Direct	The predicted impacts are a direct consequence of emissions of pollutants into the atmosphere resulting from the combustion of LNG. The impacts manifest as ambient concentrations of the respective pollutants with a risk of exposure through inhalation.
Duration	Long-term	The duration of the impacts will be for the operational life of the facility, i.e. **long-term**, enduring for as long as the facility is operational and emitting air pollutants.
Extent	Local	The impacts are predicted to be of **local** extent for all pollutants since the modelled ambient concentrations are low and their dispersion is limited to the site and the surrounding areas.
Scale	Low	The scale of the impact is related to whether the predicted ambient concentrations of the pollutants exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. For all NO_2 and CO the predicted ambient concentrations are well below the respective NAAQS and the scale of the impact is scored **low** with a value of 1.
Frequency	Low	The frequency of the impact is related to whether the predicted exceedances of the limit values exceed the tolerance provided in the NAAQS. There are no predicted exceedances of the NAAQS for either NO_2 and CO so the frequency of the impact is scored **low** with a value of 1.
Magnitude	Low	Magnitude describes the intensity of the change in air quality that is predicted to occur. The predicted ambient concentrations are low for all pollutants and are not expected to significantly add to or change the existing state. The magnitude of the change is therefore predicted to be **low**.
Receptor Sensitivity	Low	Sensitive receptors include, but are not limited to, schools, churches, residences, apartments, hospitals, day care facilities, elderly care facilities and nursing homes. These are areas where the occupants are more susceptible to the adverse effects of exposure to pollutants and contaminants. Extra care must be taken when dealing with contaminants and pollutants in close proximity to areas recognised as sensitive receptors. Ambient concentrations of NO_2 and CO are predicted to be low throughout the study area and there no sensitive receptors in the vicinity of the site. The

		receptor sensitivity is therefore predicted to be **low**.
Significance	Minor	The significance of the impact combines the magnitude with the sensitivity of the environment. With a low magnitude expected for NO_2 and CO concentrations resulting from emissions from the combustion of LNG with and a low sensitivity, the significance is predicted to be **minor** or **negligible**.

Table 7-8: Impact assessment for Scenario 2 (1 507 MW) for NO_2 and CO

Criterion	Rating	Comment
Impact – Emission of NO_2 and CO resulting from gas turbines combusting LNG		
Nature	Negative	This impact will cause an increase in ambient concentrations of NO_2 and CO in the environment.
Type	Direct	The predicted impacts are a direct consequence of emissions of pollutants into the atmosphere resulting from the combustion of LNG. The impacts manifest as ambient concentrations of the respective pollutants with a risk of exposure through inhalation.
Duration	Long-term	The duration of the impacts will be for the operational life of the facility, i.e. **long-term**, enduring for as long as the facility is operational and emitting air pollutants.
Extent	Local	The impacts are predicted to be of **local** extent for all pollutants since the modelled ambient concentrations are low and their dispersion is limited to the site and the surrounding areas.
Scale	Low	The scale of the impact is related to whether the predicted ambient concentrations of the pollutants exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. For all NO_2 and CO the predicted ambient concentrations are well below the respective NAAQS and the scale of the impact is scored **low** with a value of 1.
Frequency	Low	The frequency of the impact is related to whether the predicted exceedances of the limit values exceed the tolerance provided in the NAAQS. There are no predicted exceedances of the NAAQS for either NO_2 and CO so the frequency of the impact is scored **low** with a value of 1.
Magnitude	Low	Magnitude describes the intensity of the change in air quality that is predicted to occur. The predicted ambient concentrations are low for all pollutants and are not expected to significantly add to or change the existing state. The magnitude of the change is therefore predicted to be **low**.
Receptor Sensitivity	Low	Sensitive receptors include, but are not limited to, schools, churches, residences, apartments, hospitals, day care facilities, elderly care facilities and nursing homes. These are areas where the occupants are more susceptible to the adverse effects of exposure to pollutants and contaminants. Extra care must be taken when dealing with contaminants and pollutants in close proximity to areas recognised as sensitive receptors. Ambient concentrations of NO_2 and CO are predicted to be low throughout the study area and there no sensitive receptors in the vicinity of the site. The

		receptor sensitivity is therefore predicted to be **low**.
Significance	Minor	The significance of the impact combines the magnitude with the sensitivity of the environment. With a low magnitude expected for NO_2 and CO concentrations resulting from emissions from the combustion of LNG with and a low sensitivity, the significance is predicted to be **minor** or **negligible**.

7.7 RESIDUAL IMPACT ASSESSMENT CONCLUSIONS

Impacts on ambient air quality are associated with emissions from the CCGT while it is in operation. The impacts will cease if operations stop. In other words, there will be no residual impacts on air quality.

7.8 CUMULATIVE IMPACT ASSESSMENT

A cumulative impact is one that arises from a result of an impact from the Project interacting with an impact from another activity to create an additional impact. How the impacts and effects are assessed is strongly influenced by the status of the other activities (e.g. already in existence, approved or proposed) and how much data is available to characterise the magnitude of their impacts.

It is difficult to assess the cumulative effect of the ArcelorMittal CCGT and other possible future development projects considering the uncertainty of such projects. Future projects may include but not be limited to i) 1 500 MW LNG power plant in the vicinity of the IDZ, ii) LNG storage facilities, iii) a chlorine, caustic soda and hydrochloric acid in Saldanha Bay, and iv) a cement manufacturing plant to the east of the IDZ.

Of these plants, emissions CO and NO_X, i.e. those assessed for the ArcelorMittal CCGT, will be emitted from the power plant as a result of LNG combustion and from the cement manufacturing plant as a result of fuel combustion and heat generated in the kiln. For the cement plant the incremental predicted incremental NO_2 concentrations were very low, while CO was not assessed (Aurecon, 2013). For the power plant using LNG and Best Available Technology for power generation the NO_X and CO emissions is also expected to be very low.

Given the findings of this impact assessment (the ArcelorMittal CCGT), that of the cement plant (Aurecon, 2013) and the understanding of emissions from LNG power plants it seem unlikely that the cumulative effect will exceed the NAAQS for CO and NO_2 in Saldanha Bay. It should however be recognised that this statement is speculative and based on

professional judgement. The cumulative impact of a suite of industries is best assessed using emissions from the relevant sources and dispersion modelling.

The potential cumulative impact on air quality is rated in Table 7-9.

Table 7-9: Assessment of cumulative impacts

Criterion	Rating	Comment
Impact – Emission of NO_2 and CO from the Arcelor Mittal CCGT Power Plant and other sources, e.g. power generation using LNG and cement manufacturing		
Nature	Negative	These will cause an increase in ambient concentrations of NO_2 and CO in the environment.
Type	Direct	The cumulative impacts are a direct consequence of emissions of pollutants into the atmosphere resulting from fuel combustion at the respective facilities. The impacts manifest as ambient concentrations of the respective pollutants with a risk of exposure through inhalation.
Duration	Long-term	The duration of the impacts will be for the operational life of the facilities, i.e. **long-term**, enduring for as long as the facility is operational and emitting air pollutants.
Extent	Local	The impacts are predicted to be of **local** extent for all pollutants since the cumulative ambient concentrations are expected to be low and their dispersion will be limited to the respective sites and the surrounding areas.
Scale	Low	The scale of the cumulative impact is related to whether the ambient concentrations of the pollutants are likely to exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. For all NO_2 and CO the cumulative ambient concentrations are likely to be well below the respective NAAQS and the scale of the impact is scored **low** with a value of 1.
Frequency	Low	The frequency of the cumulative impact is related to whether exceedances of the limit values exceed the tolerance provided in the NAAQS. It is unlikely that exceedances of the NAAQS will occur for either NO_2 and CO so the frequency of the cumulative impact is scored **low** with a value of 1.
Magnitude	Low	Magnitude describes the intensity of the change in air quality that is expected to occur. The ambient concentrations are expected to be low for all pollutants and cumulatively little change the existing state is expected. The magnitude of the change is therefore predicted to be **low**.
Receptor Sensitivity	Low	Sensitive receptors include, but are not limited to, schools, churches, residences, apartments, hospitals, day care

		facilities, elderly care facilities and nursing homes. These are areas where the occupants are more susceptible to the adverse effects of exposure to pollutants and contaminants. Extra care must be taken when dealing with contaminants and pollutants in close proximity to areas recognised as sensitive receptors. Cumulative ambient concentrations of NO_2 and CO are expected to be low throughout the Saldanha Bay Municipality. The receptor sensitivity is therefore predicted to be **low**.
Significance	Minor	The significance of the cumulative impact combines the magnitude with the sensitivity of the environment. With a low magnitude expected for NO_2 and CO concentrations resulting from emissions from the combustion of LNG with and a low sensitivity, the significance is predicted to be **minor** or **negligible**.

7.9 RECOMMENDED MITIGATION MEASURES

7.9.1 Construction and decommissioning

The main concern for the construction and decommissioning phase is the generation of dust and exhaust emissions from vehicles and equipment on site. Mitigation and management of these is to implement rules on site to minimise dust and exhaust emissions. The following mitigation measures are proposed:

- Loads on vehicles carrying dusty construction materials should be covered;
- Loading and unloading bulk material should be in areas protected from the wind or carried out in calm conditions;
- Limit access to construction site to construction vehicles only;
- Impose vehicle speed restrictions on the construction site;
- Avoid unnecessary removal of vegetation and re-vegetate as soon as possible;
- Maintain high moisture content on exposed surfaces and roads by spraying with water; operate a maintenance programme for construction vehicles and construction equipment to ensure optimal performance, thereby reducing exhaust emissions.

7.9.2 Operations

The main concern for the operational phases of the CCGT are the potential to increase ambient concentrations on NO_2 and CO. The predicted ambient concentrations are low and significantly below the respective NAAQS as a result of the generation technology and the properties of LNG. As a result mitigation and management measures are aimed at ensuring optimum performance of the turbines and the on-going use of LNG. The following is proposed:

- The development and implementation of servicing programs for all operational components of the facility according to design specifications and requirements;
- Stocking of critical components to ensure the availability of spares in the event of mechanical faults;
- Commitment to use only LNG or CNG as the primary fuel.

8 MANAGEMENT & MONITORING

8.1 ENVIRONMENTAL MANAGEMENT REQUIREMENTS

Mitigation measures for incorporation into the EMP are suggested with respect to construction and decommissioning activities to limit nuisance impacts (Table 8-1). Although the predicted impacts from operations are low, it is important that the plant is maintained to ensure performance continually meets the design specifications.

It is also recommended to conduct ambient monitoring to measure compliance with the NAAQS for NO_2 thus allowing proactive management of the plant in the event of measured exceedances. It is recommended that ArcelorMittal's current ambient air quality monitoring program at is expanded to include continuous NO_2 monitoring at an appropriate site northwest of the plant where ambient concentrations are predicted to be relatively high.

Table 8-1: Recommended mitigation and management action for construction and decommissioning

Impact	Recommended Mitigation/Management action	Monitoring		
		Methodology	Frequency	Responsibility
Dust and other pollutants from construction and decommissioning	• Loads on vehicles carrying dusty construction materials should be covered • Loading and unloading bulk construction should be in areas protected from the wind on in calm conditions • Vehicles carrying dusty materials should be cleaned before leaving the site • Limit access to construction site to construction vehicles only • Impose vehicle speed restrictions on the construction site • Maintain high moisture content on exposed surface and roads by spraying with water • Maintenance programme for construction vehicles to ensure optimum performance reduced emissions	Include dust management in contractors contract conditions	On-going during construction	Contractor

Table 8-2: Recommended mitigation and management action for operations

Impact	Recommended Mitigation/Management action	Monitoring		
		Methodology	Frequency	Responsibility
Increase in ambient concentrations of NO_2 and CO	• Develop and implement servicing programs for all operational components of the facility;	Based on design specifications	On-going	Operations manager
	• Maintain stock of critical components for the facility to ensure the availability of spares in the event of mechanical faults or failures;	Based on design specifications	On-going	Operations manager
	• Commitment to use only LNG or CNG as the primary fuel;	Strategic planning	Annually	Senior management
	• The inclusion of NO_2 in the current ambient air quality monitoring program	NO_2 gas analyser	On-going	Environmental manager

8.2 ENVIRONMENTAL MANAGEMENT SYSTEM

An Environmental Management System consists of an emissions inventory, monitoring system and reporting.

The operation of the power plant is a Listed Activity in terms of the NEM: AQA. Requirements for environmental management will be dictated by the conditions in the Atmospheric Emission License (AEL). These are likely to include:

i. Annual emission measurements to assess compliance with the Minimum Emission Standards for Listed Activities (Government Gazette 37054, Notice No. 893 of 22 November 2013);
ii. Registration on the National Atmospheric Emission Inventory System (NAEIS) and annual reporting of emissions to the NAEIS (Government Gazette 38633, Notice No. R 283 of 2 April 2015);
iii. Registration on the South African Atmospheric Emission and Licensing Portal (SAAELIP) and annual reporting to the Licensing Officer.

9 IMPACT SUMMARY

All impacts arising from the scoping study have been assessed in detail. Table 9-1 and 9-2 provide a summary of impacts addressed in this study, before mitigation and with mitigation.

*Table 9-1: **Construction and decommissioning Impact Assessment Outcomes***

Project Activities/Impacts	Significance of Impacts	
Construction/Decommissioning Phase	Before Mitigation	With Mitigation
Increase in ambient concentrations of dust and construction vehicle and construction equipment exhaust emissions such as SO_2, NO_2, PM_{10}, CO and benzene in the environment.	Minor	Minor

*Table 9-2: **Operational Phase Impact Assessment Outcomes***

Project Activities/Impacts	Significance of Impacts	
Operational Phase	Before Mitigation	With Mitigation
Increase in ambient concentrations of NO_2 and CO in the environment.	Minor	Minor

10 CONCLUSION AND RECOMMENDATIONS

Air quality impacts are assessed for the operation of the proposed ArcelorMittal CCGT power plant at Saldanha Bay using LNG as the fuel. Dispersion modelling is used to predict the ambient concentrations of CO and NO_2 for to operational scenarios. The assessment of ambient air quality impacts compares the predicted concentrations of the pollutants with the respective NAAQS and considers sensitivity of the receiving environment and defines the significance of the impacts according to their type, extent, duration, scale, frequency and magnitude.

LNG is a clean fuel and its use in the ArcelorMittal CCGT power plant results in relatively low emissions of CO and NO_X. As a result the predicted ambient concentrations of CO and NO_2 are well below the respective NAAQS. The significance of the air quality impacts when LNG is used in the ArcelorMittal CCGT power plant are minor.

Employing the generic design parameters provided for the project, it is predicted that the site operations will low generate emissions, low ambient concentrations, and low environmental impacts overall. Mitigation and management measures are recommended for construction, operations and decommissioning.

It is a reasonable opinion that the project should be authorised considering the outcomes of this impact assessment.

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APPENDIX 1

MARK ZUNCKEL

Firm	:	uMoya-NILU (Pty) Ltd
Profession	:	Air quality consultant
Specialization	:	Air quality assessment, air quality management planning, air dispersion modelling, boundary layer meteorology, project management
Position in Firm	:	Managing director and senior consultant
Years with Firm	:	New firm started on 1 August 2007
Nationality	:	South African
Year of Birth	:	1959
Language Proficiency	:	English and Afrikaans

EDUCATION AND PROFESSIONAL STATUS

Qualification	Institution	Year
National Diploma (Meteorology)	Technikon Pretoria	1980
BSc (Meteorology)	Univ. of Pretoria	1984
BSc Hons (Meteorology)	Univ. of Pretoria	1988
MSc	Univ. of Natal	1992
PhD	Univ. Witwatersrand	1999

Registered Natural Scientist: South African Society for Natural Scientific Professionals

Council Member: National Association for Clean Air
Member: African Meteorological Society
Member: Air and Waste Management Association

EMPLOYMENT AND EXPERIENCE RECORD

Period	Organisation details and responsibilities / roles
1976 – May 1992	*South African Weather Bureau :* Observer, junior forecaster, senior forecast, researcher, assistant director
June 1992 – July 2007	*CSIR:* Consultant and researcher, Research group Leader: Atmospheric Impacts
August 2007 to present	*uMoya-NILU Consulting:* Managing Director and senior air quality consultant

Key and Recent Project Experience:

1996	Project leader & Principal researcher: Atmospheric impact assessment for the proposed Mozal aluminium smelter in Maputo, Mozambique.
1996	Project leader & Principal researcher: Dry sulphur deposition during the Ben MacDhui High Altitude Trace Gas and Transport Experiment (BATTEX) in the Eastern Cape.

1997	Project leader & Principal researcher: Atmospheric impact assessment of the proposed capacity expansion project for Alusaf in Richards Bay.
1997	Project leader & Principal researcher: The Uruguayan ambient air quality project with LATU.

1997	Principal researcher on the Air quality specialist study for the Strategic Environmental Assessment on the industrial and urban hinterland of Richards Bay.
1997	Project leader & Principal researcher: Feasibility study for the implementation of a fog detection system in the Cape Metropolitan area: Meteorological aspects.
2001	Project leader & Principal researcher: Air quality specialist study for the Environmental Impact Assessment for the proposed expansion of the Hillside Aluminium Smelter, Richards Bay.
2001-2003	Researcher: The Cross Border air Pollution Impact (CAPIA) project. A 3-year modelling and impacts study in the SADC region.
2002	Project leader & Principal researcher: Air quality assessment specialist study for the proposed Pechiney Smelter at Coega.
2002	Project leader & Principal researcher: Air quality assessment specialist study for the proposed N2 Wild Coast Toll Road.
2002-2005	Project leader on the NRF project – development of a dynamic air pollution prediction system
2004	Project leader on the specialist study for expansion at the Natal Portland Cement plant at Simuma, KwaZulu-Natal.
2004-2005	Researcher: National Air Quality Management Plan implementation project for Department Environmental Affairs and Tourism.
2005	Researcher in the assessment of air quality impacts associated with the expansion of the Natal Portland Cement plant at Port Shepstone.
2005	Technical assistance to the Department of Environment Affairs and Tourism in the implementation of the Air Quality Act
2006-2007	Project team leader of a multi-national team to develop the National Framework for Air Quality Management for the Department of Environment Affairs and Tourism
2007	Air quality assessment for Mutla Early Production System in Uganda for ERM Southern Africa on behalf of Tullow Oil.
2007-2010	Lead consultant on the development of a dust mitigation strategy fro the Bulk Terminal Saldanha and an ambient guideline for Fe_2O_3 dust for Transnet Projects and on-going monitoring.
2008	Lead consultant on the Air quality status quo assessment and scoping for the EIA for the Sonangol Refinery
2008-09	Lead consultant on the development of the air quality management plan for the Western Cape Provincial. Department of Environmental

	Affairs and Development Planning.
2008-10	Lead consultant on the development of the Highveld Priority Area air quality management plan for the Department of Environmental Affairs and Tourism.
2008	Lead consultant in the development of an odour management and implementation strategy for eThekwini.
2008 & 2010	Lead consultant on the Air Quality Specialist Study for the EIA for the proposed Kalagadi Manganese Smelter at Coega
2008	Lead consultant on the Air Quality Assessment for the Proposed Construction and Operation of a Second Cement Mill at NPC-Cimpor, Simuma near Port Shepstone.
2008	Lead consultant on the Air Quality Specialist Study Report for the New Multi-Purpose Pipeline Project (NMPP) for Transnet Pipelines.
2008	Lead consultant on the Air quality assessment for the proposed UTE Power Plant and RMDZ coal mine at Moatize, Mozambique for Vale.
2009	Lead consultant on the Air quality assessment for the development of the ETA STAR coal mine at Moatize, Mozambique for Impacto.
2008-09	Lead consultant on the Dust source apportionment study for the Coedmore region in Durban for NPC-Cimpor.
2009	Consultant on the Air quality specialist study for the upgrade of the Kwadukuza Landfill, KwaZulu-Natal
2009-10	Lead consultant on the Audit of ambient air quality monitoring programme and air quality training for air quality personnel at PetroSA
2010	Lead consultant on the Qualitative assessment of impact of dust on solar power station at Saldanha Bay
2010	Lead consultant on the Air quality specialist study for the EIA for the Kalagadi Manganese Smelter at Coega
2010	Lead consultant on the Qualitative air quality assessment for the EIA for the Sechaba Aphalt plant, Ferrobank
2009 – 2010	Lead consultant on the Air quality specialist study for the Environmental Management Framework for the Port of Richards Bay
2010	Lead consultant on the Air quality status quo assessment and abatement planning at Idwala Carbonates, Port Shepstone
2010	Lead consultant on the Air quality status quo assessment and abatement planning at Sappi Tugela, Mandeni
2010 – 2011	Air quality status quo assessment and revision of the Air Quality Management Plan for City of Johannesburg
2010	Lead consultant on the Air quality status quo assessment and abatement planning at First Quantum Mining's Bwana Mkubwa and Kansanshi mines, Zambia
2010 – 2011	Lead consultant on the Air quality specialist study for the EIA for the Alternative Fuel and Resources Project at Simuma, Port Shepstone

2010 – 2011	Lead consultant on the Air quality specialist study for the EIA for the Coke Oven re-commissioning at ArcelorMittal Newcastle
2010	Qualitative air quality assessment for the EIA for the Mozpel sugar to ethanol project , Mozambique
2011	Development of the South African Air Quality Information System – Phase II The National Emission Inventory
2011	Ambient baseline monitoring for Riversdale's Zambeze Coal Project in Tete, Mozambique
2010 - 2011	Ambient quality baseline assessment for the Ncondeze Coal Project, Tete Mozambique
2011-12	Air quality assessment for the mining and processing facilities at Longmin Platinum in Marikana
2012	Air quality assessment for the proposed LNG and OLNG plants in Mozambique
2012	Modelling study in Abu Dhabi for the transport and deposition of radio nuclides
2012	Air quality assessment for the proposed manganese ore terminal at the Ngqura Port
2012-13	Air quality management plan development for Stellenbosch Municipality
2012-12	Air quality management plan development for the Eastern Cape Province
2013	Air quality specialist for Tullow Oil Waraga-D and Kinsinsi environmental audit
2013	Air quality specialist study for the EIA for the Thabametsi IPP station
2013	Air quality specialist study for the EIA for the Mamathwane Common User facility
2013	Air quality management plan for the Ugu District Municipality
2013-14	Air quality specialist study for the application for postponement of the minimum emission standards for 9 Eskom power stations
2014	Air quality specialist study for the application for postponement of the minimum emission standards for the Engen Refinery in Merebank, Durban
2014-15	Baseline assessment and AQMP development for the uThungulu District Municipality
2013-15	Baseline assessment and air quality management plan for the Waterberg-Bojanala Priority Area
2014-15	AQMP review for eThekwini Municipality
2014-14	Dispersion modelling study for Richards Bay Minerals
2015	Air quality assessment for Rainbow Chickens at Hammersdale
2015	Air quality status quo assessment and planning for TNPA managed ports in South Africa

PUBLICATIONS

Author and co-author of 34 articles in scientific journals, chapters in books and conference proceedings. Author and co-author of more than 100 technical reports and presented 47 papers at local and international conferences. A full publications list is available on request.

APPENDIX 2

ARCHAEOLOGICAL IMPACT ASSESSMENT: PROPOSED GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY, WESTERN CAPE

(Assessment conducted under Section 38 (8) of the
National Heritage Resources Act No 25 of 1999)

Case Number: 16041107AS0425E

Prepared for:
ERM South Africa (Pty) Ltd
On behalf of:
ArcelorMittal South Africa

ACO Associates cc
Archaeology and Heritage Specialists

July 2016
Revised September 2016

Prepared by:

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ACO Associates cc
8 Jacobs Ladder
St James

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EXECUTIVE SUMMARY

Site Name
ACO Associates cc has been appointed by Environmental Resources Management Southern Africa (ERM) on behalf of the client, AcerlorMittal South Africa, to undertake a Heritage Impact Assessment for the proposed gas-fired power plant to be constructed adjacent the AcerlorMittal Steel Works in Saldanha Bay, Western Cape.

A NID application was submitted to Heritage Western Cape, and their response, dated 6 May 2016 requires an integrated Heritage Impact Assessment comprising the following studies:

- Impacts to Archaeological heritage resources
- Impacts to Palaeontological heritage resources

This report constitutes the Archaeological Specialist Report.

Description of Proposed Development

Survey
Field surveys were conducted by Webley, Halkett and Robinson on the 13th June 2016 and by Webley, Halkett, Robinson and Avery on the 22 June 2016.

Archaeological Resources Identified
- Two silcrete flakes and a fragment of ostrich eggshell were found along the proposed pipeline route, and one chunk of quartzite was found on the Site B location for the power plant.

Anticipated Impacts on Archaeological Resources
- No impacts are anticipated on archaeological resources.
- In a background assessment of the archaeology of the Saldanha Bay area, Hart (2015b) concludes: *"The study area is one of the best studied yet least significant tracts of landscape in the Western Cape in archaeological terms".*

Cumulative Impacts

A number of developments have taken place and/or are planned in the immediate vicinity of the proposed gas-fired power plant and pipeline. Archaeological Impact assessments conducted over the last decade have confirmed that the probability of recovering archaeological remains is low, the significance of the archaeological remains is very low and that no further mitigation is required (see Figure 5 in Appendix 2). The cumulative impact of the proposed development on archaeological resources is negligible.

Recommendations

This archaeological specialist report has not identified any impacts to archaeology and the development may proceed.

- If any human remains are uncovered, particularly along that stretch of the coastline close to Saldanha Bay, then work must stop in that area, and Heritage Western Cape must be notified immediately (Tel: 021 483 9685);

- Should any significant archaeological or palaeontological material be uncovered during construction work, then further mitigation may be required. Additional work would need to be conducted under a Workplan (rather than a permit) in terms of Section 38(10) of the NHRA.

Authors and Date

Halkett, David
Robinson, Jess
Webley, Lita

SPECIALIST DECLARATION

I, Lita Webley, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offense in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of specialist

Specialist Field: Archaeology and Heritage

Name of Company: ACO Associates

CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	**Cross-reference in this report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	Lita Webley CV attached
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Specialist declaration Page 3
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 3
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	14 & 22 June 2016. Season has no impacts on heritage
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 5
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 8
(g) an identification of any areas to be avoided, including buffers;	Section 8
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 6
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 7
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	None
(p) any other information requested by the competent authority.	Letters from registered conservation bodies and municipality - attached

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 3 - Environmental Impact Assessment Process	**Cross-reference in this report**
Describe any policies or legislation relevant to your field that the applicant will need to comply with.	National Heritage Resources Act, No 25 of 1999
Comment on need/desirability of the proposal in terms your field and in terms of the proposal's location.	Section 2
Determine the-- (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and (ii) degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated;	Section 8 & 9
Determine what the most ideal location within the site for the activity is in terms of your field.	Section 11 & 12
Identify suitable measures to avoid, manage or mitigate identified impacts.	Section 9
Identify residual risks that need to be managed and monitored.	Section 8 &9
Include a concluding statement indicating a preferred alternative in terms of your field.	Section 11 & 12

GLOSSARY

Archaeology: Remains resulting from human activity which is in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.

Heritage Western Cape: The compliance authority which protects national heritage in the Western Cape.

Holocene: The most recent geological time period which commenced 10 000 years ago.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Pleistocene: A geological time period (of 3 million – 20 000 years ago).

Structure (historic:) Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

Acronyms

DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

CONTENTS

1. INTRODUCTION

ACO Associates cc was appointed by Environmental Resources Management Southern Africa (ERM) on behalf of the client, AcerlorMittal South Africa, to undertake a Heritage Impact Assessment for the proposed gas-fired power plant to be constructed adjacent the AcerlorMittal Steel Works in Saldanha Bay, Western Cape (Figure 1).

Figure 1: The location of Site A (yellow polygon) and Site B (turquoise polygon) for the proposed power plant and the pipeline (in black) to Saldanha Bay. The proposed power plant will be directly adjacent the Blouwater Substation and less than 1km from the ArcelorMittal Steel Works. Note the dark blue line indicates the access roads and the green lines are the existing powerlines from the Blouwater substation to the Aurora substation, close to Hopefield.

2. DEVELOPMENT PROPOSALS

In order to ensure the requirement for stable, economical electricity over the long term, it is proposed to construct a 1507 MW Combined Cycle Gas Turbine (CCGT) power plant adjacent to the AcelorMittal Saldanha Steel site.

2.1 Pipeline

CNG and LNG will be supplied by ship to the Port of Saldanha where it will be offloaded by a submersible pipeline either from a mooring area located offshore or a berthing location in the Port of Saldanha. The LNG pipeline (re-gasified gas) and servitude will run from the pipeline entry point connecting to the power plant boundary. There is proposed to be a gas and sea-water forwarding station at the start of the land-based pipeline system. There will also be a gas and sea-water receiving station at the Power plant.

The gas pipeline will be buried to a depth of 3 to 4m, cover a servitude width of approximately 15-20m and be approximately 3 900m and/or 4 600m in length. Exact dimensions will be determined by the contractor after geotechnical and walk-down inspection and the contractor's own

calculations and risk assessment. The pipeline will be installed underground and this implies the opening of a working strip along the right of way of the pipeline.

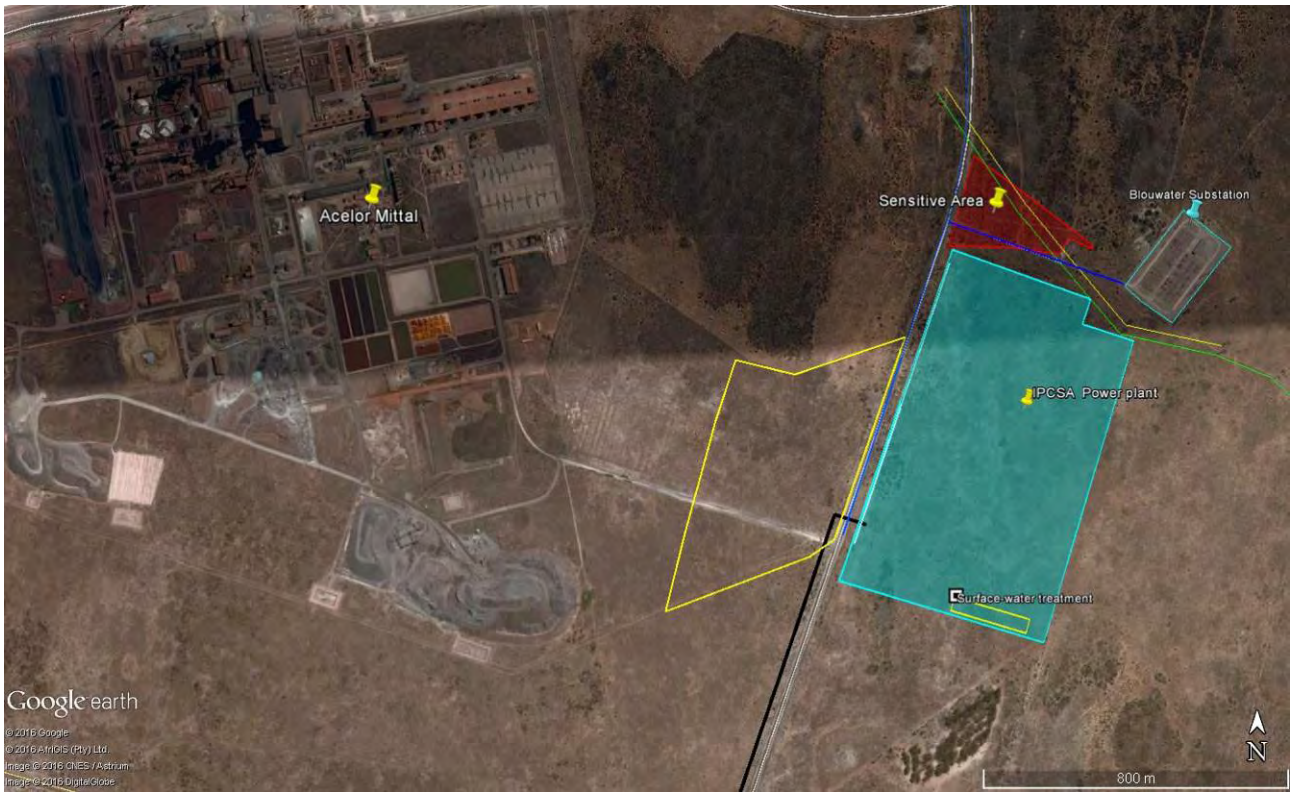

Figure 2: The proposed position of the power plant (Site A in yellow and Site B in turquoise) in relation to the Blouwater substation and the AcerlorMittal steel works.

Figure 3: The route of the proposed pipeline.

2.2 Power Lines

A feeder line of 132kV (sized for a capacity of 400MW), will take the power from the power plant to the AcelorMittal Steel Works. Any additional power generated at the plant will be evacuated through the construction of a new 22km High Voltage (440kV) line from the power plants own switch yard to the existing Aurora substation, following the existing Blouwater to Aurora 132kV feeder servitude.

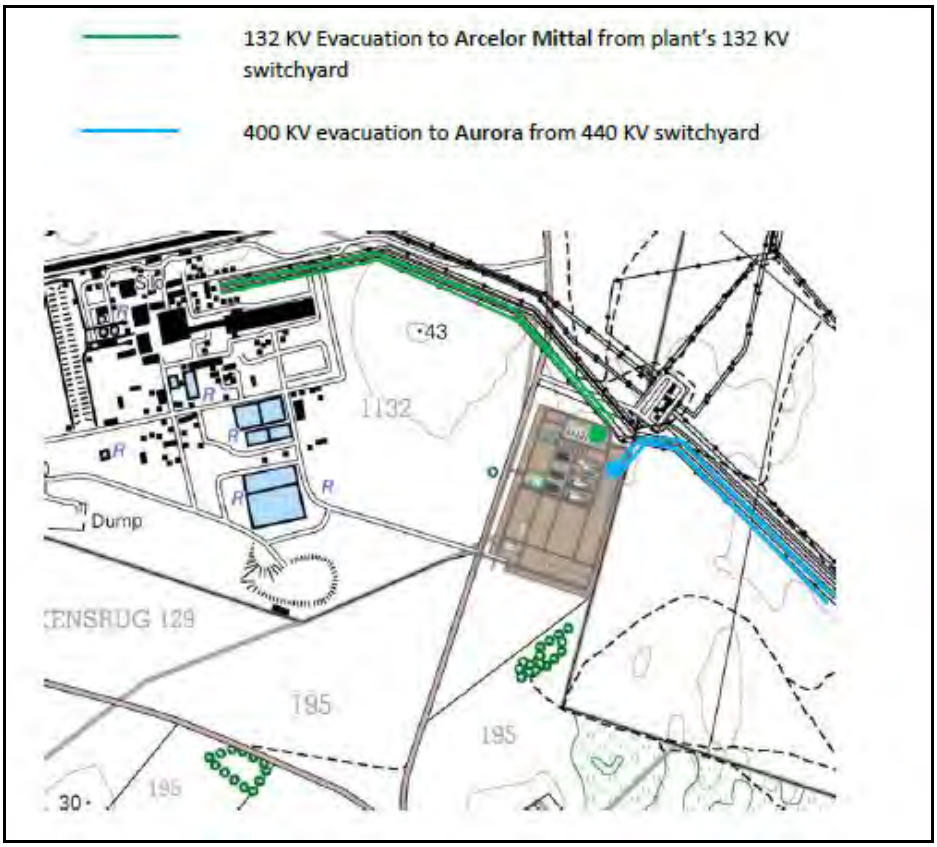

Figure 4: The new 132kV powerline from the power plant to the AcelorMittal Steel Works is indicated in green. The blue line from the Blouwater substation to the Aurora substation follows an existing servitude.

2.3 Ancillary Facilities

In addition, the project will include the following facilities:

- Access road to site;
- 132kV and 400kV switchyard;
- Control and electrical building;
- Central control room, warehouse and administrative buildings;
- Firefighting systems;
- Fuel/gas/diesel storage facilities;
- Emergency backup generators;
- Chemical storage facilities.

The proposed project will be implemented in two phases. Phase 1 will include the installation of five open cycle Siemens Industrial Trent 60 gas turbines, with a further two turbines installed in Phase 2.

2.4 Location Alternatives

ArcelorMittal considered two alternative sites for the development of the gas-fired power plant based on proximity to the existing ArcelorMittal Steel Works site. Other considerations included land availability and zoning status, distance from the existing power transmission infrastructure, vegetation sensitivity, access to the site and proximity to residential areas. Site A is adjacent the steel works, while Site B is across the road from the steel works. The Site A property is smaller than Site B and does not allow for future expansion. There is easier access to Site A than Site B.

The No-Go Alternative would mean that the project does not go ahead. In this case there would be no impact associated with the project. However, the No-Go Alternative would almost certainly mean that Saldanha Steel would no longer be financially viable and would have to shut down, leading to major negative socio-economic consequences to both the Saldanha and the wider Western Cape and South Africa.

3. TERMS OF REFERENCE

- Collect secondary data on the occurrence and distribution of heritage, archaeological and palaeontological sites in the project area;
- Legal review, including local regulatory requirements, IFC Performance Standards and other relevant local and international regulations, including permit requirements;
- Survey the project affected area (including pipeline routes), identify and describe sites of interest;
- Explain how the different elements of the project may affect any heritage sites within the project area;
- Evaluate the potential impacts on sites of interest;
- Assess cumulative impact of development with current and planned developments in the area;
- Describe mitigation/management measures that may be implemented to avoid or reduce any negative impacts on these sites and enhance benefits of the development;
- Provide recommendations for any ongoing monitoring that may be necessary, limitations of the study and indicate any additional studies that may be required, if any;
- Liaise, submit and follow-up on all relevant permits, project applications and associated documents to Heritage Western Cape, as required. Provide a description of the permit application process.

4. HERITAGE LEGISLATION

This report is conducted in terms of Section 38 (8) of the National Heritage Resources Act, No 25 of 1999 (NHRA).

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3);
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37); and
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) (Section 2 (d) (xxi)).

Since the project is subject to an Environmental Impact Assessment, Heritage Western Cape (HWC) is required to provide comment on the proposed project in order to facilitate final decision making by the Department of Environmental Affairs and Development Planning (DEA&DP).

4.1 Archaeology & Palaeontology (Section 35(4))

No person may, without a permit issued by HWC, destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

Archaeological is defined as: “material remains resulting from human activity which is in a state of disuse and is in or on land and which is older than 100 years, including artefacts, human and hominid remains and artificial features and structures”.

Palaeontological is defined as: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossilierous rock intended for industrial use, and any site which contains such fossilised remains or trace”.

4.2 Burial grounds and graves (Section 36(3))

No person may, without a permit issued by the South African Heritage Resources Authority (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

4.3 Grading

The South African heritage resources management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Table 1: Grading of Heritage Resources

Grade	Level of significance	Description
I	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
II	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
IIIA	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3a heritage resources.
IIIB	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3b heritage resources.
IIIC	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3c heritage resources.

The grading of heritage sites, as prescribed in the NHRA, is only concerned with categories I, II and III. The subdivision of Grade III sites was introduced in the Western Cape and is used in this report.

A Notice of Intent to Develop (NID) was submitted to HWC and their comment is attached to the Heritage Impact Assessment as Annex A.

5. METHODOLOGY

5.1 Background Literature study

The construction of the Port of Saldanha Iron Ore Terminal in the 1970's has seen increased industrialisation of the area culminating in formal designation of this area as an Industrial Development Zone (IDZ) supported at both Provincial and National level. The fact that Saldanha has become an important development node has resulted in numerous EIAs commissioned for both industrial and residential development. In many instances these studies were carried out on speculative future uses for the land which never reached fruition. The heritage of this area has become quite well understood. Hart (2015a & 2015b) has undertaken at least two recent desktop literature reviews of the area, and the background information on the area is therefore easily accessible.

In addition, a background search of published material, online material and other commercial (CRM) projects in the area was made via the South African Heritage Resources Information Systems (SAHRIS) database.

5.2 Field Survey

The polygon of the proposed development was provided to ACO Associates. The sites were surveyed by Halkett, Webley and Robinson on the 14th June 2016 and Avery accompanied the archaeologists on the 22nd June 2016. Transects were walked across the study area looking for heritage remains. All sites and features were photographed and recorded and their positions taken with a hand-held Garmin GPS receiver set to the WGSS84 datum.

5.3 Assumptions and Limitations

It is important to emphasise that our survey was only able to identify above ground heritage resources. There may be archaeological sites (as well as human remains) buried beneath the topsoil. We are of the opinion that this is not a significant limitation as it can be managed through the inclusion of a chance find procedure in the ESMP.

6. RECEIVING ENVIRONMENT/BASELINE

The study area is flat and without any rocky foci or outcrops that may have attracted pre-colonial settlement. It is covered with low, knee-high vegetation. The area is undeveloped and generally undisturbed with a number of informal roads criss-crossing the dunes. Calcrete is visible on the surface in areas. The local built environment is mostly modern, with the majority of buildings close to the study area being industrial in nature.

Plate 1: The pipeline comes ashore in an area which has already been extensively transformed.

Plate 2: The vegetation along the first 900m of the pipeline, from the entry point at Saldanha Bay, is extremely dense and visibility is difficult.

Plate 3: Visibility is good in the area of the proposed power plant (Site B) as it is used for livestock grazing. Note that the calcrete is close to the surface, and is exposed in places.

Plate 4: View towards Site A in the foreground, at the AcelorMittal Steel Works in the background.

6.1 Archaeological Background

There have been numerous field assessments of the Saldanha Bay area during the course of the last 20 years (Figure 5). Kaplan (1996) recorded a scatter of MSA and LSA stone artefacts during his survey for the proposed Saldanha Steel facility. Orton (2011) noted, during his survey for the Isivunguvungu Wind Farm to the south of the ArcelorMittal steel plant, that no significant archaeological remains were recovered. In 2011, Orton conducted a detailed survey of the farms Uyekraal 189/1 and Langeberg 187/4 which lie to the north of the study area and which share similar physical characteristics. Despite an extensive survey, no archaeological material of any kind was located on the surface. Orton (2013) undertook a further survey for a possible pipe line for the Mass Oil and Gas Services (MOGS) and reported finding a single calcrete flake of unknown origin. Both Kaplan (1996) and Orton (2011 & 2012) considered the archaeological significance of the area to be very low.

Hart (2015a) concludes: "All studies to date that have taken place on the flatlands/coastal plain to the north of Saldanha Bay have reported a lack of archaeological sites but high palaeontological sensitivity". In another report for the Saldanha Bay area, Hart (2015b) concludes: *"The study area is one of the best studied yet least significant tracts of landscape in the Western Cape in archaeological terms. It must however, be pointed out that the area of low sensitivity is a very specific area of the West Coast adjacent to a low energy beach where marine resources were few – namely the northern shore of Saldanha Bay".*

Figure 5: The red polygons on this map indicate the areas where archaeological surveys have previously been conducted for contract projects. Our knowledge of the archaeology of this general area is therefore reasonably comprehensive.

Early and Middle Stone Age

MSA shell midden remains have been identified along this stretch of the West Coast, most notably the late Middle Pleistocene site of Hoedjiespunt 1 (Berger & Parkington 1995; Stynder *et al.* 2001) further to the north and west of the study area, while Dietl et al (2005) have reported finding MSA

artefacts between the Geelbek Dunes, further to the south and east of the study area. In general, ESA and MSA material is sparsely distributed in the Saldanha Bay area.

Later Stone Age

LSA archaeological sites are more common than ESA or MSA sites in the vicinity of the study area and are generally located in association with specific landscape features such as deflation hollows between the sand dunes or rocky (granite) outcrops which provided shelter to hunter-gatherer or pastoralist groups. The latter is particularly evident at Kasteelberg 10 km northwest of Vredenburg and other smaller granite hills on the Vredenburg Peninsula (Sadr *et al.* 2003; Smith 2006; Smith *et al.* 1991). Other surveys just west (Hart & Pether 2008) and east (Orton 2011) of the study area yielded no surface archaeological material, while a survey at the northern end of Saldanha Bay located just two ephemeral LSA sites (Hart 2003). These areas mostly abut sandy shores, but further south in the vicinity of Club Mykonos there are many shell middens associated with the rocky shores. A number of these sites have been excavated revealing the typical cultural finds, such as stone tools, ostrich eggshell beads and shell scrapers associated with coastal shell middens (Hart 2001; Hart and Gribble 1998; Hart & Jerardino 1998).

Another landscape feature that attracted prehistoric settlement is sand dunes. Some 20 km south of the study area, Conard and Kandel (2006; Conard *et al.* 1999; Kandel & Conard 2005) have described numerous occurrences LSA material located in deflating areas between the dunes at Geelbek in the West Coast National Park.

Occasionally, the pattern of archaeological sites associated with landscape features does not hold true. A significant open shell midden was recently uncovered, accidentally, in the town of Saldanha Bay, some 600m from the coast and in a flat, open area (Orton 2009). While the site was destroyed during construction activities, the tiny amount of material recovered showed that occupation spanning the last 6000 years had occurred. Multiple burials were also present (Dewar 2010) but these were all clustered within a few centuries of 2000 years ago.

6.2 Colonial Period

Since its discovery, Saldanha Bay (named by the Dutch after Antonio de Saldanha who visited the Cape in the early 1500's), was used as a safe anchorage by virtually every sea going nation who had trading interests in the east. The bay shores were not permanently settled in any meaningful way until quite late in the history of the Cape. The Dutch East India Company *(Vereenigde Oostindische Compagnie or VOC)* chose Table Bay as a preferred location to establish a permanent re-victualing station rather than Saldanha Bay, because Table Bay had permanent water, arable land, and supplies of wood and was generally well suited to land based settlement. Being anxious to maintain a presence at Saldanha Bay, the VOC established a small garrison on the Postberg Peninsula in 1666. The bay remained in Dutch hands until the first British occupation of 1795. Archaeological sites relating to the colonial period are generally rare with the most significant one from this region being Oudepost, the Dutch East India Company outpost on the Churchaven Peninsula (Schrire et al. 1990). The lack of water at Saldanha impeded its development until a permanent water supply was constructed by the military engineers at the beginning of World War 2.

Development of the area was restricted to sparse farms and fishing which was centered at the small hamlet of Hoedjiesbaai. In the early 20th century whale fisheries were established at Donkergat and Salamander Bay which saw increased growth of the hamlet with the installation of jetties and coaling facilities. By the late 1930's the whaling industry had collapsed. In 1942 Saldanha Bay became a defended anchorage with boom defenses, a mine field and batteries on each side of the entrance to the bay. The bay itself was extensively used by convoys and warships alike. A permanent naval base was established and the area's water problems were at last resolved when military engineers established a water supply which was piped from the Berg

River. The strategic importance of Saldanha Bay continues to grow with its status as the Cape's only deep sea Port.

6.3 Cemeteries and Graves

Later Stone Age burials can occur almost anywhere, but particularly in sandy substrate. People would likely have been buried at or very close to where they died and numerous burials have been reported from the Saldanha coast and adjacent hinterland (Morris 1992). The table below is derived from data supplied in Morris (1992) and shows the general location of human remains and approximate radiocarbon dates. It highlights the very real possibility of uncovering human remains during construction along the Saldanha Bay coastline. It is important to emphasise that burials recovered after 1992, such as those at Diaz Street, Saldanha (Dewar 2010) are not included in this table.

Table 3: Later Stone Age burials recovered from Saldanha Bay (after Morris 1992)

Catalogue Number	Description	Radiocarbon Dating (BP is Before Present)
SAM6063	Military area, Saldanha Bay - found on a kopje during excavations for water pipes	1170±30BP
SAM4791	Noordbaai, Saldanha – in shallow grave in eroded midden	None
SAM4792	Noordbaai, Saldanha – on surface midden	None
SAM4793	Noordbaai, Saldanha – in shallow grave in eroded midden	4110±60BP
SAM4794	Noordbaai, Saldanha – on midden	None
SAM4899	Saldanha	2440±60BP
SAM4900	Saldanha – from dune on shore from foundations of a house, Camp St	140±50BP
SAM5095	Saldanha – from midden on dune, 100ft from sea, 0.4miles from Hoedjies Bay Hotel	2660±70BP
SAM6074	Saldanha – found in sand dunes above high water mark	1360±40BP
SAM6075	Saldanha – found in sand dunes above high water mark	1330±40BP
SAM6078	Saldanha	None
SAM6147	Saldanha	None
NMB1347	Saldanha	None
NMB1348	Saldanha	None
SAM4666	Saldanha	None
UCT60	Saldanha – grave 2.5 feet deep in soft sand of hill	950±50BP
UCT264	Saldanha – found during construction of railway jetty	None
UCT138	Saldanha – from midden deposit about 50 feet from sea	None
SAM6020	Saldanha - Tikosklip	620±30BP

7. FINDINGS

Based on observations, most of the area surveyed has been extensively disturbed by agricultural practices which include ploughing and old agricultural lands. This is supported by the many large heaps of calcrete blocks. Despite a fairly comprehensive field survey (Figure 6) along the pipeline, and in the area identified for the power plant (Sites A and B), no pre-colonial or colonial period archaeological sites were found. The archaeological findings discussed below constitute isolated finds and their co-ordinates are provided in Table 2.

7.1 Pre-Colonial Archaeological Sites

Scatters of shell, overwhelmingly dominated by white mussels (various species) and land snails (*Trigonephrus globulus*), were recorded along the coastal dune at the commencement of the pipeline. This dominance suggests that the scatters were mostly made through natural processes: (1) natural mortality of the snails and their subsequent exposure through deflation and (2) collection of the mussels by gulls. Gulls are well known to collect mussels and drop them on to hard surfaces to break them open, after which they eat the shellfish. These finds are thus technically palaeontological and they will be discussed at greater length in the Palaeontological

report. However, among these shells were a few items that hint at a human addition to the assemblages. These include a few limpets (*C. granatina* and *S. argenvillei*), some *Turbo sarmaticus* operculae, some ostrich eggshell fragments and some animal bones (including bird bone). The anthropogenic component at these sites is very ephemeral, as Orton (2012) observed a few kilometres to the south-east, during his survey for the West Coast Desalination plant.

Figure 6: Map of the archaeological survey tracks (in red).

Plate 5: Scatter of shell in the sand dunes along the commencement of the pipeline.

Plate 6: Two fragments of flaked silcrete and a single fragment of ostrich eggshell was found along the route of the pipeline. They are of vary low significance.

The only other archaeological remains recovered, was one chunk of quartz, and a single chunk of quartzite.

7.2 Graves

No evidence of graves or stone cairns was found.

8. IMPACT ASSESSMENT

Specialists are requested to assess the impacts at all phases of the project life: construction, operation and decommissioning. In practice, the vast majority of impacts to heritage resources occur during the construction phase.

8.1 Impacts to Pre-colonial & Colonial Archaeology

Since archaeological sites are non-renewable, it is important that they are identified and their significance assessed prior to development. The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The significance of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project.

The biggest threat to pre-colonial archaeological remains is potential impacts to sub-surface remains and these are difficult to predict and to mitigate.

Table 4: Potential impact to buried Archaeology (pre-colonial and colonial)

Nature: Disturbance and destruction of pre-colonial and colonial period archaeological material by construction of the pipeline and power plant		
	Without Mitigation	**With Mitigation**
Type	Direct	Direct
Extent	Local	Local
Duration	Permanent (Irreversible)	Permanent
Scale	Small	Small

Frequency		
Likelihood	Unlikely	Unlikely
Impact Magnitude	Low Impact Magnitude	Low Impact Magnitude
Receptor Sensitivity	Low	Low
Impact Significance	Low	Low
Status (positive or negative)	Minor	Negligible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Impacts are expected to be low. It is recommended that: • If any archaeological material is uncovered during construction, that work must stop in that area and Heritage Western Cape must be notified (Telephone: 021 483 9685).		
Cumulative impacts: The cumulative impact will remain low, with the probability of finding archaeological remains low, the significance of the remains remaining very low, and the impacts negligible.		
Residual impacts: N/A		

Archaeological material was not observed on the study site and impacts are thus expected of very low significance. A small chance exists of finding buried archaeological material but this is expected to be very low, and monitoring is not required.

8.2 Impacts to Graves and Cairns

Graves enjoy high heritage significance. Human remains are protected by a plethora of legislation including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). In the event of human bones being found on site, Heritage Western Cape must be informed immediately and the remains removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.

Table 5: Potential impact to Graves and Cairns

Nature: Disturbance and destruction of pre-colonial and colonial human remains by construction of the pipeline and power plant		
	Without Mitigation	**With Mitigation**
Type	Direct	Direct
Extent	Local	Local
Duration	Permanent (Irreversible)	Permanent
Scale	Medium	Low
Frequency		
Likelihood	Unlikely	Unlikely
Impact Magnitude	Low Impact Magnitude	Low Impact Magnitude
Receptor Sensitivity	High	Low
Impact Significance	Low	Low
Status (positive or negative)	Minor	Negligible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Impacts are expected to be low. It is recommended that: • If any human remains area uncovered during construction, that work must stop immediately in that area and Heritage Western Cape must be notified (Telephone: 021 483 9685).		
Cumulative impacts: Although human remains enjoy a high degree of significance, the probability of uncovering them along the route of the pipeline and the proposed gas fired power plant is low and the cumulative impact is therefore also very low.		
Residual impacts: N/A		

Graves are best avoided by development. An extensive consultation process is required if exhumation is considered.

9. MITIGATION

The study has not identified any likelihood of impacts to archaeology, and further monitoring of the construction activities is not required.

However, if any archaeological or human remains are uncovered during development, work should stop in that area and Heritage Western Cape must be notified. They will either send out a staff member to investigate, or else contact an archaeologist to undertake a field assessment. If significant finds are uncovered, then mitigation may be required under a Workplan issued by Heritage Western Cape. Mitigation may include the excavation of the material. Alternatively, if a highly significant site (Grade 1) is uncovered, HWC may recommend the conservation of the site.

10. CUMULATIVE IMPACTS

The study area is one of the best studied yet least significant tracts of landscape in the Western Cape in archaeological terms.

Previous archaeological impact assessments undertaken in the surrounding area were consulted and the following conclusions were made:

- Hart & Pether (2008) rate impacts of the Salkor Yard Expansion, the railway line and powerlines as the scale is low, confidence is high, that the significance (with or without mitigation) is “Not Significant”;
- Halkett (2011) with respect the AFRISAM cement project do not provide any impact ratings but did not expect any significant impacts;
- Orton (2011) with respect the proposed Isivunguvungu Wind Farm described the probability of finding archaeological sites as “improbable”, the significance as “very low” and commented that “No assessments in the immediate vicinity has yielded significant archaeology and none is present on this site. Cumulative Impacts are thus insignificant”;
- Orton (2011) with respect the proposed pipe yard in the Iron Ore terminal noted that no significant archaeological resources were expected on the development site (improbable), and the significance was expected to be very low.
- Kruger (2013) with respect the Saldanha Separation Plant rated the archaeological remains as having low significance, that impacts would be negligible.

All archaeologists who have conducted research in this specific area of the Saldanha IDZ, have expressed a high degree of confidence that the likelihood of finding significant remains was extremely low, and the cumulative impacts have therefore been assessed as “insignificant”.

From a cumulative impact perspective, no mitigation is required, with the exception of the standard protocol to consider the possibility of buried archaeology and/or human remains.

The proposed development may therefore proceed.

11. EMP

The following recommendations should be included in the EMP:

- If any archaeological material is uncovered during construction, that work must stop in that area and Heritage Western Cape must be notified (Telephone: 021 483 9685);
- If any human remains area uncovered during construction, that work must stop immediately in that area and Heritage Western Cape must be notified (Telephone: 021 483 9685).

12. RECOMMENDATIONS

Indications are that in terms of archaeological heritage the proposed activity is viable; impacts are expected to be very limited and controllable.

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Table 2: Archaeological sites

*NCW - a resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate (Guide to Grading for Local Authorities: Version 9 – March 2016).

OES = Ostrich eggshell fragments.

SITE	LAT S DEC DEG	LON E DEC DEG	DESCRIPTION	SIGNIFI-CANCE
-001	33 0.315	18 0.652	Very large spread white mussel shell and snail shell next to a high sand dune, along the start of the pipeline. There is some fresh bone (including bird bone). Gull drops along the dune or related to the mid-Holocene?	Palaeonto-logical
-002	33° 0.175	18° 0.805	Calcrete outcrop on jeep track	Not archaeo-logical
-003	33° 0.135	18° 0.865'	White mussel in the jeep track – *Lutraria* sp?	Palaeonto-logical
L001	33° 0.143	18° 0.864	On a little ridge near the road, two silcrete flakes and a fragment of OES	NCW
L002	33° 0.135	18° 0.864	Single quartz chunk	NCW
L003	33° 0.117	18° 0.906	Pipeline cover, along the pipeline route	Not archaeo-logical
L004	33° 0.176	18° 1.611	Heap of stone from old fields	Not archaeo-logical
L005	32° 59.835	18° 2.089	Road rubble dumped on the pipeline route	Not archaeo-logical
L006	32° 59.595	18° 2.173	Several small pans lined with calcrete	Not archaeo-logical
L007	32° 59.314	18° 2.662	Large, dark grey quartzite chunk	NCW

ANNEXURE A

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Erfenis
Heritage

Our Ref:	HM/WEST COAST/SALDANHA BAY/FARM YZERVARKENSRUG 129 & PORTION 2 OF FARM JACKELSKLOOF 195
Case No.:	16041107AS0425E
Enquiries:	Andrew September
E-mail:	andrew.september@westerncape.gov.za
Tel:	021 483 9543
Date:	06 May 2016

Stuart Heather-Clark
2nd Floor Great Westerford
240 Main Road
Rondebosch
7700
Stuart.heather-clark@erm.com

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: HIA REQUIRED
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED ARCELORMITTAL GAS TURBINES AND ASSOCIATED ELECTRICAL INFRASTRUCTURE ON REMAINDER EXTENT ON FARM YZERVARKENSRUG 129 AND PORTION 2 OF FARM JACKELSKLOOF 195, SALDANHA BAY, WEST COAST, SUBMITTED IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 16041107AS0425E
DEADP Reference: N/A
The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received on 25 April 2016. This matter was discussed at the Heritage Officers meeting held on 29 April 2016.

You are hereby notified that, since there is reason to believe that the proposed gas turbines and associated electrical infrastructure will impact on heritage resources, HWC requires that a Heritage Impact Assessment (HIA) that satisfies the provisions of section 38(3) of the NHRA be submitted. This HIA must have specific reference to the following:

- Impacts to archaeological heritage resources
- Impacts to palaeontological heritage resources

The required HIA must have an integrated set of recommendations.

The comments of relevant registered conservation bodies and the relevant Municipality must be requested and included in the HIA where provided. Proof of these requests must be supplied.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

Yours faithfully

Mr Mxolisi Dlamuka
Chief Executive Officer, Heritage Western Cape

SALDANHA BAAI BAY
MUNISIPALITEIT | MUNICIPALITY | uMASIPALA

REF NO:
Pl 129 rem; Pl195/2
ENQUIRIES:
N Duarte; E Mmbadi
Ms Mr

Tougheeda Aspeling

REGISTERED MAIL

ERM Southern Africa (Pty) Ltd
Postnet Suite 90
Private Bag X12
Tokai
7966

RE: DRAFT SCOPING REPORT FOR PROPOSED GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY, WESTERN CAPE PROVINCE.

1. The Proposed Gas-Fired Independent Power Plant to support Saldanha Steel and other Industries in Saldanha Bay: Draft Scoping Report dated 04 March 2016 refers.

2. The negative cumulative impact on the Critical Biodiversity Area within the Saldanha Bay area due to development of industries and associated infrastructures is Saldanha Bay Municipality's priority concern. A detailed botanical study is required for further comments.

3. Storm water management and waste water discharge are of serious concern and should be discussed in detail.

4. Please inform the Environment & Heritage Section of the Saldanha Bay Municipality on any Paleontological and Archaeological findings for our records.

pp: MUNICIPAL MANAGER
Date: 05-04-16
/em

T: (022) 701 7000 • F: (022) 715 1518
mun@sbm.gov.za • www.sbm.gov.za
Private Bag X12 • Vredenburg • 7380

Serve, Grow and Succeed Together

WESKUS DISTRIKSMUNISIPALITEIT
WEST COAST DISTRICT MUNICIPALITY

Rig alle korrespondensie aan:
Address all correspondence to:

MUNISIPALE BESTUURDER/
MUNICIPAL MANAGER

Navrae/Enquiries : Doretha Kotze
Verw.Nr./Ref. No.: 13/2/12/3/1

Posbus / P O Box 242
MOORREESBURG, 7310

Telefoon/Phone (022) 433 8400
Faks/Fax Nr. 086 6926 113

E-Mail Adres/Address :
westcoastdm@wcdm.co.za

1 April 2016

ATTENTION: TOUGHEEDA ASPELING

Environmental Resources Management
Postnet Suite 90
Private Bag X12
TOKAI
7966

Madam

DRAFT SCOPING REPORT: PROPOSED GAS-FIRED POWER PLANT FOR SALDANHA STEEL AND OTHER INDUSTRIES, SALDANHA BAY

1. Your letter of 4 March 2016 and the Draft Scoping Report for the project have reference.

2. The West Coast District Municipality takes note of the information contained in the Draft Scoping Report for the proposal. However, it is recommended that more information be provided on the following:

   2.1 Cumulative impact on water resources taking into account all existing and proposed industrial developments at the Saldanha Port.

   2.2 Disaster Risk Management.

Yours faithfully

MUNICIPAL MANAGER
/dk

LITA WEBLEY – ABBREVIATED CURRICULUM VITAE (2016)

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ACADEMIC QUALIFICATIONS:

- Matriculated: 1974, Kloof High School, Kwa-Zulu Natal, South Africa
- BA (Hons) Archaeology, 1978, University of Stellenbosch
- MA (cum laude) Archaeology, 1984, University of Stellenbosch
- PhD Archaeology, 1992, University of Cape Town

PROFESSIONAL CAREER:

- 1979-1980: Junior lecturer, Semitic Languages, University of South Africa
- 1981: Junior Lecturer, Archaeology, University of Stellenbosch
- 1982-1983: Research Assistant, Anthropology, University of Stellenbosch
- 1984: Temporary Lecturer, Archaeology, University of Fort Hare
- 1985-1986: Teaching Assistant, Archaeology, University of Cape Town
- 1988-1990: Archaeologist, Natal Museum Services, Pietermaritzberg
- 1990-1997: Archaeologist, Albany Museum, Grahamstown
- 1997-1998: Assistant Director, Albany Museum, Grahamstown
- 1999-2005: Acting Head (Acting Deputy Director), Albany Museum, Grahamstown.
- 2005-2008: Director: Albany Museum
- 2008-to present: Principle Investigator, ACO Associates cc

FIELDS OF SPECIALITY AND COMPETENCE:

- Heritage and Archaeological Impact Assessments in Western Cape, Eastern Cape and Northern Cape;
- Accredited as Principal Investigator for Stone Age Archaeology, Shell Midden Archaeology, Colonial Period Archaeology, and as Field Director for Grave Relocations
- Ethno-archaeology (anthropology) and oral history in Northern and Eastern Cape
- Specialised in Archaeology of Northern Cape
- Presentation of Heritage Workshops to communities and government officials
- Excavations at over 50 archaeological sites
- Design and implementation of museum displays

CONSULTANCY WORK

- Completion of over 250 Heritage/Archaeological Impact Assessments since 1996;
- Heritage surveys/cultural mapping in: Richtersveld National Park, Addo National Park and Namaqua National Park;
- Heritage Surveys in Great Fish Nature Reserve, Fort Fordyce Nature Reserve, Karoo Nature and Mkambati Nature Reserve in the Eastern Cape Province.

PUBLICATIONS:

- Five chapters in books
- Total of 20 articles in refereed journals
- At least 20 popular articles
- Numerous conference presentations in South Africa and abroad (United States and Europe)

COURSES COMPLETED:

- GIS Course at Rhodes University in 2004
- Architectural and Urban Conservation Course (Skills Development) presented by Dr S Townsend in the Faculty of Engineering and the Built Environment, University of Cape Town, 2008.

PROFESSIONAL STATUS:

- Association of Southern African Professional Archaeologists
- Accredited Principle Investigator for CRM (Stone Age, Coastal Shell Middens and Colonial Archaeology) and Field Director (Burials and Exhumations)

HERITAGE COMMITTEES:

- 1994: Heritage sub-committee responsible for drafting new heritage legislation for the Eastern Cape
- 1997-2001: Member of the transitional Eastern Cape Regional Committee of the National Monuments Council.
- 2003-2008: Executive member of Makana Heritage Forum (Makana Municipality) Grahamstown
- 2013 – to present: Member of permits committee (APM) of Heritage Western Cape
- 2013 – to present: Member of the Council of Heritage Western Cape
- 2013-2014: Member of the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) permit committee
- 2015 – to present: Member of the IACom committee of Heritage Western Cape

SKILLS BASE AND CORE COMPETENCIES

Managerial skills
Excavation skills (excavated over 50 archaeological sites)
Publication/report writing skills (published 25 peer-reviewed articles and chapters in books)
Editorial skills (served on 3 editorial boards)
Museum Display skills (involved in 8 Museum exhibitions)
Heritage management skills (served on various heritage bodies in Eastern & Western Cape)
Heritage training skills (presented 8 heritage training workshops to local communities and government officials in the Eastern Cape)

APPENDIX 1

Palaeontological Assessment: Proposed Gas-Fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape (1:50000 3218CA & CC Velddrif; 3317BB &3318AA Saldanha)

Prepared by

Graham Avery
(Sole Proprietor)

Archaeozoology, Stone Age Archaeology and Quaternary Palaeontology

July 2016

Contents

Executive Summary

Graham Avery was commissioned by ACO Associates cc on behalf of their client to provide an assessment report on the palaeontological implications of the Proposed Gas-Fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape. The palaeontological assessment relates to the proposed servitude for the pipelines from Saldanha Bay shore to the proposed location of the power plant further inland.

Proposed activity: Provision of independent gas-fired power in the Saldanha Bay area.

Location: It is located in a palaeontologically-sensitive region of potentially fossiliferous sediments underlain by bedrock of Cape granite Suite rock, which outcrops in places but is not palaeontologically relevant here. The route traverses remnants of Plio-Pleistocene Langebaan Formation calcretes, and Velddrif Formation, each of which has palaeontological potential; agricultural activity has modified most of the proposed servitude. During excavations for the pipeline, fossil finds may be encountered in these Formations. Any finds would be significant and would require careful recording and possible systematic excavation. Given the proposed depth at which the pipe line will be laid, it is unlikely to affect much earlier Varswater Formation deposits.

Dependent on the depth of foundations, excavations for the Power Plant and ancillary facilities may encounter older sediments like the Varswater Formation.

Palaeontological remains are rare, protected by the South African National Heritage Resources Act of 1999, and if encountered, must be recorded by an appropriately qualified person.

Given proposed excavation depths, impacts of the pipeline are likely to be low and in the Langebaan Formation due to predicted sparsity of fossils, but manageable. Should Velddrif Formation shell deposits be encountered at the coast, impact would be moderate, but manageable. Appropriate management would reduce impacts to very low.

Given the sparseness of fossil occurrence in the Langebaan Formation and our lack of knowledge, palaeontological finds would have significant importance and impact at the power plant site would be high in the Langebaan Formation and, possibly in earlier formations if encountered, , but appropriate management would reduce impact to very low.

With respect cumulative impacts, provided that palaeontologists can use the opportunity arising from major construction works to adequately sample and record profiles and exposed material as part of the environmental management process, a potential negative impact can be transformed into a positive opportunity to increase the levels of knowledge about a locality and its past environments.

In summary, provided palaeontologists are given the opportunity to recover potentially-important ‘fossil’ material in sediments that are not normally accessible, potentially negative impacts can be seen as positive.

Proposed Gas-Fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape

Declaration

by the independent person who compiled a specialist report or undertook a specialist process I Graham Avery, as an appointed independent specialist hereby declare that I:

1. acted as an independent specialist in this application;
2. regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
3. do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
4. have and will not have no vested interest in the proposed activity proceeding;
5. have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
6. am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
7. have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
8. am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Signature of the specialist:

Graham Avery (Sole Proprietor) Archaeozoology, Stone Age Archaeology and Quaternary Palaeontology

Name of company:

18th July 2016

Date:

Introduction

A gas-Fired Power Plant to Support ArceloMittal Saldanha Steelworks and other Industries in Saldanha Bay is planned to ensure stable, economical electricity over the long term. The power plant will be adjacent to the AcelorMittal Saldanha Steelworks. The project will supply the power needs of ArcelorMittal Saldanha Steel and excess electricity will be made available to industries in the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape.

Pipeline

CNG and LNG will be supplied by ship to the Port of Saldanha where it will be offloaded by a submersible pipeline either from a mooring area located offshore or a berthing location in the Port of Saldanha.

The gas pipeline and servitude will run from the pipeline entry point connecting to the power plant boundary. There is proposed to be a gas and sea-water forwarding station at the start of the land-based pipeline system. There will also be a gas and sea-water receiving station at the Power plant.

Both Natural Gas and sea water/fresh water will be transferred down the pipeline. There will be a dual, parallel gas pipeline for security of gas supply. A seawater pipeline will provide the power plant with sea water for desalination. Fresh water hydrants will be placed above ground near to the pipeline marker beacons as a rapid response measure in the event of a gas-leakage fire.

The pipeline will be installed underground and this implies the opening of a working strip along the right of way of the pipeline. The pipeline(s) will be buried to a depth of 3 to 4m and cover a servitude width of approximately 6m to 20m, possibly 30 m to 36m elsewhere during construction (depending on safety and construction concerns), and approximately 3900m to 4600m in length.

Power Lines

A feeder line of 132kV (sized for a capacity of 400MW) will take the power from the power plant to the AcelorMittal Steel Works.

Ancillary infrastructure will include:

- Access road to site;
- 132kV and 400kV switchyard;
- Control and electrical building;
- Central control room, warehouse and administrative buildings;
- Firefighting systems;
- Fuel/gas/diesel storage facilities;
- Emergency backup generators;

- Chemical storage facilities.

Excavations for foundations will be required.

Power Plant Location Alternatives

ArcelorMittal considered two alternative sites for the development of the gas-fired power plant based on proximity to the existing ArcelorMittal Steel Works site. Site A is adjacent to the steel works, while Site B, the preferred alternative, is across the road from the steel works adjacent to the existing Blue Water Sub-station (Figure 1).

Figure 1. Location of Alternatives A (yellow) and B (red). Black arrow indicates start of onshore pipeline servitude.

Method

Graham Avery was commissioned by Lita Webley (ACO Associates) on behalf of their client to assess the palaeontological and Pleistocene archaeological potential of the proposed pipeline and Power Plant. A background study of the palaeontological potential of the study area was conducted by Dr G. Avery Archaeozoologist. The 1:125000 Map Sheet 255: 3217D &

3218C (St Helenabaai), 3317B &3318A (Saldanhabaai) and other geological sources were consulted. Existing Palaeontological Impact Assessments have been drawn on for useful descriptions of the stratigraphic and lithological framework of sediments in the Saldanha area (Roberts and Smith 2008, Pether 2013b, Pether 2014, Pether 2010a).

In addition, to GA's own experience, literature describing known palaeontological and Pleistocene archaeological sites was consulted to illustrate the potential of superficial and sub-surface sediments through their geological contexts and observations. The servitude for the proposed pipe line and alternative Power Plant locations A and B were traversed on foot on 22nd June 2016 (with ACO staff members, D. Halkett, L. Webley and J. Robinson). Visibility was good, since while the area is vegetated, it is mostly sparse and did not overly obscure the sandy surface.

Checklist

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	Cross-reference in this report
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page Appendix A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 4 Declaration
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Pages 5-6 Introduction
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 6 Method
(e) a description of the methodology adopted in preparing the report or carrying out the specialized process;	Page 6 Method
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Pages 9 Baseline
(g) an identification of any areas to be avoided, including buffers;	None
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 7
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Page 20 Known Sites and Potential
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Page 24
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(p) any other information requested by the competent authority.	This document and declaration completed
Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 3 - Environmental Impact Assessment Process	Cross-reference in this report
Describe any policies or legislation relevant to your field that the applicant will need to comply with.	Page 25 Heritage Permits Required
Comment on need/desirability of the proposal in terms of your field and in terms of the proposal's location.	Page 20 Known Sites and Potential
Determine the-- (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and (ii) degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources, and	Page 24 Impact Assessment; Page 26 Recommendations

(cc) can be avoided, managed or mitigated;	
Determine what the most ideal location within the site for the activity is in terms of your field.	Page 24 Impact Assessment
Identify suitable measures to avoid, manage or mitigate identified impacts.	Page 26 Recommendations
Identify residual risks that need to be managed and monitored.	
Include a concluding statement indicating a preferred alternative in terms of your field.	Page 26 Recommendations

Baseline

Geology and Stratigraphy

The Saldanha area is known to be palaeontologically sensitive. The geology of the area provides a fundamental control of the sedimentation and therefore potential occurrences of palaeontological and Pleistocene archaeological remains (Rogers 1980). Surface geology and lithology is described in Figure 2.

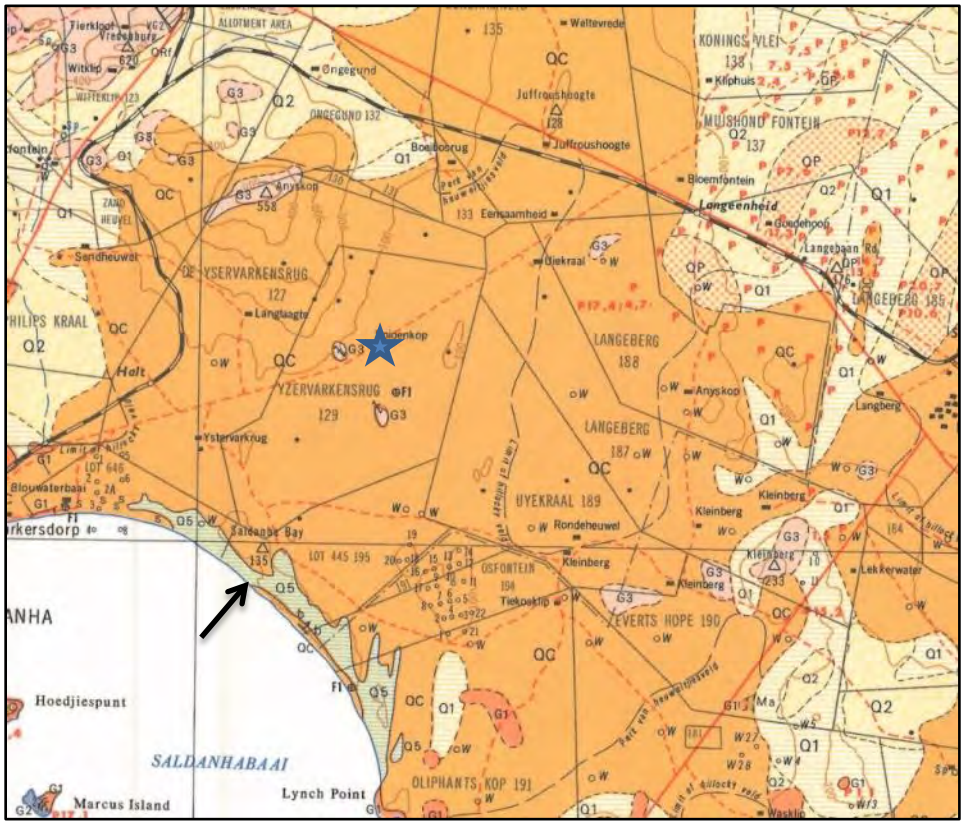

Figure 2. Surface geology of the study area (Visser and Schoch 1972). ArcelorMittal SA Saldanha Steelworks is starred and the start of the onshore pipeline is arrowed.

In the Saldanha region the Cenozoic sediments overlie basement rocks of the Cape Granite Suite (G1, G3), which outcrops in places. The Cenozoic sediments of the region, previously included in the Bredasdorp Group, are in what is now called the Sandveld Group (Table 1, Figures 2, 3 and 4) and include shallow marine, back barrier, estuarine, fluvial and terrestrial aeolian contexts dating from the Miocene, Pliocene, Pleistocene and Holocene, i.e. the past 20 Ma (Rogers 1980, Rogers 1982, Rogers 1983, Roberts et al. 2006, Roberts and Brink

2002, Roberts et al. 2011, Pether 2007, Pether, Roberts and Ward 2000, Pether 1995, Pether 2013a, Pether 2013b, Hendey 1981, Theron et al. 1992, Visser and Schoch 1973, Felix-Henningsen, Kandel and Conard 2003, Dale and McMillan 1999, Franceschini 2003, Flemming 1977).

Sediments of the Sandveld Group likely to be encountered are (Figure 2, Table 1) Witzand Formation (Qw = Recent (Holocene) and Langebaan Formation (QC, QI = Quaternary Langebaan Formation – limestone and calcrete, partially cross-bedded; calcified parabolic dune sand, including the seabed). Deposition of the Langebaan Formation, which overlies much of the region and can reach depths of >30 m, took place over a significant period, broken by significant sea level changes that affected aeolian transport and input (Table 1, Figure 3, 4, 5 and 6). Exposures of Springfontyn Formation (Qs, Q1, Q2 = Middle Pleistocene – light-grey to pale-red sandy soil) exist outside the affected area.

Table 1. Summary of the stratigraphy and lithology of the Sandveld Group. Modified from Pether (2013b), table 2, Pether (2014) Pether et al. (2000) and Roberts et al. (2006). The Langebaan and Velddrif Formations are the most likely sediments to yield palaeontological material in the context of this project, although considerably-deeper fossil-bearing formations also exist. In this context, preserved Pleistocene archaeological material is known from the Middle and Late Pleistocene, but is unlikely to be older than the Springfontyn Formation (Braun et al. 2013, Klein et al. 2007, Avery 2016 In Prep, Fuchs et al. 2008, Felix-Henningsen et al. 2003, Kandel and Conard 2012, Woodborne 2000) where it overlies the Langebaan Formation, as at Anyskop.

Formation	Age and Lithologies	Fossil Potential
Witzand	Holocene and recently active calcareous dune fields and cordons (~12 ka)	Rare sub-fossils of importance for historical faunal distribution. Mainly Later Stone Age archaeological sites.
Springfontyn	Pleistocene to Recent (Holocene) quartzose sand dunes, silts and peats (<~2 Ma)	Mineralized bones generally sparse, but can be prolific in some areas, e.g. Elandsfontein and part of Baard's Quarry. High significance
Langebaan	Late Quaternary aeolianites <~3 Ma	Mineralized bones moderately common. Local to high significance. Extends under sea. Local to high significance
Velddrif	Quaternary raised beaches and estuarine deposits <~1.2 Ma. Sea levels below ~15 m asl	Marine molluscs common and rare bones at or near the coast. High significance
Marine erosion surfaces below ~15 m asl.		
Old indet. sands		
Langebaan	Late Pliocene to mid- Quaternary aeolianites. <~3 Ma	Molluscs and sparse (can be patchy concentrations, e.g. Langebaanweg, bones of terrestrial and marine forms. Extends under sea. Local to high

		significance
Uyekraal -- Previously subsumed in the upper Varswater Fm	Mid-Pliocene marine deposits ~3 Ma. Sea-level max. ~35 m asl	Shell fossils common, local significance. Fossil bones very sparse, high significance
Marine erosion surface to ~35 m asl		
Old indet. sands		
Langebaan	Earlier Pliocene aeolianites <~3 Ma.	Fossil bones moderately common, local to high significance
Varswater – upper	Later early Pliocene regressive deposits of wider area. 5-4 Ma. Sea-level max. ~50-60 m asl	Fossil bone rare, high significance. Poorly known, fossil shells of high significance
Varswater – lower	Early Pliocene transgressive marine deposits in embayments (upper KGM?, LQSM and MPPM members	Fossil bone common locally, high significance. Shells very sparse, high significance
Marine erosion surface to ~ 60 m asl		
Very old indet sands		
Prospect Hill	Miocene aeolianite 12 to 9 Ma	Fossils very sparse – high significance
Saldanha	Mid-Miocene marine deposits (predicted presence), 17-14 Ma. Sea-level max. ~90 m asl. May Include the lower KGM?	Very few fossils recovered, high significance if found.
Marine erosion surface to ~100 m asl		
Langeenheid Clayey Sand -- Previously a member of the Lower Varswater Fm	Mid Miocene early-transgression estuarine deposits (prev. LCSM Member in lower Varswater Fm.). 18-17 Ma.	Plant microfossils – high significance
Elandsfontyn	Middle to late Miocene fluvial coarse, angular sands, muds and carbonaceous sediments. ~15 Ma to ~12 Ma	Microfossils, including pollens, and macro remains of plants, high significance

Ma = Million years ago; ka = Thousand years ago

<u>Note:</u> chronology for the base of the Lower Pleistocene Boundary has been formally re-defined to an earlier date of 2.58 Ma; the base of the Holocene has also been formalized at 11.8 ka (Gibbard et al. 2010).

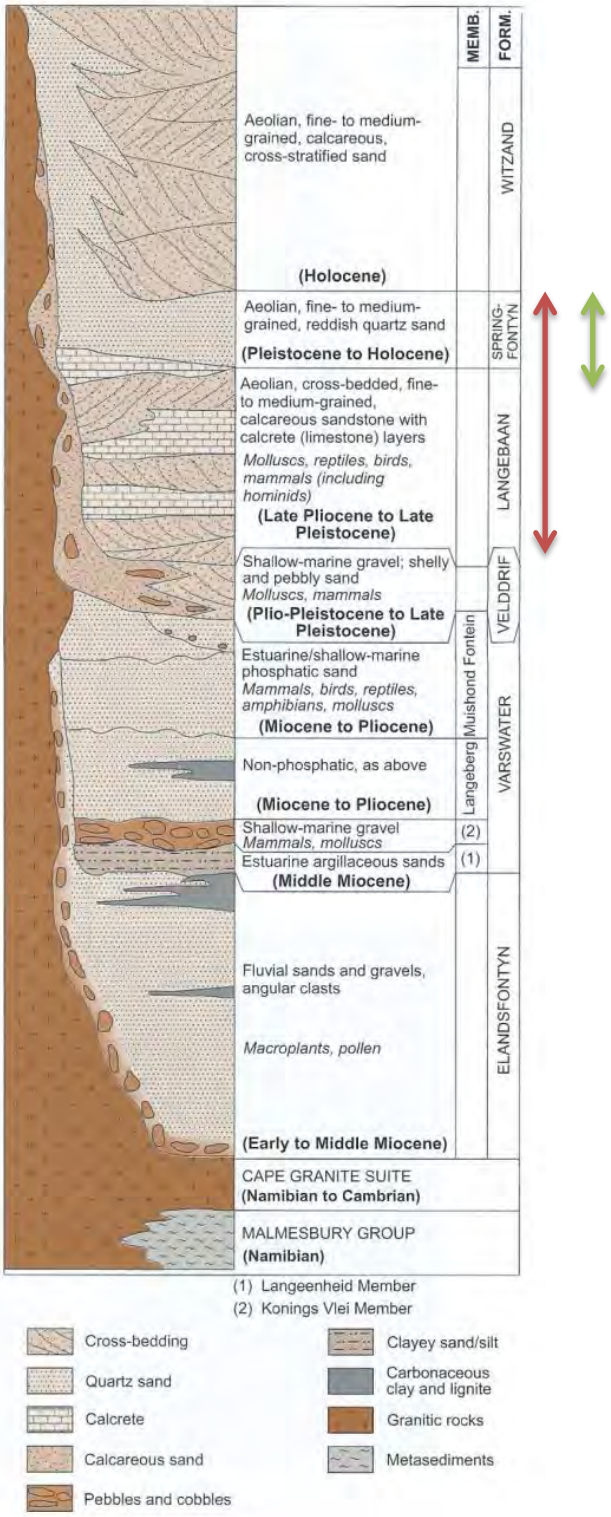

Figure 3. composite summary of Sandveld Group Lithostratigraphy in the Saldanha region (Roberts et al. 2006). Formations most likely to yield palaeontological (red) and/or Pleistocene archaeological (green) remains are arrowed.

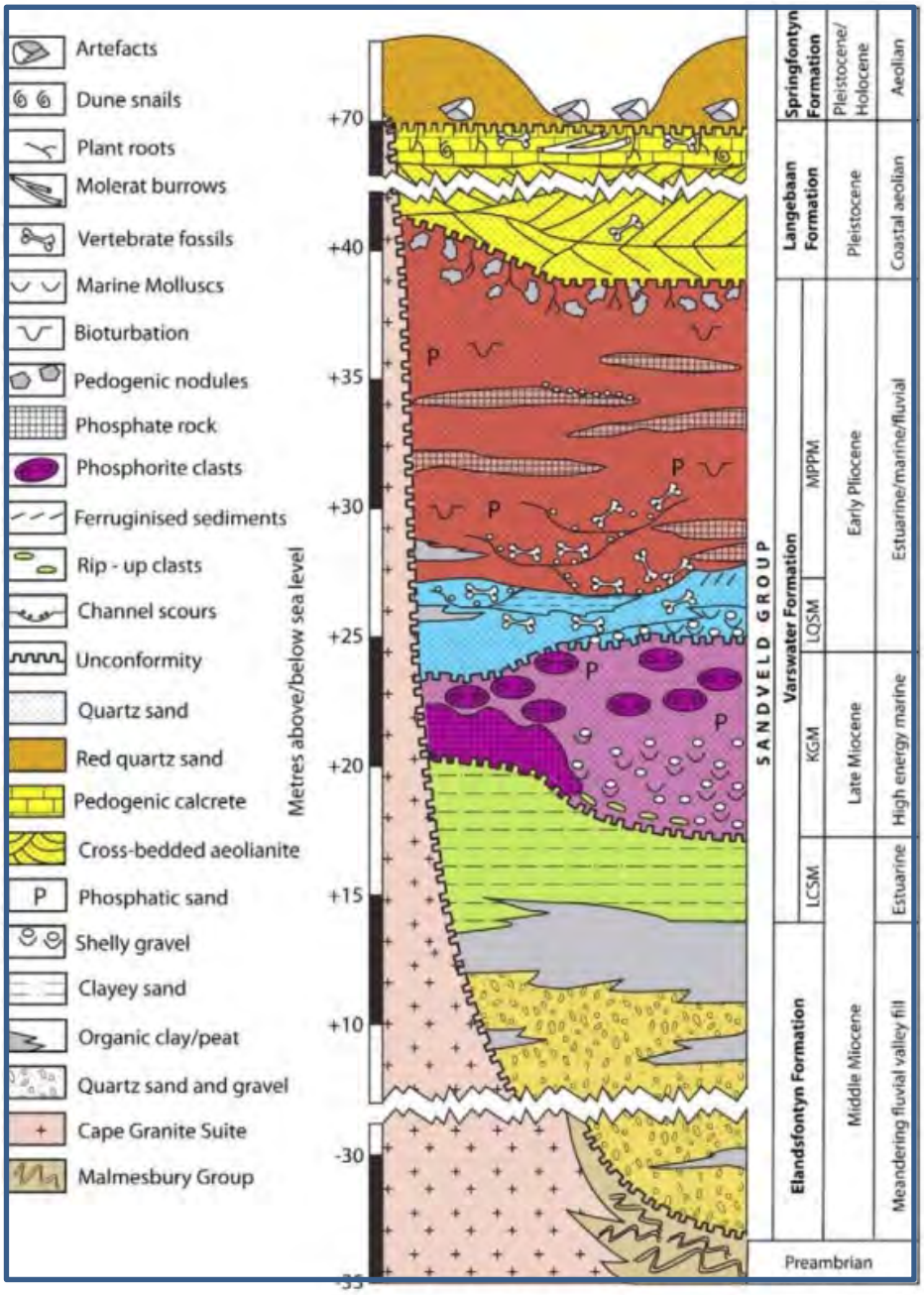

Figure 4. Lithostratigraphy and fossil-bearing formations at Langebaanweg are representative of that area (Roberts et al. 2011). Here the Langebaan Formation is ~35 m in depth.

Characteristically sandy sediment has been transported inland from the coast in a number of different-aged pulsing dune plumes (Figure 5).

Figure 5. Significant dune plumes, extending inland from the Saldanha coast (Witzand in dark purple, Langebaan Formation in light purple and Springfontyn Formation in light brown) provide the various covering sediments (Fig. 1, Roberts and Smith (2008)).

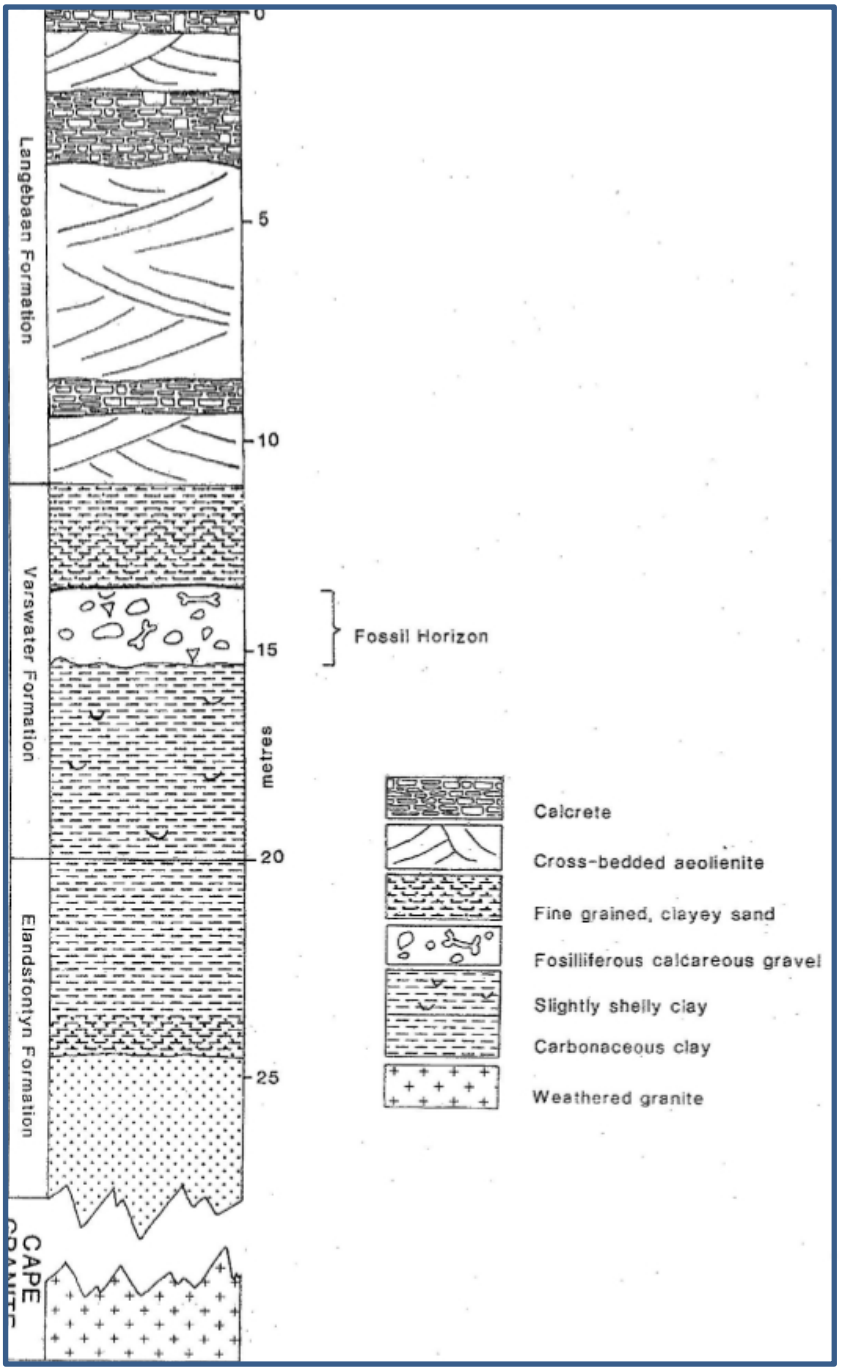

Figure 6. Stratigraphic profile recorded by Roberts (1997b) during construction of Saldanha Steel facility. Depth of Langebaan Formation here is ~12 m.

Results of Foot Survey and Desktop Study

Tracks of the foot survey coverage are shown in Figure 7.

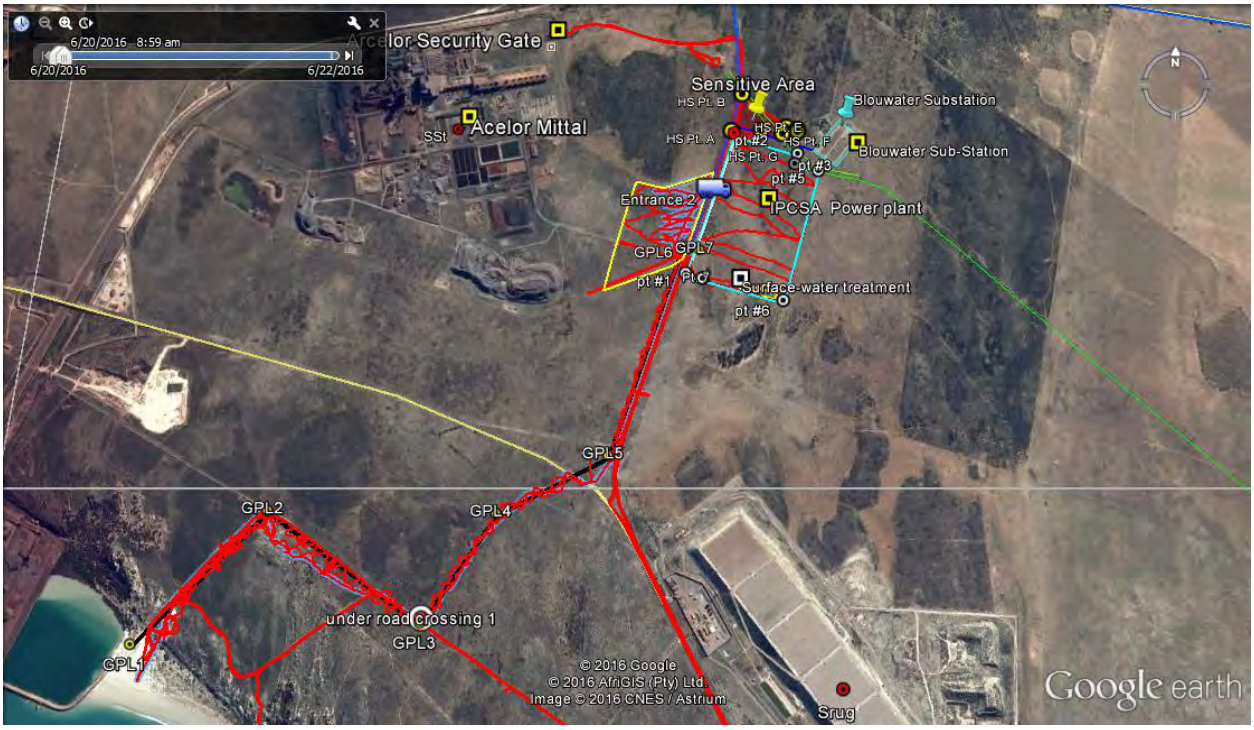

Figure 7. Combined tracks showing extent of coverage over the pipe line servitude and Alternative areas A and B. SSt=Saldanha Steel site; Srug=Skurwerug.

With the exception of sparse *Trigonephrus globulus* shells in the calcrete and rare trace fossils (root casts and insect burrows in calcrete lumps), no palaeontological or Pleistocene archaeological remains were observed on the surface.

Figure 8. Insect burrow (Top L); Disused field (bottom L); Root Casts (Top & Bottom R).

At the initiation point of the pipeline servitude, on the adjacent Witzand Formation dunes, is a deflated swale with a scatter of marine molluscs, primarily of *Donax serra*, *Mactra glabrata* and terrestrial *Trigonephrus globulus* (Figures 9 and 10); the shells are relatively recent and probably the result of gull-dropping.

Figure 9. Scatter of marine molluscs on deflated Witzand dune surface.

Figure 10. Scatter of recent terrestrial Trigonephrus on deflated Witzand dune surface.

The Witzand dunes gave way to a surface where calcrete of the Langebaan Formation outcropped (Figure 11).

Figure 11. Road cut through outcropping Langebaan Formation calcrete near start of pipeline servitude.

Past agricultural activity evidenced by piles of calcrete lumps typical of field clearance (Figure 12) was evident over much of the area traversed. Where Cape dune mole-rat *Bathyergus suillus* heaps were observed in old fields, pushed-up sand was clean of bone and stone.

Figure 12. Edge of disused field with pile of calcrete typical of removal during preparation of surfaces for agriculture.

Known Sites and Potential

Several important sites with fossils and/or Pleistocene archaeological material have been recorded in the Saldanha area (Table 2, Figure 13, 14). *Trigonephrus globulus*, root casts and insect burrows may occur anywhere in the Langebaan Formation. Their presence should be recorded, but since they tend to be ubiquitous, are not considered further in the assessment. Marine mollusc deposits of the Velddrif Formation occur near the coastline and reflect past sea level changes. They are important.

Table 2. Summary of palaeontological and Pleistocene archaeological sites noted. See Table 1 for lithological and chronological details regarding the formations within which fossils and/or stone artefacts occur.

Site	Formation	Selected References	Type of Occurrence	Acronym
Besaansklip	Langebaan	(Brink 2005); National Museum, Bloemfontein	Palaeontology. Hyaena den accumulation in Langebaan Formation.	Bklip
Danger Bay	Velddrif	(Pether 2014, Pether 2010a)	Palaeontological. Molluscs in raised beach deposits <15 m asl.	DangerB
Eensaamheid – Wind Farm proposal	Springfontyn Langebaan ?Varswater	(Avery and Avery 2009)	Palaeontology. Langebaan Formation included fossil gastropod *Trigonephrus globulus*. Potential, given depth of proposed foundations reportedly to >60 m.	Ens
Hoedjiespunt – hyaena	Langebaan	(Klein 1983, Berger and Parkington 1995, Churchill, Berger and Parkington 2000, Hare and Sealy 2013, Stynder et al. 2001, Stynder 1997, Woodborne 2000, Grine and Klein 1993); Iziko South African Museum Cenozoic Collections	Palaeontological. Brown hyaena den in eroded ridge of Langebaan Formation with terrestrial and marine taxa and modern *Homo sapiens* remains.	HDP1
Hoedjiespunt – Middle Stone Age DAMA site	Langebaan	(Woodborne 2000, Kyriacou et al. 2015, Stynder et al. 2001, Stynder 1997, Will et al. 2013); Iziko South African Museum Cenozoic Collections, UCT	Middle Stone Age artefacts associated with shell midden, which includes terrestrial and marine vertebrate taxa.	HDP1
Hoedjiespunt – Lime Quarry	Langebaan	(Cooke 1955, Hendey 1974)	Palaeontological. Marine fossils. First fossil otariid seal recorded in South Africa, (Cooke 1955), p166.	LQ
Hoedjiespunt – Sea Harvest – hyaena	Langebaan	(Grine and Klein 1993, Butzer 2004, Klein 1983); Iziko South African Museum Cenozoic Collections	Palaeontological. Brown hyaena den with terrestrial and marine taxa and modern *Homo sapiens* remains. In crevices eroded into the Langebaan Formation. Rhizoliths (root castes) and *Trigonephrus globulus* in aeolianites.	SH

Hoedjiespunt – Sea Harvest – Middle Stone Age midden	Langebaan	(Grine and Klein 1993, Volman 1978, Butzer 2004); Iziko South African Museum Cenozoic Collections	Archaeological. Middle Stone Age shell midden contiguous with adjacent hyaena dens. In eroded Langebaan Formation crevice/overhang.	SH
Kraalbaai	Langebaan (lower?)	(Rogers 1980, Compton and Franceschini 2005, Pether 2013b, Theron et al. 1992, Almond 2012)	Marine Molluscs underlying aeolianite.	Kraalb
Kreeftebaai – Tierbank, Postberg	Velddrif	(Flemming 1977, Pether 2013b); G Avery pers. observation	Palaeontological. Molluscs, including extinct *Crepidula capensis praerugulosa* in calcrete. (Pether 2013), Fig. 5.	Kreef2
Kreeftebaai – Tierbank, Postberg	Velddrif	(Flemming 1977, Pether 2013b) G Avery pers. observation	Palaeontological. Molluscs in loose raised beach deposits above HWS. Palaeontological. (Pether 2013), Fig. 5.	Kreef1
Langebaan – Kraalbaai	Langebaan (Kraalbaai Member)	(Roberts and Berger 1997, Roberts and Brink 2002)	Trackway of modern human *Homo sapiens* footprints; spoor of probable hyaena. Exposed between fractured cross-bedded structures of aeolianite. Rare vertebrate bones.	Fprint
Langebaan – Oosterwal	Langebaan	(R. Govender, pers. comm.); Iziko South African Museum Cenozoic Collections	Palaeontological. Marine fish and mollusc remains on intertidal platform.	Owal
Langebaan – Skrywershoek	Langebaan	(Grindley 1969, Rogers 1980, Haughton 1932, Franceschini 2003); Iziko South African Museum Cenozoic Collections	Palaeontological. Marine molluscs. Terrestrial vertebrates, including *Elephas*, exposed intertidally in Langebaan Lagoon and above. Not in Saldanha Municipal area.	Shoek
Langebaanweg – E Quarry	Langebaan; Varswater (including Saldanha)	(Hendey 1974, Grine and Hendey 1981, Hendey 1981, Roberts et al. 2011); Iziko South African Museum Cenozoic Collections	Palaeontological. National Heritage Site of global importance. Sub-surface, reached during mining. Highly diverse terrestrial, aquatic, marine vertebrate taxa; marine molluscs. Most taxa extinct. Plant taxa (pollens). Primates very rare, no hominins. Sea level > 40 m.	LBW
Langebaanweg – Baard's Quarry	Langebaan; Varswater	(Hendey 1978); Iziko South African Museum Cenozoic Collections	Palaeontological. Sub-surface, reached during mining. Probably mixed Pliocene and Lower Pleistocene in river channels. Terrestrial and marine/estuarine vertebrate taxa.	Baard's
Langebaanweg–Anyskop	Springfontyn	(Dietl, Kandel and Conard 2005, Conard 2001); Iziko South African Museum Cenozoic Collections	Middle and Late Pleistocene archaeological. Early Stone Age (ESA) artefacts – Late Acheulean – and Middle Stone Age – Howiesons Poort.	Akop

Namaqua Sands Smelter	Langebaan ?Uyekraal	(Pether 2006)	Palaeontology. Bones noted in nearby borrow pit. Likelihood of intersecting fossiliferous formations if excavation is deep enough.	Nsand
Saldanha Bay – Small Bay	Velddrif Langebaan	(Pether 2010a)	Palaeontological. Marine molluscs exposed in raised beach deposits <15 m asl.	Sbay
Saldanha Bay – Spreeuwalle	Langebaan Velddrif?	(Flemming 1977, Avery et al. In Prep); Iziko South African Museum Cenozoic Collections	Palaeontological and Pleistocene archaeological. Diverse terrestrial taxa; aquatic and terrestrial molluscs around wetland. Date on overlying calcrete duricrust of 59 ka (W. Sharp, pers. comm.). Intertidal – formed during period of lower sea level.	SPW
Saldanha Bay – Yacht Club – Barn Owl	Langebaan	(Manthi 2002)	Palaeontological. Barn Owl roost with micromammal taxa.	YC
Saldanha Bay – Leentjiesklip	Langebaan		Palaeontological. Marine molluscs exposed in development area.	Lklip
Saldanha Bay – Old Quarry	Langebaan	(Pether 2010a)	Palaeontology. Bones of tortoises and mollusc shells in old quarry near Iron Ore Port.	Oqua
Saldanha Bay Skurwerug	Langebaan	(Hendey and Cooke 1985, Tankard 1976, Rogers 1982); Iziko South African Museum Cenozoic Collections	Palaeontological. Excavations for crude oil storage encountered a small patch of important terrestrial fossils, including an extinct pig.	Srug
Saldanha Bay – Yacht Club – hyaena	Langebaan	(Avery 2014, Avery 2013); Iziko South African Museum Cenozoic Collections	Palaeontological. Brown hyaena den with terrestrial taxa.	YC
Saldanha Port – Portion 16 Pienaars Poort 197	Velddrif Langebaan	G Avery pers. observation	Palaeontological. Marine molluscs exposed in raised beach deposits in borrow pit.	SP
Saldanha Steel	Langebaan	(Pether 1995, Roberts 1997a, Avery and Klein 2011, Avery 1994); Iziko South African Museum Cenozoic Collections	Palaeontological. Sub-surface, reached during deep foundation excavation. Some terrestrial *Trigonephrus globulus* in Langebaan Fm.	SS
SALKOR	Langebaan	(Pether 2011, Almond 2012)	Palaeontological. Sparse bones of ungulate.	SAL

Swartriet	Langebaan	G Avery pers. observation	Palaeontological. Intertidal. Patch of sparse vertebrate bones in eroding intertidal platform.	Sriet

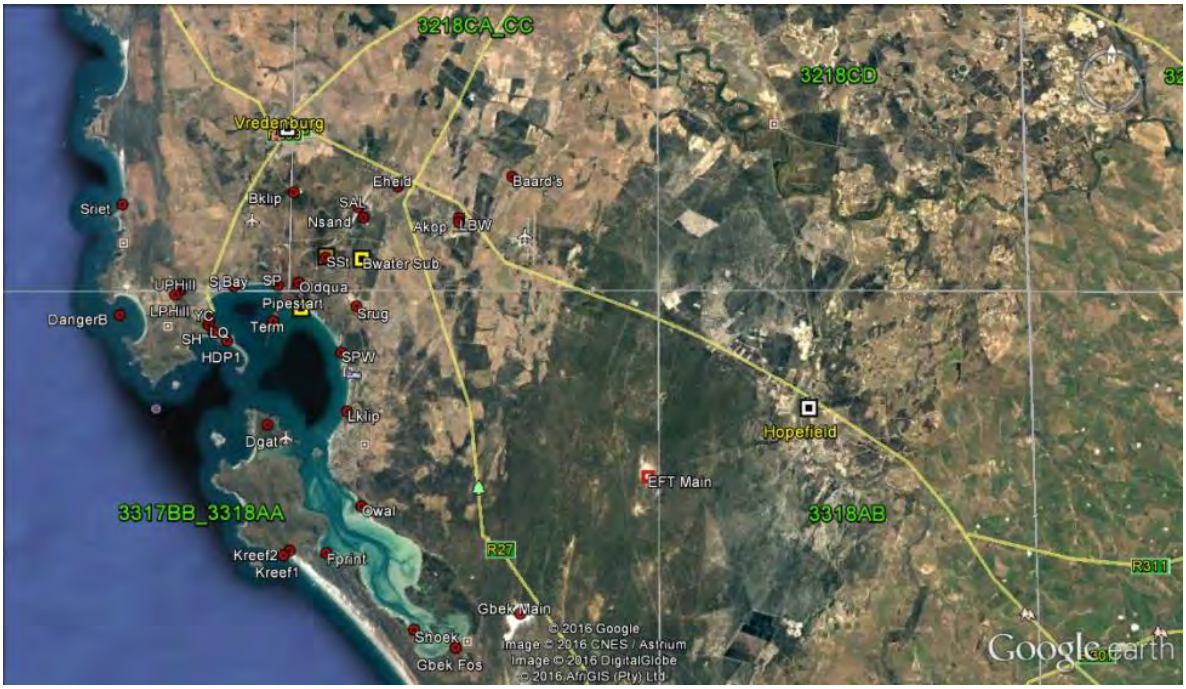

Figure 13. Google Earth view with locations of palaeontological occurrences.

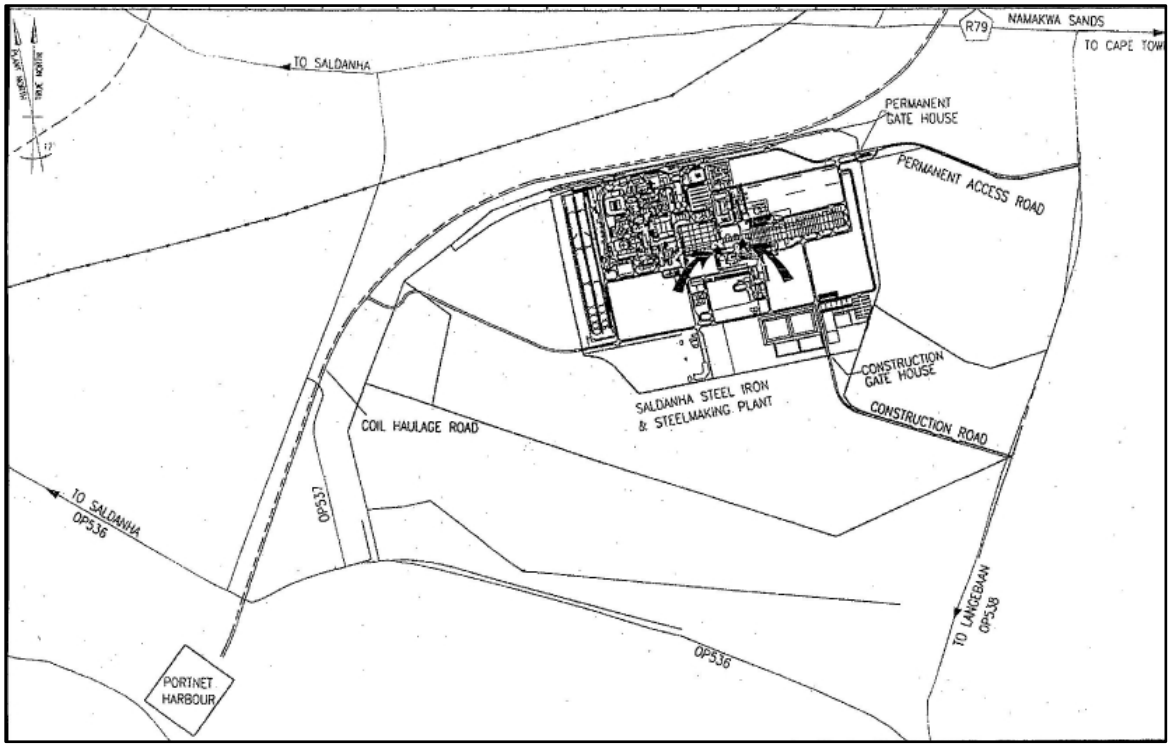

Figure 14. Location of fossils (arrowed) recovered during deep foundation excavation on Saldanha Steel precinct (Roberts 1997b).

Palaeontological Potential

A fossil record along the entire project area does not exist. However, based on the distribution and nature of known sites, sufficient information is available to make at least general assumptions of what may be expected in many areas. It is noted, however, that sub-surface palaeontological potential cannot properly be assessed superficially without digging.

It is entirely possible that excavations into sediments not normally accessible to palaeontologists will be encountered in sub-surface deposits of the Langebaan and Velddrif Formations. However, rather than treating this as a negative, implementation of appropriate management may enable observations otherwise impossible to be made and provide opportunities to recover important fossil material.

Portions of the proposed project area have been heavily disturbed by agriculture and these surfaces have been adequately covered during the foot survey, without revealing Palaeontological or Pleistocene archaeological remains other than terrestrial molluscs and insect burrows; these latter are ubiquitous and will have no effect on the project.

However, it is not possible to exclude the possibility that sparsely-distributed sub-surface fossils may be encountered during excavations. Small pockets of bone can occur, for instance, where bone accumulators like hyaenas, jackals or porcupines used holes/burrows dug by aardvarks; older and younger sediments, too, may contain ancient wetland deposits and/or more-recent sub-fossils, which would require appropriate recording.

Areas with good palaeontological records are shown, but do not preclude the possibility that palaeontological and/or Pleistocene archaeological remains could be found anywhere. Current knowledge is adequate to make predictions at the former and, to a certain extent the latter. The other areas are unknown, although it can be predicted that sparse fossils may be encountered.

As examples of potential, the richness of the globally important Langebaanweg (West Coast Fossil Park) fossil landscape (Hendey, 1981) and sites, such as Saldanha Steel (Roberts 1997b), Prospect Hill (Roberts and Brink 2002), Elandsfontein (Klein, *et al*., 2007), Sea Harvest (Grine and Klein 1993), Hoedjiespunt 1 (Berger and Parkington 1995), (Brink 2005)Duinefontein 2 (Cruz-Uribe, *et al.*, 2003) and the Swartklip hyaena accumulation (Klein, 1975) and their important contributions to knowledge of past animal life should be noted.

Impact Assessment

Impacts are likely to be consistent across the servitude and power facility and are combined in Table 3.

Given that the depth of ancillary facilities is unknown, it is noted that, should they encounter earlier Formations than the Langebaan and Velddrif, mitigation may be at a different level of detail.

Impacts during construction are possible in all areas. Loss of material would be irreversible. Appropriate mitigation (see Recommendations) would alleviate this.

Cumulative impacts are possible in all areas in future if further excavation contemplated.

Gas Line: Proposed line (Figure 7) is supported.

No palaeontological preference over alternative areas Site A (adjacent to Saldanha Steel) or Site B (adjacent to Bluewater).

Table 3: Potential impact to buried Palaeontology

Nature: Disturbance and destruction of Pleistocene palaeontological material by construction of the pipeline and power plant		
	Without Mitigation	**With Mitigation**
Type	Direct	Direct
Extent	Local	Local
Duration	Permanent (Irreversible)	Permanent
Scale	Medium	Small
Frequency	Unknown	
Likelihood	Likely	Unlikely
Impact Magnitude	Medium	Negligible Impact Magnitude
Receptor Sensitivity	High	Low
Impact Significance	High	Low
Status (positive or negative)	High	Negligible
Irreplaceable loss of resources?	Yes	Negligible
Can impacts be mitigated?	Yes	
Mitigation: Impacts are expected to be low. It is recommended that: • Excavations be monitored by suitably-qualified person with palaeontological experience. • If any palaeontological material is uncovered during construction, protocols established in EMP to kick in (possible collection, stoppage in specific area, recording, etc). If permit not already acquired by monitor, work must stop in that area and Heritage Western Cape must be notified (Telephone: 021 483 9685). • Collected material to be placed in Iziko SA Museum Cenozoic Collections. • If Human remains are encountered: SAPS and SAHRA (Telephone: 021 462 4502) must be notified immediately and work in that area stopped until assessed by appropriately-qualified person.		
Cumulative impacts: The cumulative impact of increased development on the sensitive palaeontological resources of the Saldanha Bay area is high, if mitigation measures are not applied. If mitigation, in the form of monitoring, as described above, is implemented, then the benefits of the development will be positive.		
Residual impacts: N/A		

Cumulative Impacts

Within the last 30 years, Saldanha Bay has been transformed into a significant center of heavy industry within the Western Cape. Since the construction of the bulk terminal and dredging of the bay to accommodate large bulk carriers in the 1970's, several other companies have developed large operations in the area, namely the Saldanha Steel smelter, and the Namakwa Sands Smelter which both use the Port of Saldanha's general cargo facilities. Thus, within a relatively short period of time the northern edge of the bay has been transformed from windswept wilderness into a near-industrial landscape.

Hart & Pether (2008) note that the palaeontological sequence of the Saldanha – Langebaan areas is therefore well described. Numerous palaeontological impact assessment reports have been produced over the last two decades (see References at the end of this report). The reports are unanimous in noting the significance of the palaeontological resources. However, the

distribution of resources is patchy and unpredictable and the resources have never been found to be a fatal flaw in development.

Palaeontological material are likely to be destroyed by bulk earthmoving and mining operations; however palaeontological resources tend to be extensive (depending on the resource) and are rather more resistant to impact than archaeological material for the simple reason is that there is more of it. Because palaeontological material is often very deeply buried, scientists often rely on human intervention in the land surface to collect data. Aside from natural exposures, open cast mines, quarries and deep road cuttings often present the only opportunities for palaeontologists to examine deep sediments which under normal circumstances they may not have access to.

In summary, provided that palaeontologists can use the opportunity arising from major construction works to adequately sample and record profiles and exposed material as part of the environmental management process, a potential negative impact can be transformed into a positive opportunity to increase the levels of knowledge about a locality and its past environments.

Mitigation

Heritage Permits Required

- The primary heritage legislation that needs to be considered is The South African Heritage Resources Act 25 of 1999, amendments and regulations (www.sahra.org.za). All heritage material, including human burials, is included.
    - Clearance in terms of the National Heritage Act of 1999 and the National Environmental Management Act (NEMA, Act 107 of 1998) will be required before a development can proceed. Legislation vested in other State institutions, such as the Departments of Mineral Resources and Water Affairs may also apply.
    - A permit for the disturbance and removal of palaeontological material will be required from the Western Cape Provincial Heritage Agency; potential delays could be minimized by the appointed specialist obtaining a permit before mining is initiated.
    - If human remains are encountered, or presence of a burial is suspected, the South African Heritage resources Agency (SAHRA) must be notified immediately; no bones may be further moved until an archaeologist or appropriately-qualified palaeontologist has assessed them and a permit from SAHRA, in such cases, is granted. SAHRA must be contacted immediately through the appointed specialist and laid down procedures, including notification of the SAPS, must be followed.

Recommendations

1. Sub-surface excavations should be monitored by a palaeontologist or archaeologist with appropriate palaeontological experience. The frequency of this to be worked out *a priori* with the contractor to minimize time spent on site.

2. Potential impacts are manageable. Protocols for dealing with palaeontological monitoring and possible further mitigation must be included in the Environmental Management Plan (EMP).
3. Any material recovered will be lodged in the Cenozoic collections of Iziko South African Museum.
4. Funds must be available *a priori* to cover costs of fieldwork and one date should the need arise.

Environment Management Plan (EMP)

Palaeontological Points for EMP

- Other examples exist, but Pether (2010b) and Roberts and Braun (2014) provide outlines for the development of a Palaeontological Management Plan and protocols, which can be adapted to specific circumstances in consultation with an appropriately-qualified palaeontologist. In this context, each project should be assessed in its own right.
- Training in the nature and value of palaeontological and archaeological remains should be provided to project staff and equipment operators.
- Excavations will provide an opportunity to assess the sub-surface palaeontological potential and geology of the site.
- All fossils are protected by law. Should anything of a palaeontological nature be encountered on site by the Contractor (or any other party), e.g. bones or wetland deposits, work is to be stopped in that area immediately, and the OM / Principal Agent notified. Failure to do so will result in a penalty and this must be carefully explained to workers during the Environmental Education Programme undertaken by the OM. The author of this report can assist with training in basic recognition of palaeontological material.
- In the event of palaeontological material being encountered, the OM will demarcate the area and notify the appointed specialist (palaeontologist/ archaeologist with appropriate experience) who will view the material and ascertain whether further study of the area is required.
- Should the specialist confirm a genuine fossil or sub-fossil and recommend further study of the area, work in the applicable area is to cease until further notice while arrangements are put in place. Heritage Western Cape (HWC) is to be informed immediately by the OM.
- Should any human remains be disturbed, exposed or uncovered during excavation, these shall immediately be reported to the South African Police Service and, if suspected that the remains are older than 60 years, the SAHRA (tel 021 462 4502) and Heritage Western Cape (HWC).
- Removal of discovered palaeontological remains, by a contracted specialist shall be at the Developer's expense.

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Appendix A

Profile Dr Graham Avery

Graham Avery, a retired archaeozoologist, grew up in East London and worked at Iziko South African Museum for more than 40 years. In the Archaeology Department he administered the Archaeological Data Recording Centre, conducted research, curated archaeological artefact and faunal collections and became Head; with the establishment of Iziko he moved to Cenozoic Studies in the Natural History Collections Department. In his tenure in the Natural History Department he fulfilled the role of curator, scientist and mentor of new staff.

His Masters dissertation (UCT, 1976) was on Open Coastal Shell Middens between Cape Agulhas and Kleinmond and his PhD (UCT, 1990) was on Birds, Pleistocene Palaeoenvironments and Palaeoecology at Eland's Bay Cave, Die Kelders Cave and Nelson Bay Cave.

As an archaeozoologist his research focuses on the palaeoecology of past humans and animals, particularly birds, within the framework of changing terrestrial and coastal environments, including sea levels during the Pleistocene and Holocene primarily in the area between Eland's Bay and Cape Agulhas studying coastal shell middens, tidal fish traps and palaeontological occurrences like Spreeuwalle (Saldanha Bay), Elandsfontein (near Hopefield) and Duinefontein 2 (Koeberg Nature Reserve). He conducted monthly surveys for beached seabirds and seals over twenty nine years, using the results to elucidate Middle and Later Stone Age exploitation of seabirds. He has identified and assembled comparative samples of large raptor, jackal, porcupine and hyaena prey for biologists and taphonomic assessments that can improve our understanding of past human and predator behaviour. He has worked in South Africa, Zambia, Kenya and France and has co-directed excavations at Die Kelders Cave 1, Duinefontein2 and Ysterfontein 1 with Dr Richard Klein (Stanford University, USA) and his teams.

As a consequence of his research he has acquired significant knowledge of and experience in the Quaternary and other deposits of the Western Cape and the fossils they contain.

He has been involved in completed exhibits on South African archaeology and rock art, Robben Island, Darwin in the Cape, *Australopithecus sediba*, public outreach at Die Kelders Cave (aka Klipgat) and is currently working on an outreach project at Ysterfontein.

In retirement he continues his palaeoecological research on birds and mammals from archaeological, palaeontological and predator accumulations and has conducted a number of Palaeontological Impact Assessments (PIAs) in Quaternary contexts of the Western Cape.

He joined the South African Archaeological Society as a 12 year old, served as Western Cape Secretary/Functions Organizer in the 1970s and has recently been elected Vice-President. He is a member and Past President of the Southern African Association of Professional Archaeologists (accredited for Cultural Resource Management), a member and Councillor of the Royal Society of South Africa, an Honorary Member and Past President of the Wildlife and Environment Society of South Africa, a member of the Advisory Board for the Percy FitzPatrick Institute of African Ornithology's, a member of the Permits Committee of Amafa and a member of the Scientific Advisory Board, Cape Town Science Centre. He is Editor of the Royal Society's *RSSAfNews* and has edited *Piscator*, the Journal of the Cape Piscatorial Society.

Curriculum Vitae Dr Graham Avery

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Business Details

Graham Avery (Sole Proprietor): Archaeozoology, Stone Age Archaeology and Quaternary Palaeontology.

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- Cell: 083 441 0028
- Email: gavery@iziko.org.za; drgavery97@gmail.com

Professional Qualifications

- PhD (archaeology) 1990 "*Archaeological and palaeoenvironmental interpretation of avian remains from archaeological sites*". University of Cape Town.
- MA (archaeology) 1976 "*Systematic Investigation of Coastal Shell Middens in the South Western Cape*". University of Cape Town.
- BA (Archaeology, Social Anthropology, African History, History and Geography) 1969 University of Cape Town.

Current Positions

Retired 31 January 2012.
Associate Natural History Collections Department, Cenozoic Studies, Iziko South African Museum (April 2012–).
Research Associate, Archaeology Department, University of Cape Town (July 2012–).

Positions Held

- Archaeozoologist, Curator of Quaternary Collections, Cenozoic Studies Section, Natural History Department, Iziko South African Museum (2002–January 2012). [moved to Natural History Collections Department when Iziko came into being]
- Head of Human Sciences Division, South African Museum (1993–2002).
- Head of Archaeology Department, South African Museum (1990–1993).
- Acting Head of Archaeology Department, South African Museum (1985–1990).
- Researcher, Archaeology Department, South African Museum (1980–2002).
- Manager: Archaeological Data Recording Centre, South African Museum (1974–1979).
- Environmental Archaeologist, South African Museum (1970–1973).
- Manager (temporary): Archaeological Data Recording Centre, South African Museum (1969).

Research

Research Interests

The Late Quaternary palaeoecology of south-western Africa covering material from the Pliocene to the Holocene:

- Archaeozoological studies—mammals, birds and molluscs in the palaeo-ecological and human history of South Africa;

  Experimental and comparative actualistic studies – taphonomy of human and non-human bone accumulations resulting from carnivores, scavengers and raptors, such as hyaenas, jackals, leopards, eagles and the larger owls. These include a 29-year long-term project monitoring beached birds and mammals;

- Past climates and environments using evidence from birds and mammals (including pollens from hyaena coprolites); and
- The application of archaeozoological and palaeontological research to modern issues of global change, conservation, heritage resource management and education.

Research Projects

- Taphonomy of Verreaux's Eagle prey (with Aaron Armstrong, University of Minnesota). Paper Published in Journal of Archaeological Science.
- Prey of Verreaux's Eagles in the Cedarberg and Sandveld (with Megan Murgatroyd, UCT) – Paper in press Avian Biology.
- Prey of African Crowned Eagle in Urban areas of Kwazulu Natal (with Malan, et al.). 2008 – 2014. Paper published Ostrich.
- Taphonomy and pathology of seal remains from the Langebaanweg Early Pliocene fossil site (with R. Govender, Iziko Museums of South Africa).
- Interpreting the environment of human development in eastern Africa (with D.M. Avery, Iziko SA Museum and F.K. Manthi and S. Mucila, National Museums of Kenya. Funding from PAST 2009 – ongoing.
- Spreeuwalle Late Pleistocene Wetland on The Western Cape Coast, South Africa, And its Implications for the Pleistocene History of the Fynbos (with R.G. Klein, Stanford University, USA, C. Cordova, Oklahoma State University, USA, E. Bergh, Iziko South African Museum, Warren Sharp, UC Berkeley, USA and Julie Luyt, University of Cape Town). Funding From Leakey Foundation and PAST. 2003 – Ongoing.
- Uniab brown hyaena den: Taphonomy of a modern hyaena den on the Uniab delta fan, Skeleton Coast Park, Namibia (with P. Fosse, CNRS, Université de Toulouse Mirail, France, J-B. Fourvel, Université de Toulouse Mirail, France, J-F. Tournepiche, Angolême Museum, D.M. Avery, Iziko Museums of South Africa, R. Loutit and S. Braine).
- Pathologies on Gemsbok at the Uniab brown hyaena den (with R. Govender, Iziko Museums of South Africa).
- Human behavior, taphonomy, biodiversity and palaeoecology from osteological remains of birds from archaeological and palaeontological sites in the western and Eastern Cape Provinces: Includes a range of Middle and Late Pleistocene ocurrences.
- CNRS/NRF International Co-operation Project on taphonomy of spotted hyaena bone accumulating habits. (with P. Fosse, CNRS, Université de Toulouse Mirail, France, J-F. Tournepiche, Angolême Museum and J-B Fourvel, Université de Toulouse Mirail, France). 2002 – ongoing.
- Late Pleistocene Middle Stone Age shell midden at Ysterfontein (with R.G. Klein, Stanford University, T.E. Steele, UC Davis, D. Halkett, University of Cape Town): excavation and study of

the bird remains. 2002–2007. Paper published in South African Archaeological Society Goodwin Series.

- Records of Middle and Upper Pleistocene birds in fossil and archaeological sites. – ongoing.
- Palaeo-ecology of the Western Cape Coast. (with Klein, R.G., Stanford University, L. Scott, University of the Free State). Funded initially by NRF grant to A. Chinsamy-Turan, Iziko Museums of Cape Town). 2002 – ongoing.
- Prey of black sparrow hawks in the western Cape (with R. Simmons, Percy FitzPatrick Institute for African Ornithology, University of Cape Town, and O. Curtis, Cape Technikon Nature Conservation MA student).2002 – ongoing.
- Cercopithecoid and other remains in crowned and black eagle prey assemblages. (with J. P. Kerbis, Field Museum, Chicago, USA; G. Malan, Tshwane University of Technology; A. Armstrong, University of Minnesota, USA). 2001 – ongoing.
- Co-Director of Duinefontein Project (with R.G. Klein, Stanford University and K. Cruz-Uribe, Northern Arizona University): excavation and overall interpretation; avian remains; palaeo-environment (carbon and oxygen isotopes with J. Lee-Thorp, University of Cape Town); pollens in hyaena coprolites (with L. Scott). NSF and Leakey Foundation funding allocated to RGK. 1997–2002. Various publications.
- Co-Director of Die Kelders Cave Project (with R.G. Klein Stanford University, F.E. Grine and C. Marean, State University of New York at Stony Brook). NSF funding allocated to RGK. 1992–1995. Various publications.
- Prey of black, martial and crowned eagles in the Cape Province (with A. Boshoff and G.N. Palmer, Cape Nature Conservation). 1988–1994. Papers published.
- Late Quaternary palaeoecology of south-western Africa – avian fauna project, taphonomy of modern and archaeological/fossil bone accumulations and an investigation of the Middle Pleistocene hominid and other occurrences at the Elandsfontein fossil site, south-western Cape. Funding through colleagues involved in the project. Now part of “Palaeo-ecology of the Western Cape Coast Project” 1980 – ongoing.
- Avian fauna, palaeoenvironments and palaeoecology in the Pleistocene/Holocene of the southern and western Cape (PhD). Funding through colleagues involved in excavation projects. 1978–1990.
- Monthly survey of dead seabirds and marine mammals on South African beaches.1977–2006.
- Archaeological salvage of historical material from the Cape Town Station Concourse and Golden Acre Sites. Excavation and preservation of Wagenaar's Reservoir. 1974–1979.
- Systematic investigation of open-station shell midden sites along the south-western Cape coast (MA). CSIR, HSRC, Museum funding to GA. 1970–76 (MA).

Fieldwork Experience

- Extensive fieldwork (survey and excavation) at a range of archaeological and palaeontological sites dating from the Miocene to the Holocene (see Appendices 1 & 2).
- Surveys and collections of modern prey of mammals and raptors for taphonomic and palaeo-environmental studies.
- Monthly surveys for beached seabirds birds and marine mammals over 29 years.

- Initial development of the avian comparative osteology collection and contributions to its subsequent expansion and to that of the mammal comparative osteology collection. Assisted in the collection of barn owl pellets and in bird atlassing. This and other study material (above) led to the establishment of the Iziko Taphonomic Collection in Cenozoic Studies.

Curatorial and Museology

Collections Management

Planning, management, curation and co-ordination of the archaeological, physical anthropology and Quaternary collections of Iziko SA Museum, as well as the Archaeological Data Recording Centre. Using databases of different types. Writing contracts for collections, external loans and impact assessments. Overseeing the input of the archaeological, physical anthropology caste and Quaternary mollusc collections on Excel spreadsheets to make them more accessible and contributing to the improvement and upgrading of the LogosFlow Humanities Database, used by the African Studies section. Assisting in the development of a LogosFlow Archaeology/Quaternary Database to capture data for individual cultural items, fossils and assemblages with a view to simplifying transfer of data already on spreadsheets to an Access relational database.

Collections Policy Development

Assisting in the development of Archaeology, Human Remains and Palaeontology collection policies.

Sensitive Collections

Best practices for sensitive collections (human remains). Organized a workshop on sensitive collections, the results of which led to greater understanding of museum and social issues, which have significantly changed the way in which many museums in South Africa treat human remains in particular. Contributed to public forums on the issues of museums and human remains and a member of the Iziko Reference Group on Human Remains, which developed Iziko's current Policy on Human Remains.

Collection Development and Access

Development of the archaeology, Quaternary, Comparative Osteology and Taphonomy collections. Encouraged researchers to use the museum as an institutional base and to deposit their material in Iziko's collections leading to significant additions to Iziko holdings at virtually no cost to the museum. As visitors, they have helped to create critical mass in cultural archaeology, archaeozoology, and Quaternary palaeontology, added scientific value to the collections and enhanced public and academic perceptions (local and international) of the museum.
Marketing Iziko's archaeological and Quaternary collections, which have been increasingly studied by local and international researchers and postgraduate students.

Cultural Resource Management (CRM)

Extensive experience in this field. See Honorary Positions and Appendix 1.

Contributions to Development and Training

Lectures to university and technikon students and courses on the curation and conservation of collections and collection management. Provided in-service training and mentoring for museum staff, university students, postdocs and interns. Participated in training programmes for tour guides and museum volunteers.

Organizational and Management

See also under Honorary Positions.

Other training

- Workshop on Employment Relations February 2008 (Prof. Barney Jordaan)
- Rating Staff Performance, May 2008 (Iziko).
- Workshop on Managing Behavioural Change July 2006 (Simply Talented).
- Workshop on Competency-Based Interviews July 2006. (Willem Conradie).
- Workshop on Strategic Implementation Of The Employment Equity Act, March 2005 (Brian Williams Consultancy).
- Workshop on Performance Management 2005 (Iziko).
- Workshop on Hiv-Aids 2005.
- Workshop on Developing A Constitution For The Employment Equity Consultative Forum 2005 (Brian Williams).
- In-service-training in archaeological data management and on the curation and conservation of archaeological and Quaternary collections.
- Corporate Business & Management Training Course "Principles of Management" 2002.
- Effective Meetings 2003. (Non-Profit Resource Training Course).
- Introduction to Fundraising in South Africa 2001 (Non-Profit Resource Training Course).

Active member of Iziko's Employment Equity Consultative Forum from its inception to the end of 2005 (representing the Professionals Group and White Males) and drafted its Constitution.
Extensive organizational, management and leadership experience; led and co-operated on research, collection and exhibition projects, within and across departments and institutions, from inception to completion, making effective use of limited human and other resources. For two years I supervised and re-motivated the curatorial and preparation staff responsible for the mammal and avian comparative osteological collections. I have developed and managed divisional budgets and supervised project teams. I am proficient at scheduling and running meetings, discussions, conferences and workshops.
I have, with other staff, encouraged researchers and students to study Iziko collections and developed a supportive environment that has led to increased numbers of research visitors.
I was involved in strategic planning and goal-setting in the museum and other organizations, particularly WESSA, a Non-Government Environmental Organization with a multi-million Rand budget. Member of the South African Museum committee responsible for the development of its structure, which was introduced in 1993 and involved in developing structural advances in post-Apartheid Iziko, as an elected member of the Workflow Forum and in various consultative processes.
I was instrumental in the initiation of discussions that led to the successful formal partnership and joint honorary appointments between the University of Cape Town and the South African Museum.

Public Programmes, Public Understanding of Archaeology and Palaeontology and Communication

I have a fundamental respect for the power of knowledge and its role in maintaining human dignity coupled with a wish to pass on information I am privileged to have gained through my studies and experiences. I am an enthusiastic communicator with excellent "people", oral and written skills, which enable me to share my knowledge with a wide range of age-groups, educational levels and social backgrounds.

I have applied the results of my archaeozoological and palaeontological research to training, education and tourism/recreation. I have lectured extensively to adult and learner audiences, tertiary level students and conferees, and conducted behind-the-scenes activities and excursions for the same groups. I have regularly contributed to the museum's Summer and Winter School programmes and the

development of teacher and learner resources and the museum's online resources. I was web co-ordinator for the Natural History Collections Department.

- The museum's public programmes are its link with its public and a key measure of the success with which we address transformation and empowerment. As my contribution in this sphere I have, for instance, been involved in re-contextualizing the San Diorama, the "*Ulwazi Lwemvelo - Indigenous Knowledge in South Africa*" exhibit and the whale exhibit and have helped publish a teaching resource. These illustrate my commitment to empowerment and the development of partnerships with other institutions and local communities.
- Initiating and assisting in the planning, co-ordination and leadership of a number of exhibitions (archaeology, rock art, Robben Island, indigenous knowledge, Blombos Cave artefacts, *Search for Our Early Ancestors, Natural Selection, Darwin and the Cape* and *Australopithecus sediba)* and exhibition planning for "Origins", "New Cenozoic", "Human Journey", "San Diorama" and "Links between natural history and culture").
- Outreach projects that led to exhibits at Cape Town's Golden Acre (17th century Wagenaar's Reservoir, 19th century Maclear's Beacon), the Elandsfontein fossil site at the Hopefield Information Centre and the development of information boards for the Klipgat Cave (Die Kelders). Currently part of a team developing information boards for the Ysterfontein 1 archaeological site.
- Interviews by and features in the media, including the press, television and documentary films, the most recent being the "Shorelines" documentary.
- Cultural Resource Management. Heritage impact assessments, site preservation and cultural tourism related to archaeological and palaeontological sites.
- Compiling, with A. Galla (Australia), and coordinating the publication of "*Changing the Paradigm: a Plan for Diversifying Heritage Practice in South Africa*", a discussion document on the transformation of South African museums, for SAMA, that arose from the proceedings of the South African Museums Association Cross-Cultural Workshops, which were held at museums around South Africa.
- Organization of a workshop on "Sensitive Collections" and member of reference group that developed Iziko Museum's Policy on Human Remains.

Membership of Professionally-Related Societies

- Royal Society of South Africa.
- Association of Southern African Professional Archaeologists (ASAPA). Professional Member #008 with Cultural Resource Management (CRM) accreditation.
- South African Society for Quaternary Research (SASQUA).
- International Council for Archaeozoology (ICAZ).
- South African Archaeological Society.
- Southern African Museums Association (SAMA) (Life Member).

Other Primary Interests

Conservation, particularly participation in processes aimed at engendering and promoting civil and State understanding and the implementation of sound practices in environment and resource use. To this end, I have been active in promoting the principles, policies and actions of WESSA of which I have been a

Regional Chairman, National Councilor, Board member and, as national President, Chairman of the Council and Board of Directors. I am a strong and active supporter of the Society's initiatives in environmental education and conservation, empowerment of communities and networking with other environmental NGOs.

Honorary Positions

Vice-President, South African Archaeological Society (2016-2018).
Honorary Research Associate, Iziko South African Museum (2012–).
Research Associate, Archaeology Department, University of Cape Town (2012–).
Editor *RSSAfNews* (2012–).
Editor *Piscator* (2012–2015).
Council Member Royal Society of South Africa (RSSAf) (2010–2016).
Member Cape Town Science Centre Scientific Advisory Board (2008–).
Member of Cape Nature Klipgat Development Group (2004–2007).
Past President and Honorary Life Member Wildlife and Environment Society of South Africa (WESSA) (2004–).

Member: Permit Review Committee, Amafa aKwaZulu-Natali (Heritage KwaZulu-Natal) (2001–ongoing).

Chairperson, Southern African Association of Archaeologists (now ASAPA) (2000–2004).
Specialist Advisor: Archaeology, Palaeontology & Meteorite Permit Committee, South African Heritage Resources Agency (SAHRA) (2000–2003).

Research Associate, University of Cape Town (UCT/Iziko MOU) (1999-2011).
Member of the Percy FitzPatrick Institute for African Ornithology Advisory Board (Representing WESSA) (1999–).

Trustee, World Wildlife Fund South Africa (WWF SA) (1999–).

Trustee, Klipgat Trust for coastline and heritage between Die Kelders Cave (Klipgat) and Gansbaai (1998–).

Awards (Other than Grants)

Honorary Life Membership of the Wildlife and Environment Society of South Africa (WESSA) (2004).
Heritage Award Amafa Akwazulu Natali (conservation of heritage in KwaZulu Natal).

Personal References

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Prof. C. Garth Sampson (archaeologist)

Appendix 1 – Publications/Reports

In Preparation, Submitted and In Press

Murgatroyd, M., Avery, G. Underhill, L.G. and Amar, A. **In Press.** Adaptability of a specialist predator: The effects of land use on diet diversification and breeding performance of Verreaux's eagles". *Avian Biology*.

Cordova, C. & G. Avery (**Submitted May 2016**) African savanna elephants and their vegetation associations in the Cape Region, South Africa: Opal phytoliths from dental calculus on prehistoric, historic and reserve elephants. *Quaternary International*.

Govender, R. and Avery, G. **Submitted 2015.** Bone pathologies on Gemsbok *Oryx gazella*, from Uniab River fan, Skeleton Coast Park, Namibia.

Garcia-Heras, M. S., F. Mougeot, R. E. Simmons, G. Avery, M. Avery and B. Arroyo 2016 **In Prep** Assessing the diet of a vulnerable raptor species endemic from southern Africa, the Black Harrier *Circus maurus*. *Ostrich*

Avery, G. **In prep**. A new Pliocene species of *Arctocephalus* (Pinnipedea: Otariidae) from the west coast of South Africa.

Avery, G. Klein, R.G., Cordova, C., Bergh, E., Sharp, W. and Luyt, J. **In Prep**. Spreeuwalle: a Late Pleistocene Wetland on the Western Cape Coast, South Africa, and its Implications for the Pleistocene History of the Fynbos.

Avery, G. Fosse′ P. Fourvel, J-B., Tournepiche, J-F., Rudi Loutit, R. Avery, D.M. and Braine, S. **In Prep**. Modern brown hyaena (*Parahyaena brunnea*) bone accumulation in the Uniab River coastal fan, Skeleton Coast Park, Namibia, and taphonomic implications.

Avery, G. **In Prep**. Middle Pleistocene birds from the Western Cape Province, South Africa.

Avery, G., Scott, L., Fosse, P., Fourvel, J-B. and Tournepiche, J-F. **In Prep**. Late Holocene vertebrate fauna and vegetation from a Brown Hyaena *Parahyaena brunnea* den in the Sutherland District, Western Cape Province, South Africa.

Articles

Malan, G.E. Strydom, S. Schultz & G. Avery 2016. Diet of the nesting African Crowned Eagles *Stephanoaetus coronatus* in emerging and forest-savanna habitats in KwaZulu-Natal, South Africa. *Ostrich* 87**:** 145-153.

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Aaron Armstrong and Graham Avery 2014. The taphonomy of Verreaux's Eagle (*Aquila verreauxii)* prey accumulations from the Cape Floral Region of South Africa: implications for archaeological interpretations. *Journal of Archaeological Science* 52: 163-183.

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Avery, G. and Klein, R. 2011. Review of fossil phocid and otariid seals from the southern and western coasts of South Africa. *Transactions of the Royal Society of South* Africa 66(1): 14- 24.

Fosse, P, Philippe Fosse, Graham Avery, Nuria Selva, Wojciech Smietana, Henryk Okarma, Adam Wajrak, Jean-Baptiste Fourvel et Stéphane Madelaine 2011. Taphonomie comparée des os longs d'ongulés dévorés par les grands prédateurs modernes d'Europe et d'Afrique (*C. lupus, P. brunnea*). In: Brugal, J.-P., Gardeisen, A. and Zucker, A. (Eds). Prédateurs dans tous leurs états. Évolution, biodiversité, interactions, mythes, symboles Rencontres internationales d'archéologie et d'histoire d'Antibes XXXI: 127-156.

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Avery, G. 1976. *Systematic Investigation of Open Station Shell Midden Sites Along the Southwestern Cape Coast*. MA Thesis, University of Cape Town. 158 pp.

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Avery, G. In Prep. Palaeontological Assessment and Monitoring of Access Road and Infrastructure for Proposed Phosphate Mine, Elandsfontein, Hopefield.

Avery, G. 2016. Palaeontological Impact Assessment: Proposed Gas-Fired Independent Power Plant to Support Saldanha Steel and Other Industries In Saldanha Bay, Western Cape (1:50000 3218CA & CC Velddrif; 3317BB &3318AA Saldanha). 29 pp.

Avery, G. May 2016. Palaeontological Assessment: Rectification Application for the Unlawful upgrading and realignment of an existing unsurfaced access road on Portions 4 and 7 of Farm No. 264 and infilling of the road within 100 meters of the High Water Mark Arniston, Western Cape Province (1:50000 3420 CA & CC). 15 pp.

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Appendix 2 – Field Experience

Experience Gained from others

- Archaeological Field School, Middelburg Ash Heap Project—volunteer supervisor, C.G. Sampson, University of the Witwatersrand & Southern Methodist University (1990).
- Langebaanweg fossil site, southwestern Cape—Q.B. Hendey, Palaeontologist, South African Museum) (1975).
- Byneskranskop Cave, southwestern Cape—F.R. Schweitzer, South African Museum (1974)
- Duinefontein hominid and fossil sites, southwestern Cape—R.G. Klein, University of Chicago (1974).
- Kangara & Paardeberg Caves, southern Cape—H.J. Deacon, University of Stellenbosch (1973).
- Nelson Bay Cave, southern Cape—R.R. Inskeep, University of Oxford (1973)
- Nelson Bay Cave, southern Cape—R.G. Klein, University of Chicago (1971).
- Die Kelders Cave, southwestern Cape—F.R. Schweitzer, South African Museum (1969-70).
- De Hangen Shelter, western Cape—J. Parkington, University of Cape Town (1968-69).
- Klasies River Mouth Caves, southern Cape—J.J. Wymer, University of Chicago (1967).

Own Excavations (excludes small salvage)

- Ysterfontein MSA midden with R.G. Klein, T.E. Steele and UCT Archaeological Contracts Office. (2005-2007).
- Spreeuwalle wetland. (2003-).

- Duinefontein 2 excavation with R.G. Klein, K. Cruz-Uribe, H.J. Deacon [1997] and UCT Archaeological Contracts Office. (1997-2001).
- Die Kelders Cave 1 extension excavation with R.G. Klein, F.E. Grine and C.W. Marean. (1992-95).
- Tierberg Rock Shelter, Prince Albert, Karoo with D.M. Avery. (1990).
- Khoe-San burials, Milnerton, Cape Town. (1986).
- Brown hyaena prey accumulation, Salpeterkop, southwestern Cape. (1983-84).
- Brown hyaena and black-backed jackal prey accumulations, Skeleton Coast Park, SWA/Namibia.1980-89
- Elandsfontein hominid and fossil site, southwestern Cape. (1980-2007).
- Pearly Beach open shell midden sites, southwestern Cape. (1973-76).
- Golden Acre & Station Concourse early colonial sites, Cape Town with M.L. Wilson. (1971-75)
- Hawston open shell midden, southwestern Cape. (1971-72).

Archaeological and Palaeontological Site Recording and Assessment

Also see under Cultural resource Management Reports (CRM).

- I have had extensive experience in the location, mapping, survey and recording of archaeological, palaeontological and rock art sites, particularly in the Cape Province. Since 1990 this has been intermittent, but see CRM section regarding EIAs, most of which included site surveys.
- Archaeological and palaeontological sites at Elandspunt, Langebaan, southwestern Cape with D.M. Avery (1985).
- Surveys of archaeological and rock art sites on portions of Anysberg, Kaminassie and Outeniqua Mountains, southern Cape for Department of Forestry (1979).
- Numerous trips recording archaeological and rock art sites, southwestern and southern Cape (1979).
- Survey of archaeological sites in the Saldanha Bay area, southwestern Cape own and supervising M. Cronin & F. Thackeray (1974).
- Survey of coastal archaeological sites between Cape Agulhas and Kleinmond, southwestern Cape (1970-71).

Actualistic/Taphonomic

In addition to my own research, I have encouraged scientists I work with to lodge samples in Iziko's Taphonomy Collection, which I established and have developed.

- Taphonomy of small mammal prey of Verreaux's Eagle (with Aaron Armstrong, University of Minnesota).
- Remnants of seal-ravaged seabirds, Ysterfontein (2006).
- Prey of Martial Eagles, Mabuasehube National Park, Botswana with W. Borello, Gaborone, for Botswana Government and South African Museum (1990).
- Prey of Verreaux's, Martial and Crowned eagles (1990-).
- Prey of Peregrine and Lanner Falcons (1991-), Pale Chanting Goshawks, Marsh Harriers and Black Sparrowhawks.
- Excavation of 'modern' brown hyaena bone accumulation, Salpeterkop, Sutherland (1983).
- Excavation of modern Brown hyaena and Black-backed jackal bone accumulations, Skeleton Coast Park, SWA/Namibia (1982).

- Surveys for beached birds and seals, southwestern Cape, southern Cape, Eastern Cape, KwaZulu Natal with members of the African Seabird Group) and Namibia (with Directorate of Tourism & Nature Conservation staff)(1977-2006).
- Collection of owl pellet and other avian predator prey samples, southwestern Cape (with Cape Department of Nature and Environmental Conservation, D.M. Avery & R.K. Brooke) (1977-ongoing).
- Intertidal transect and collection of mollusc specimens, southwestern Cape (with Marine Biology Department, South African Museum) (1976).
- Collection of avian osteological specimens, southwestern, eastern and northern Cape (1971-1985).

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PROPOSED ARCELORMITTAL COMBINED CYCLE GAS TURBINE POWER PLANT, 400 KV OVERHEAD POWER LINE TO THE EXISTING AURORA SUBSTATION AND UNDERGROUND PIPELINE TO THE PORT OF SALDANHA, SALDANHA, WESTERN CAPE:

AVIFAUNAL IMPACT STUDY

Produced for ERM by:

SIMON TODD CONSULTING

June 2016

EXECUTIVE SUMMARY

Simon Todd Consulting was enlisted by Environmental Resources Management (ERM) to undertake an avifaunal impact study for the proposed ArcelorMittal combined cycle gas turbine (CCGT) power plant, on-site switching yard and ancillary infrastructure as well as a new 400 kV overhead power line to the existing Eskom Aurora substation in order to connect the proposed power plant to the national grid and an underground pipeline to transport gas, water and power between the Port of Saldanha and the proposed power plant.

Up to 267 bird species are known to occur within the study area and broader impact zone of the development, including 26 red-listed or threatened species, 40 endemic species and 26 near-endemic species. A large portion of these were however not considered relevant, with 16 species considered as priority species for this study. The birds of greatest potential relevance and importance in terms of the possible impacts of the development are likely to be local populations of endemic passerines, resident or visiting large terrestrial birds, resident or passing raptors and transient waterbirds.

The development will pose several impacts to avifauna, which after mitigation, include: a **moderate** and **minor** displacement impact caused respectively by habitat loss and disturbance associated with the construction and maintenance activities of the various features of the development; a **minor** impact of electrocutions of birds on power infrastructure; and a **minor** impact of avian collisions with overhead power lines due to the fact that the new overhead power lines are routed in an existing feeder servitude and therefore do not result in an altogether new impact threat.

The study area and more specifically the proposed site location are not considered unique habitats in the landscape and are already subject to varying degrees of transformation and degradation. Although four threatened and/or priority species were recorded in the study area – Martial Eagle, Lanner Falcon, Black Harrier and Southern Black Korhaan – the area is not considered critical for their conservation and the extent of habitat loss for these species would be considered low.

The proposed ArcelorMittal CCGT power plant, 400 kV overhead power line to the Eskom Aurora substation and underground pipeline to the Port of Saldanha has been assessed as being of **moderate** sensitivity from an avifaunal perspective due to the presence of priority species, the general avifauna occurring in the study area and broader impact zone of the development and the nearby proximity of two IBAs. **The development is however likely to have little, if any significant long-term impact on the avifauna of the wider area, especially after mitigation, and as such, is considered to have acceptable levels of impact overall.**

CONTENTS

DECLARATION OF INDEPENDENCE

I, **Blair Zoghby**, in my capacity as a specialist consultant, hereby declare that I:

- Act/acted as an independent specialist to Environmental Resources Management (ERM) (Pty) Ltd for this project.
- Do not have any personal, business or financial interest in the project expect for financial remuneration for specialist investigations completed in a professional capacity as specified by the Environmental Impact Assessment Regulations, 2014.
- Will not be affected by the outcome of the environmental process, of which this report forms part of.
- Do not have any influence over the decisions made by the governing authorities.
- Do not object to or endorse the proposed developments, but aim to present facts and my best scientific and professional opinion with regard to the impacts of the development.
- Undertake to disclose to the relevant authorities any information that has or may have the potential to influence its decision or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2014.

PROFESSIONAL EXPERIENCE

Simon Todd Consulting has extensive experience in the assessment of renewable energy developments, having provided ecological assessments for more than 100 different renewable energy developments. This includes a variety of facilities in the immediate vicinity of the current site as well as in the broader North Cape region. Simon Todd is a recognised arid-areas ecological expert and is a past chairman of the Arid-Zone Ecology Forum and has 18 years' experience working throughout the country. Simon Todd is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

Blair Zoghby has been involved in ornithological conservation and research for eight years and holds an MSc degree in Zoology/Conservation Biology obtained through the Percy FitzPatrick Institute of African Ornithology, University of Cape Town, South Africa. He has undertaken numerous avian impact assessments across the country and as such, has experience working with a wide variety of bird species and bird habitats.

INDEMNITY

- This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken.
- This report is based on a desktop investigation using available information and data related to the site to be affected, *in situ* fieldwork, surveys and assessments and the specialists best scientific and professional knowledge.
- The Precautionary Principle has been applied throughout this investigation.
- The findings, results, observations, conclusions and recommendations given in this report are based on the specialist's best scientific and professional knowledge as well as information available at the time of study.
- Additional information may become known or available during a later stage of the process for which no allowance could have been made at the time of this report.
- The specialist reserves the right to modify this report, recommendations and conclusions at any stage should additional information become available.
- Information, recommendations and conclusions in this report cannot be applied to any other area without proper investigation.
- This report, in its entirety or any portion thereof, may not be altered in any manner or form or for any purpose without the specific and written consent of the specialist as specified above.
- Acceptance of this report, in any physical or digital form, serves to confirm acknowledgement of these terms and liabilities.

Blair Zoghby

Simon Todd Pr.Sci.Nat 400425/11.

June 2016

1. INTRODUCTION

1.1. BACKGROUND

ArcelorMittal is proposing the establishment of a combined cycle gas turbine (CCGT) power plant, with an on-site switching yard and ancillary infrastructure as well as a new 400 kV overhead power line to the existing Eskom Aurora substation in order to connect the proposed power plant to the national grid. The proposed CCGT power plant, on-site switching yard and ancillary infrastructure will be located on the Remaining Extent of Farm Yzervarkensrug 129 and Farm Jackelskloof 195, the new 400 kV overhead power line will be routed east of the plant following the existing Aurora to Blouwater 132 kV feeder servitude and the pipeline servicing the development will be routed south-west to the Port of Saldanha in the Western Cape.

The National Environmental Management Act (NEMA) (Act 107 of 1998) requires that an Environmental Impact Assessment (EIA) be conducted for any development which could have a significant effect on the environment, with the objective to identify, predict and evaluate the actual and potential impacts of these activities on ecological systems; identify alternatives; and provide recommendations for mitigation to minimize the negative impacts. The results of the EIA are then lodged with the National Department of Environmental Affairs (DEA) for further examination before an outcome of authorisation for the development is given.

In order to meet these requirements and manage the EIA process, ArcelorMittal has appointed Environmental Resources Management (ERM) as independent environmental assessment practitioners. As part of the specialist studies required for the EIA, ERM has enlisted Simon Todd Consulting to provide an avifaunal impact study of the developable area.

The purpose of the avifaunal impact study is to describe and detail the avian ecological features of the proposed site, provide an assessment of the avian ecological sensitivity of the site, identify and assess the significance of the likely impacts associated with the development and provide measures to avoid, minimize and mitigate project related impacts to avifauna.

1.2. RELEVANT ASPECTS OF THE DEVELOPMENT

- The proposed development area is located within an area identified for industrial development according to the Saldanha Bay Municipal Spatial Development Framework.
- The site for the proposed CCGT power plant and switching yard is located less than 1 km to the east of the existing ArcelorMittal Steelworks, immediately adjacent to the Eskom Blouwater substation, and will have a footprint of approximately 800 m x 600 m in size.
- The power generated at the plant will be evacuated through the construction of a new 22 km High Voltage (HV) 400 kV overhead power line from the plants own switching yard east to the existing Eskom Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude.
- The underground pipeline, which will consist of four pipes (two gas, one water and one power) buried to a depth of 3 – 4 m, will be routed south-west to the Port of Saldanha approximately 4.6 km away and will have a servitude of 15 – 20 m.
- Ancillary infrastructure associated with the proposed development will include access tracks/roads, control and electrical building, central control room, warehouse and administrative buildings and storage facilities.

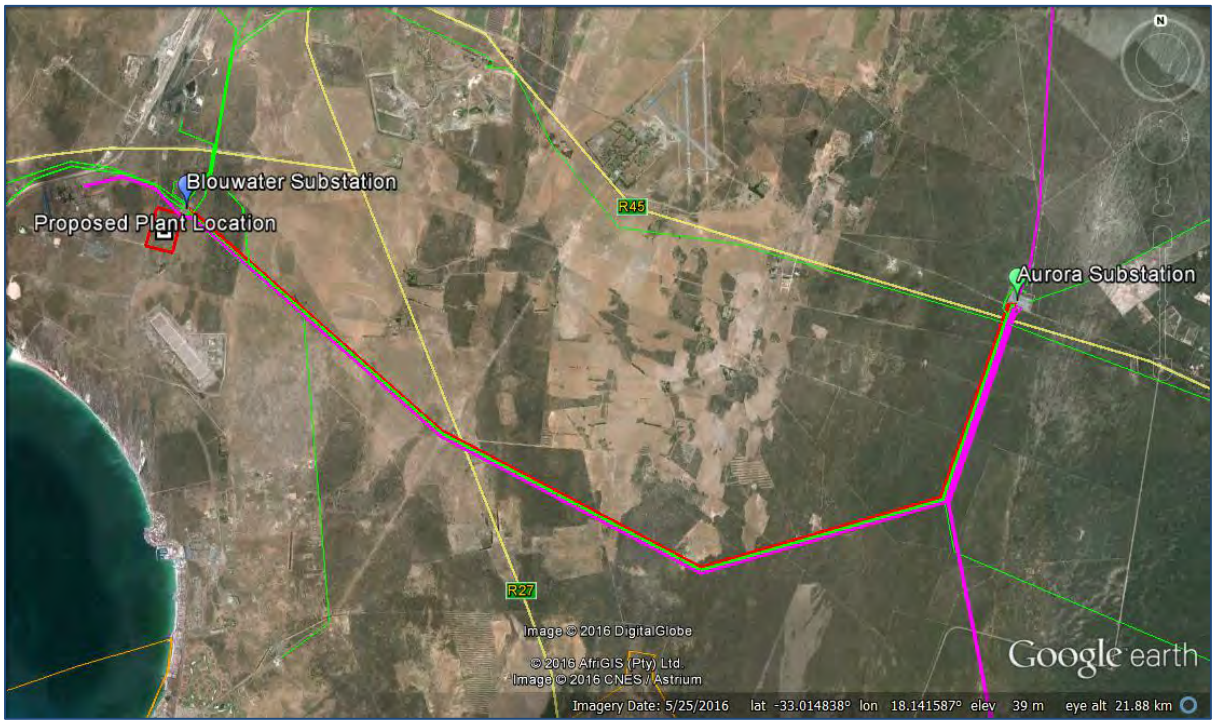

Figure 1: Satellite image showing the proposed CCGT power plant location and route of the proposed 400 kV overhead power line (red line) between the Eskom Blouwater Substation (blue marker) and the Eskom Aurora Substation (green marker). Note that

the proposed power line route follows the existing feeder servitude for high voltage lines (green line) and transmission lines (purple line).

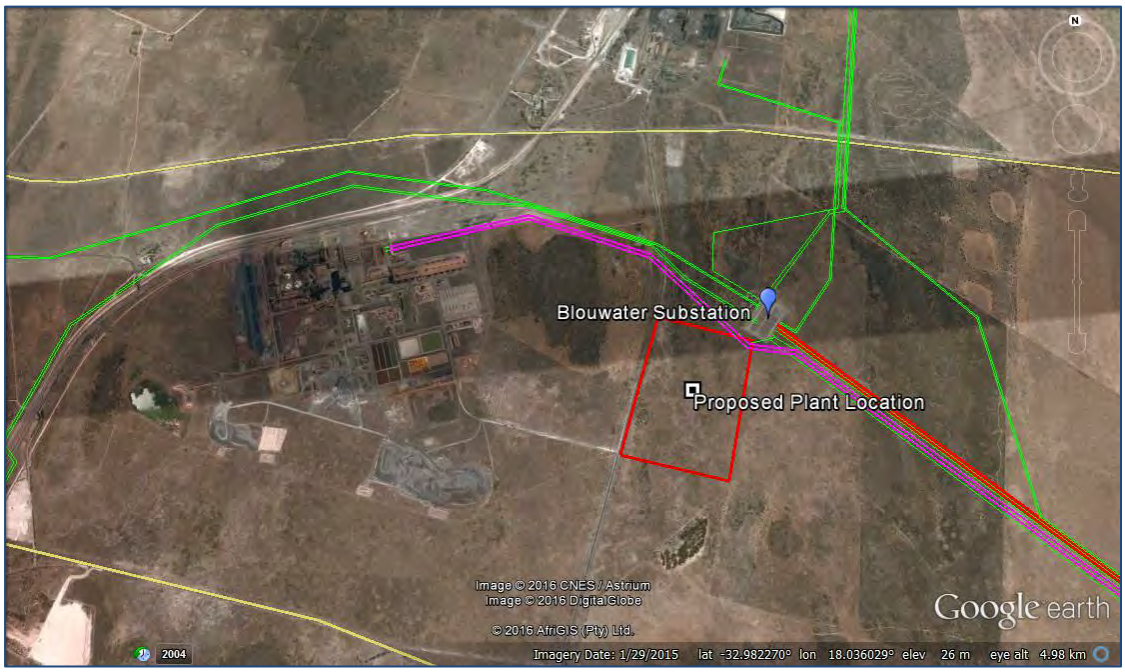

Figure 2: Satellite image showing a closer view of the proposed CCGT power plant location just to the east of the existing ArcelorMittal Steelworks.

1.3. RELEVANT LEGISLATION AND GUIDELINES

The following legislation is applicable to the proposed development:

1.3.1. The Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is an international convention (to which South Africa is a signatory) and represents a commitment to sustainable development. The Convention has three main objectives: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources (http://cbd.int/convention/guide/). Although the convention does not include specific recommendations or guidelines pertaining to birds and energy infrastructure interactions and impacts, it does make provisions for keeping and restoring biodiversity.

1.3.2. The Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to

make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e. power lines (Art 111, par. 4b and 4c).

1.3.3. The Agreement on the Convention of African-Eurasian Migratory Water Birds

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to guarantee the conservation of migratory waterbirds within their national boundaries through species and habitat protection and the management of human activities.

1.3.4. The National Environmental Management: Biodiversity Act

The National Environmental Management: Biodiversity Act (No. 10 of 2004, NEMBA) regulations on Threatened and Protected Species (TOPS) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. The national Act and several sets of provincial conservation legislation provide for among other things, the management and conservation of South Africa's biodiversity; protection of species and ecosystems that necessitate national protection and the sustainable use of indigenous biological resources.

1.4. TERMS OF REFERENCE

The specific terms of reference for this Avifaunal Impact Study include the following:

- A description of the environment of the study area in terms of the avian habitats present.
- A consolidated list of bird species and priority bird species (priority species will include nationally and/or globally threatened, rare, endemic or range-restricted bird species) likely to occur within the study area and broader impact zone of the development, with information on the relative value (in terms of breeding, nesting, roosting and foraging) of the site for these birds.
- A delineation of areas that are potentially highly sensitive, no-go areas that may need to be avoided by the development.
- A description and evaluation of the environmental issues and potential impacts (including direct, indirect and cumulative impacts) that the proposed development may have on the bird species present.
- A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts.

- A description of any mitigation measures that may be required to manage impacts related to the monitoring and assessment of the site.

1.5. STUDY METHODOLOGY

1.5.1. Approach

The Avifaunal Impact Study included the following steps:

- A review of all available published and unpublished literature pertaining to bird interactions with plants, substations and power lines, summarising the issues involved and the current level of knowledge in the field. Various information sources including data on the local avifauna of the area and previous studies of bird interactions with plants, substations and power lines were be examined.
- A site visit to the study area (6-8 June 2016) to determine the *in situ* local avifauna and avian habitats present on site. Walked transects, vehicle transects and vantage point surveys were conducted in various habitats across the site to:
    - Quantify aspects of the local avifauna (such as species diversity and abundance);
    - Identify important avian features present on site (such as nesting and roosting sites);
    - Confirm the presence, abundance, habitat preference and movements of priority species;
    - Identify important flyways across the site; and
    - Delineate any obvious, highly sensitive, no-go areas to be avoided by the development.
- The compilation of a consolidated and annotated list of the avifauna likely to occur within the study area and the broader impact zone of the development based on a combination of existing distributional data, species seen during the site visit, previous studies conducted in the area and experience of the local avifauna.
- The compilation of a short-list of priority bird species (including nationally and/or globally threatened, rare, endemic or range-restricted bird species) which could be affected by the proposed development. These species will subsequently be considered as adequate surrogates for the local avifauna in general, and mitigation of impacts on these species will be considered likely to accommodate any less important bird populations that may also potentially be affected.
- An avian site sensitivity map was generated by integrating avian microhabitats present on site and avifaunal information collected during the site visit. The avian sensitivity of the different units identified in the mapping procedure were rated according to the following scale:
    - *Low:* Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and avifauna.

Most types of development can proceed within these areas with little ecological impact.

- *Medium*: Areas of natural or previously transformed land where the impacts are likely to be largely local. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological and avian impacts provided that appropriate mitigation measures are taken.
- *High:* Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- *Very High:* Critical and unique habitats that serve as habitat for rare, threatened, endemic or range-restricted species and/or perform critical ecological roles. These areas are essentially no-go areas from a development perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as *Medium-High,* where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

- The construction of a matrix of potential impacts of the development on the local avifauna will be drawn up and the significance of these impacts will be assessed in terms of the available suite of mitigation options available.
- A final statement on the overall significance of the potential impacts of the development on the avifauna of the area will be written up.

1.5.2. Data sources used

The following data sources and reports were used in varying degrees of detail for this study:

- The Southern African Bird Atlas Project 1 (SABAP 1; Harrison *et al*., 1997) quarter degree squares (QDC) 3218CC (298 cards) and 3318AA (381 cards) as well as the Southern African Bird Atlas Project 2 (SABAP 2; http://sabap2.adu.org.za/index.php) pentads 3255_1800 (7 cards), 3300_1800 (92 cards), 3300_1805 (6 cards) and 3300_1810 (5 cards) were consulted to determine the bird species likely to occur within the study area and the broader impact zone of the development.
- The Important Bird Areas (IBA; Barnes, 1998) report was consulted to determine the location of the nearest IBAs and their importance in relation to this study.
- The Coordinated Avifaunal Roadcounts (CAR; Young *et al*., 2003) data was consulted to obtain relevant data on large terrestrial bird reporting rates in the study area.
- The Coordinated Waterbird Counts (CWAC; Taylor *et al.,* 1999) data was consulted to determine if large concentrations of waterbirds, associated with South African wetlands, occur within or near the study area.

- The conservation status, endemism and biology of all species considered likely to occur within the study area was then determined from Hockey *et al.* (2005) and Taylor *et al.* (2015).
- The South African National Vegetation Map (Mucina & Rutherford, 2006) was consulted in order to determine the vegetation types and their conservation status that occur within the study area.

1.5.3. Limitations and assumptions

The specialist made the assumption that the sources of information used in the compilation of this report are reliable. However, it must be noted that there are limiting factors and these could detract from the accuracy of the predicted results:

- The SABAP 1 data for the relevant quarter degree squares covering the developable area are now >18 years old (Harrison et al., 1997).
- Limited time in the field means that important components of the local avifauna (i.e. nest sites or localised areas of key habitats for rare or threatened species) could have been missed. The full length of the proposed power line was however surveyed and no nest sites were recorded to the best of this specialists capabilities, given the time and extent of such a task.

The site visit as well as personal experience of the avifauna of the area and of similar species in different parts of South Africa, through the specialist's experience working across the country, goes some way to remedying any knowledge deficiencies.

2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

2.1. BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map (Mucina & Rutherford, 2006) the proposed CCGT power plant and proposed 400 kV overhead power line traverse three vegetation types within the Fynboss Biome *en route* from the plant location in the west to the Eskom Aurora Substation in the east. The vegetation types include: Saldanha Limestone Strandveld where the proposed CCGT power plant and on-site switching yard is situated, Saldanha Flats Strandveld along the central region of overhead power line route and Hopefield Sand Fynbos around the Eskom Aurora Substation. All three vegetation types are classified as *Endangered* and are, on the whole, made up of shrublands with a moderately tall shrub layer and low, open, succulent undergrowth.

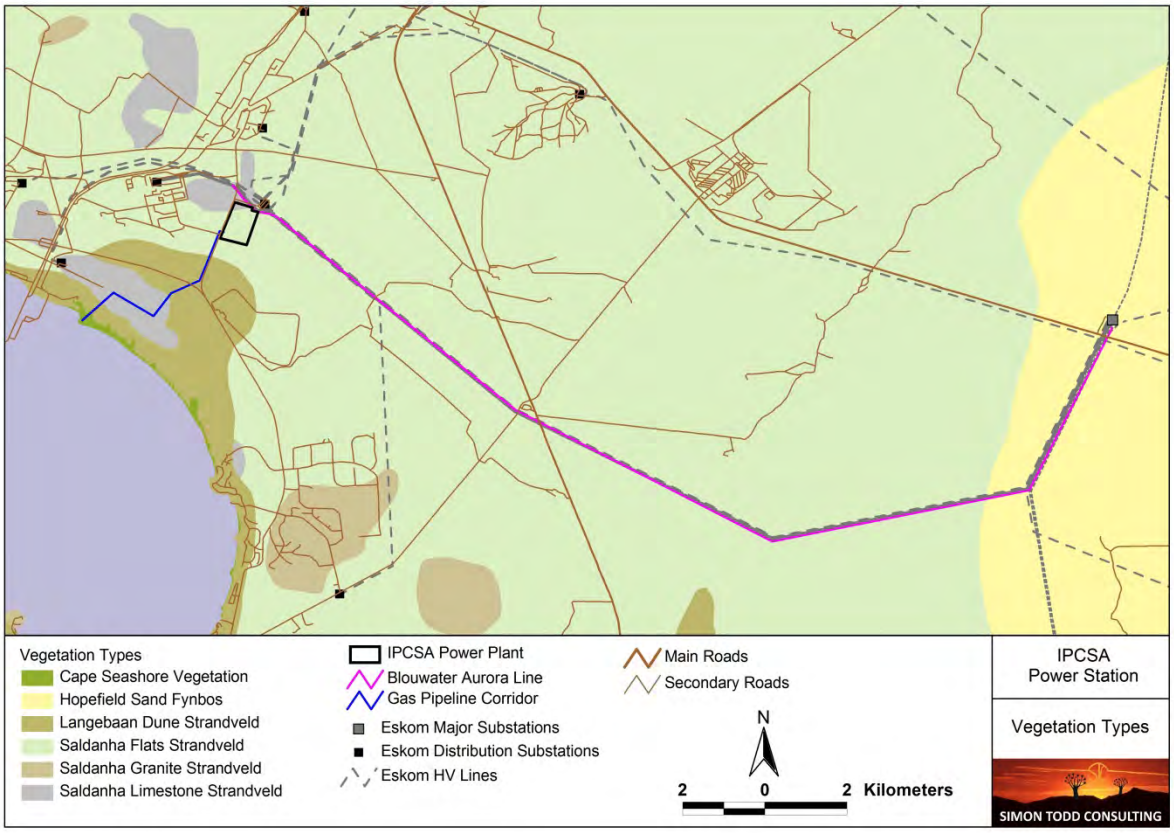

Figure 3: Broad-scale overview of the vegetation in and around the proposed CCGT power plant and 400 kV overhead power line to the Eskom Aurora Substation. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

2.2. AVIAN MICROHABITATS

While broad-scale vegetation patterns influence the distribution and abundance of bird species holistically, it is the fine-scale vegetation patterns and various avian microhabitats in an area that determine local avifauna populations.

A number of different avian microhabitats were identified at the site and these formed the basis of the avian site sensitivity map. These units include:

- *Fynbos shrubland*: This habitat unit represents a large portion of the vegetation traversed by the eastern section of overhead power line and is largely made up of dense low shrub. This habitat unit supported the highest diversity and abundance of species in the study area, specifically endemic and near-endemic passerines, as well as a few species of conservation concern (Martial Eagle *Polemaetus bellicosus* and Lanner Falcon *Falco biarmicus*).
- *Strandveld shrubland*: This habitat unit represents the majority of the vegetation traversed by the overhead power line (western and central section) and is comprised

of sparse shrub with scattered rock and succulent-dominated undergrowth. Bird species diversity and abundance was relatively low in this vegetation, however one species of conservation concern – Black Harrier *Circus maurus* – was recorded in and is known to favour this habitat unit.

- *Cultivated land*: Cultivated land represents a significant feeding area for many bird species in any landscape. The land preparation process opens up the soil and makes insects, seeds, bulbs and other food sources readily accessible to birds. The crops and pasture plants are also easy food sources and often attract insects which are in turn eaten by birds. Cultivated lands occur throughout the study area, with relevant bird species of conservation concern (Blue Crane *Anthropoides paradieus* and Southern Black Korhaan *Afrotis afra)* likely to be attracted to these areas.
- *Stands of exotic plantations*: This habitat unit occurs sporadically throughout the study area and represents the only large trees within the landscape. Although this habitat unit is largely made up of exotic tree species (*Eucalyptus)* where bird species diversity and abundance was not particularly high, it represents a potentially important nesting area for larger raptors.
- *Ephemeral pans:* There are numerous ephemeral pans (which will only hold water after heavy rains) scattered around the study area. This habitat unit is important for numerous species of waterbirds, specifically those of conservation concern (Greater Flamingo *Phoenicopterus ruber,* Lesser Flamingo *Phoenicopterus minor,* Great White Pelican *Pelecanus onocrotalus* and Maccoa Duck *Oxyura maccoa*).

It should however be noted, that the study area has already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises such as agriculture and industry due to its close proximity to the town of Saldanha.

Figure 4: Dense fynbos shrubland (left) and more open strandveld shrubland (right).

Figure 5: Cultivated lands (left) and stands of exotic plantations (right).

Figure 6: Ephemeral pan.

2.3. AVIFAUNA

Up to 267 bird species have been recorded within the relevant and respective SABAP 1 and 2 quarter degree squares and pentads covering the study area and broader impact zone of the development (Appendix 1), including 26 red-listed or threatened species, 40 endemic species and 26 near-endemic species. A large portion of these species were however not considered relevant for this study due to the fact that the grid size used for the SABAP 1 data collection was 27 km x 27 km, extending out to sea, and therefore includes pelagic species which would definitely not occur in the study area or broader impact zone of the development. Of the 26 red-listed or threatened species listed, 16 are relevant to this study. A total of 32 bird species were recorded during the field visit, most notable of which being Martial Eagle, Lanner Falcon, Black Harrier and Southern Black Korhaan.

The birds of greatest potential relevance and importance in terms of the possible impacts of the proposed CCGT power plant and 400 kV overhead power line are likely to be local

populations of endemic passerines (Cape Long-billed Lark *Certhilauda curvirostris* and Cape Clapper Lark *Mirafra apiata*), resident or visiting large terrestrial birds (Blue Crane, Southern Black Korhaan and Secretarybird *Sagittarius serpentarius*), resident or passing raptors (Martial Eagle, Lanner Falcon, Black Harrier) and transient waterbirds (Greater Flamingo, Lesser Flamingo, Great White Pelican and Maccoa Duck).

At the time of the site visit (6-8 June 2016), bird diversity and abundance was greatest in the *Fynbos shrubland* habitat unit at the eastern end of the proposed power line route, near the Eskom Aurora substation. A large majority of this eastern section of the proposed power line route traverses a game lodge/reserve where the natural vegetation remains relatively intact (especially in comparison to the surrounding areas). All four of the red-listed or threatened species (Martial Eagle, Lanner Falcon, Black Harrier and Southern Black Korhaan) recorded during the field visit were seen in this area. Other habitat units were less prolific, however the *Cultivated lands* habitat unit did also produce a high number of species and is expected to be visited regularly by Blue Cranes due to their fondness towards cereal crop fields and planted pastures. It is also expected that numerous species of transient waterbirds will fly-over the study area between resource areas, with many species (Greater Flamingo, Lesser Flamingo and Great White Pelican) doing so at night.

Figure 7: Lanner Falcon (left) and Martial Eagle (right) both recorded in the *Fynbos shrubland* habitat unit. Note both species making use of the existing power infrastructure.

On the basis of the observations recorded during the field visit, and in combination with already documented information on the avifauna of the study area, 16 priority species are considered central in this avifaunal impact study (Table 1). These are mostly threatened species which are known to occur, or could occur, in relatively high numbers in the developable area and the broader impact zone of the development and which are likely to be, or could be, negatively affected by the proposed CCGT power plant and 400 kV overhead power line.

Overall, the avifauna of the study area and the broader impact zone are not considered unique and are typical of what occurs across large areas of the Fynbos Biome, however

because of the expected occurrence of numerous priority species in the study area and the nearby proximity of two Important Bird and Biodiversity Areas, the sensitivity of the site, from an avian perspective, will be of **moderate** significance.

Table 1: Priority species list considered central to the avifaunal impact study for the proposed ArcelorMittal CCGT power plant and 400 kV overhead power line, selected on the basis of conservation status (Taylor *et al.*, 2015).

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in the study area	Susceptible to
Bustard, Ludwig's	*Neotis ludwigii*	Endangered	Endemic	Moderate	Semi-arid dwarf shrubland, also in arid savanna and fynbos	Low	Collision
Crane, Blue	*Anthropoides paradieus*	Near-threatened	Endemic	High	Grasslands, but also in wetlands, cultivated pastures and croplands	High	Collision
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Near-endemic	Low	Sparsely vegetated arid regions	Low	Disturbance
Duck, Maccoa	*Oxyura maccoa*	Near-threatened	-	Moderate	Inland water bodies with emergent vegetation; flyover	Moderate	Habitat loss/disturbance
Eagle, Martial	*Polemaetus bellicosus*	Endangered	-	Low	Open savanna and woodland on plains, also semi-arid shrublands	Recorded in the study area	Collision, electrocution
Eagle, Verreaux's	*Aquila verreauxii*	Vulnerable	-	Moderate	Mountainous regions and rocky areas with cliffs	High	Collision
Falcon, Lanner	*Falco biarmicus*	Vulnerable	-	High	Open grassland or woodland near cliff or electircity pylons	Recorded in the study area	Collision, disturbance/ habitat loss
Flamingo, Greater	*Phoenicopterus ruber*	Near-threatened	-	High	Saline or brackish water bodies; flyover	High	Collision
Flamingo, Lesser	*Phoenicopterus minor*	Near-threatened	-	High	Eutrophic shallow wetlands, saltpans; flyover	High	Collisions
Harrier, African Marsh	*Circus ranivorus*	Endangered	-	High	Inland and coastal wetlands, and ajacent moist grasslands	High	Habitat loss/disturbance; collisions
Harrier, Black	*Circus maurus*	Endangered	Near-endemic	High	Fynbos, shrubland, dry grassland and croplands	Recorded in the study area	Disturbance/ habitat loss
Korhaan, Southern Black	*Afrotis afra*	Vulnerable	Endemic	High	Renosterveld, fynbos and succulent Karoo	Recorded in the study area	Habitat loss/disturbance; collisions
Pelican, Great White	*Pelecanus onocrotalus*	Vulnerable	-	High	Shallow lakes, estuaries, large pans and dams	High	Collisions
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	Moderate	Open grassland with scattered trees and shrubs	Moderate	Collision
Stork, Black	*Ciconia nigra*	Vulnerable	-	Moderate	Mountainous regions	High	Collision, electrocution
Vulture, Cape	*Gyps coprotheres*	Endangered	Near-endemic	Low	Mountainous regions, but range widely in surrounding areas	Low	Habitat loss/disturbance; collisions; electrocutions

2.4. IMPORTANT BIRD AND BIODIVERSITY AREAS

Important Bird and Biodiversity Areas (IBA) are sites of global significance for bird conservation, identified nationally through multi-stakeholder processes using global standardised, quantitative and scientifically agreed criteria (Marnewick *et al.,* 2015). The criteria are based in the presence of threatened species, assemblages of restricted-range and biome-restricted species, and large concentrations of congregatory species, referred to collectively as IBA 'trigger' species. Birds have been shown to be effective indicators of biodiversity hotspots, and so IBAs hold a large and representative proportion of other taxa too. Therefore, the conservation of IBAs ensures both the survival of a correspondingly large variety and abundance of other biodiversity and the integrity of ecosystem services that also support human well-being (Marnewick *et al.,* 2015).

At their closest points, the proposed development is ± 2 km north of the West Coast National Park and Saldanha Bay Islands IBA and ± 8 km south of the Berg River Estuary IBA.

Figure 8: Satellite image showing the proposed development in relation to the West Coast National Park and Saldanha Bay Islands IBA (to the south) and the Berg River Estuary IBA (to the north).

2.4.1. West Coast National Park and Saldanha Bay Islands IBA

Site description

The West Coast National Park adjoins the town of Langebaan c. 100 km north of Cape Town and encompasses Langebaan Lagoon, a wetland of international importance and a designated Ramsar site; the coastal zone, which includes Postberg Nature Reserve and much of 16 Mile Beach; and the islands in Saldanha Bay, namely Jutten (43 ha), Malgas (18 ha), Marcus (17 ha) Vondeling (21 ha) and Schaapen (29 ha). Meeuw Island (7 ha) still belongs to the SANDF but is included in the IBA. The lagoon, an arm of Saldanha Bay, is approximately 15 km long, 3 km wide and up to 6 m deep, and is sheltered from wave action. The spring tide range extends from 1.7 m at the mouth to 1.4 m at the lagoon's southern end. Several hydrological conditions change along the length of the lagoon, creating a gradient of habitats. Although it receives no significant freshwater input above ground, the lagoon is fed by a number of underground aquifers, particularly the Elandsfontein aquifer, and consequently qualifies as an estuary.

The rich mud of the salt marshes supports dense populations of molluscs and crustaceans. Some 71 species of marine algae have been recorded in the lagoon and its verges are lush with salt-marsh succulents and dense stands of bulrushes, reeds and freshwater vegetation. The lagoon serves as a nursery ground for juvenile fish, and gobies, pipefish, skates, rays and small sharks are common. Extensive areas of mudflats, sand flats and salt-marsh succulents (concentrated in the south) are exposed at low tide. The localised freshwater input at the lagoon's southern section permits the growth of a diversity of palustrine wetland vegetation.

The islands within the IBAs borders are diverse. Jutten, a large, triangular island, lies about 800 m from Jut Point at the southern entrance to Saldanha Bay and rises to some 60 m a.s.l. Sparse vegetation grows over numerous boulders strewn across its flat perimeter and up the sides of two small hills. There are buildings on the island and stone and concrete walls intricately subdivide it. Malgas Island, which is circular and flat, lies across from Jutten at the northern entrance to Saldanha Bay. Large boulders are scattered across this barren island. Marcus Island rises to just over 7 m a.s.l. and lies deep in Saldanha Bay, about 1.2 km south of Hoedjies Point. Since 1976 it has been connected to the mainland by a 2-km causeway, which was built as part of the harbour development for the export of iron ore and the import of crude oil. Sparse vegetation is interspersed between scattered boulders. Meeuw and Schaapen islands, which lie about 800 m from one another, are near the shore of Donkergat Bay and Langebaan Town respectively. Both islands are located in the southern section of Saldanha Bay, almost in the mouth of Langebaan Lagoon, and are sparsely covered by vegetation.

Well-developed strandveld, comprising low bushes and succulents, dominates the terrestrial vegetation around the lagoon. Many flowering annuals put on a show in spring and there are also elements of coastal sclerophyllous fynbos, especially in the east. Some old

farmlands provide more open habitat. The open coast on the park's western border is exposed to heavy wave action and is predominantly sandy in the south and rocky in the north.

Birds

More than 250 bird species have been recorded in the West Coast National Park. Langebaan Lagoon is the most important wetland for waders in South Africa, regularly accounting for c. 10% of South Africa's coastal wader numbers. It consistently supports more than 20 000 non-passerine waterbirds in summer, of which 16 500 are waders and 93% are Palearctic migrants. In some years wader numbers can increase from 4 000 in winter to 20 000 in summer. Grey Plover *Pluvialis squatarola*, Curlew Sandpiper *Calidris ferruginea*, Sanderling *C. alba*, Red Knot *C. canutus* and Ruddy Turnstone *Arenaria interpres* are the major components of the summer wader assemblage. Important resident waders include Chestnut-banded Plover *Charadrius pallidus*, White-fronted Plover *C. marginatus* and Kittlitz's Plover *C. pecuarius*.

In winter, the lagoon regularly holds more than 6 500 birds, of which Greater Flamingo *Phoenicopterus ruber* and Lesser Flamingo *P. minor* make up 2 000, and 4 000 are waders. The terrestrial strandveld habitat is important for African Marsh Harrier *Circus ranivorus*, Black Harrier *C. maurus*, Southern Black Korhaan *Afrotis afra*, Red-chested Flufftail *Sarothrura rufa* and African Rail *Rallus caerulescens*, and possibly also for the secretive Hottentot Buttonquail *Turnix hottentottus*.

The islands in Saldanha Bay are home to nearly 80 000 coastal seabirds. Malgas Island is one of only six localities in the world that supports breeding Cape Gannet *Morus capensis*and is known to have been used by the species since at least 1648. The colony on the island comprises 25% of the global Cape Gannet population. Together, the islands hold important numbers of African Penguin *Spheniscus demersus*, although there is considerable cause for concern because the populations at Malgas, Marcus and Jutten islands have declined by more than 50% – a decline that is mirrored across the species' west coast breeding sites. The largest known Kelp Gull *Larus dominicanus* colony in southern Africa is found on Schaapen Island. Nearly 10% of South Africa's Hartlaub's Gull *Chroicocephalus hartlaubii* population and 5% of the global Crowned Cormorant *Phalacrocorax coronatus*population are present in this IBA. Important populations of Bank Cormorant *P. neglectus*, Cape Cormorant *P. capensis* and Swift Tern *Thalasseus bergii* also breed at the various islands.

The lagoon has supported large numbers of Caspian Tern *Sterna caspia* in the past, but they may have moved to the Lower Berg River wetlands (SA104). Twelve per cent of the world's African Black Oystercatcher *Haematopus moquini* population is found scattered throughout the IBA, mostly on the islands. The coastal strandveld supports several restricted-range and biome-restricted assemblage species, including the recently described Cape Long-billed

Lark *Certhilauda curvirostris*, Karoo Lark *Calendulauda albescens*, Cape Bulbul *Pycnonotus capensis*, Cape Spurfowl *Pternistis capensis* and Sickle-winged Chat *Cercomela sinuata*.

IBA trigger species
Globally threatened species are African Penguin (614 breeding pairs), Cape Gannet (30 000 breeding pairs), Cape Cormorant (3 343 breeding pairs), Bank Cormorant (65 breeding pairs), Crowned Cormorant (maximum 308 individuals; CWAC data), African Black Oystercatcher, Lesser Flamingo (maximum 687 individuals; CWAC data), Chestnut-banded Plover, Secretarybird *Sagittarius serpentarius*, Black Harrier and Southern Black Korhaan. Regionally threatened species are Caspian Tern, Greater Flamingo, Great White Pelican *Pelecanus onocrotalus*, Verreauxs' Eagle *Aquila verreauxii*, African Marsh Harrier and Lanner Falcon *Falco biarmicus*.

Restricted-range and biome-restricted species include Cape Spurfowl and Cape Bulbul, which are common; Karoo Lark, which is locally common; and Cape Long-billed Lark and Layard's Tit-Babbler *Sylvia layardi*, which are uncommon.

Species that meet the 1% or more congregatory population threshold are Cape Gannet (30 000 breeding pairs; CWAC data), Cape Cormorant (3 343 breeding pairs; CWAC data), Crowned Cormorant (maximum 308 individuals; CWAC data), Bank Cormorant (65 breeding pairs; CWAC data), Greater Flamingo (maximum 1 312 individuals; CWAC data), Lesser Flamingo (maximum 687 individuals; CWAC data), White-fronted Plover (maximum 197 individuals; CWAC data), Grey Plover (maximum 3 300 individuals; CWAC data), Ruddy Turnstone (maximum 1 600 individuals; CWAC data), Curlew Sandpiper (maximum 7 859 individuals; CWAC data), Sanderling (maximum 4 950 individuals; CWAC data), Kelp Gull (4 221 breeding pairs) and Hartlaub's Gull (245 breeding pairs). Species that meet the 0.5% population threshold are Kittlitz's Plover (maximum 106 individuals; CWAC data), Red Knot (maximum 2 000 individuals; CWAC data) and Common Tern *Sterna hirundo* (maximum 1 000 individuals; CWAC data).

Threats
The proclamation of the national park at this site precludes most threats, although the Industrial Development Zone at Saldanha and the expansion associated with it could impact negatively on the system as a whole. After the completion of the Sishen–Saldanha railway line in the early 1970s and the construction of a deep-water harbour in Saldanha Bay, the area was committed as a major port for the export of iron ore. Major industrial development subsequently led to the town's growth. Metal pollution from the iron-ore berth and pollution and oiling incidents from urbanisation and shipping pose a threat to the future of the lagoon. The development of the port has already altered the hydrodynamics and physical structure of the bay; it is due to be expanded and the number of different products exported, including various minerals and chemicals, will be increased.

These changes, which include the development of potential phosphate mines next to the IBA, pose a major threat to the sensitive ecosystems of Langebaan Lagoon in that increased shipping traffic and industrial activities may result in oil or chemical spills. The intertidal salt flats, marshes and rocky islands are at particular risk. Chronic pollution from crude oil or other contaminants that spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge can occur. African Penguins are particularly susceptible to events such as this and a single oil disaster can severely affect populations. One large spill could threaten all the important seabird populations at the Saldanha Bay islands, as well as impact the Ramsar-designated Langebaan Lagoon.

Dredging required to deepen the harbour is an additional threat as it can lead to increased sedimentation in the lagoon itself. A fine layer of sediments on the mudflats reduces habitat quality for invertebrates and could also reduce the foraging quality for birds. Sewage effluent overflows and leaks from soak-away tanks in the towns of Langebaan and Saldanha occasionally affect water quality in the bay, impacting negatively on the sensitive ecology of the system and potentially reducing the habitat quality.

Between 1956 and 1980 the global Cape Gannet population declined some 50%. The collapse was attributed to a decrease in sardine *Sardinops sagax* stocks, the gannets' primary food source. Despite the global decline, which affected mainly Namibian colonies, the Malgas Island colony has been increasing since the late 1960s to early 1970s, which correlates with the local recovery of sardine stocks in the Western Cape. African Penguin and Cape Cormorant are thought to have been affected by competition with commercial fisheries, especially purse-seining for surface-shoaling fish such as anchovy *Engraulis capensis* and sardine. A recommendation has been made that marine reserves with a radius of 25 km are established around important breeding islands. Commercial fishing should be banned or restricted within these zones.

Uncontrolled recreational activities such as jet-skiing and kite-boarding can disturb foraging birds. This is a particular threat for migratory waders, which need to gain weight for the return flight to the northern hemisphere. It is being tackled by the West Coast National Park Forum and the development of a watercraft association in Langebaan. A new camp may be built in the park, at a site known as Kleinmooimaak on the lagoon shore. If it goes ahead, the disturbance effect along the shore will increase and the activities and numbers of people utilising this area will have to be regulated.

Seals have been known to prey on juvenile seabirds and this can impact on populations on the rocky islands of the IBA. This threat is being actively managed by park and DEA: Oceans and Coasts Division officials and the culling of rogue seals is carried out when necessary. Since the construction of the causeway to Marcus Island, several mammalian predators have periodically occurred on the island, including Cape grey mongoose *Herpestes pulverulentus*, yellow mongoose *Cynictis penicillata*, small-spotted genet *Genetta genetta* and Cape fox *Vulpes chama*. During a four-year period, a minimum of 195

individuals of nine seabird and shorebird species, including large numbers of African Penguin and African Black Oystercatcher (8% of the island's breeding population was killed in a single season), were killed by mammalian predators on Marcus Island. This led to the construction of a predator-proof wall, which has reduced, but not eliminated, predation on the island. Since the construction of the causeway, populations of all breeding seabirds on Marcus Island have declined. European rabbits *Oryctolagus cuniculus* have substantially altered the vegetation on Schaapen and Jutten islands, but there is no evidence to suggest they have adversely affected breeding seabirds.

2.4.2. Berg River Estuary IBA

Site description
Covering an area of c. 6 621 ha, the Berg River Estuary IBA is located 140 km north of Cape Town. The town of Laaiplek lies directly north of the river mouth, and 6 km upstream is the town of Velddrif. The Berg River forms one of only four perennial estuaries on the arid west coast of southern Africa. The IBA includes only the lower Berg River, but this system is reliant on the management of its catchment, which extends c. 160 km upstream from the river mouth to its source in the Franschhoek and Drakenstein mountains. From its source, the river flows through the towns of Paarl and Wellington before arching west and meeting the Atlantic Ocean at Laaiplek. The lower reaches of the river meander over very flat country so that, on average, the riverbed falls only 1 m in the last 50 km.
The ecological functioning of the estuary is determined by seasonal changes in river discharge and consequent changes in salinity and turbidity. In winter, when the estuary is flooded by muddy, fresh river water, most of the marine species disappear. As the floods recede in spring, the salinity increases and the system shifts back to a predominantly marine environment. When the shallow pools on the floodplain start to dry out, also in spring, there is a marked increase in the number of birds the wetlands support.

The floodplain encompasses eight major wetland types in addition to the river channel: ephemeral pans, commercial salt pans, reed marsh, sedge marsh, salt marsh, halophytic floodplain, xeric floodplain and intertidal mudflats. The ephemeral pans comprise monospecific stands of *Juncus maritimus* in summer. After winter rains, abundant *Aponogeton distachyos* appears, along with other species. The commercial salt pans comprise a salt desert generally lacking macrophytes.

The reed marsh is based on saturated, silt-rich soils, mainly on inner riverine beds. Although the sedge marsh is dominated by *Juncus kraussii*, smaller sedge species are also present in a varied mosaic that includes non-sedge species. The salt marsh experiences tidal flooding by saline water twice a day and is dominated by fleshy-leaved salt-tolerant species. Halophytic floodplain vegetation consists primarily of *Sarcocornia pillansii*, which may be interspersed with open patches that are colonised by ephemeral growth in spring. The xeric floodplain vegetation comprises a great diversity of xerophytes. The floodplain can be inundated for up to two weeks at a time when the Berg River floods. The terrestrial vegetation within the

catchment has been altered dramatically and consists primarily of an agricultural matrix, with patches of Strandveld near the coast and a mosaic of invasive alien *Acacia* species and indigenous fynbos in the mountainous interior.

Birds

Since 1975, approximately 250 bird species have been recorded on and adjacent to the lower Berg River, 127 of which are waterbirds. The most important habitats for foraging birds are the estuarine mudflats and ephemeral floodplain pans, while for breeding the riparian marshes and the commercial salt pans are key. On average, more than 12 000 non-passerine waterbirds occur at the estuary during summer and 6 000 non-passerine waterbirds during winter. In combination, the estuary and floodplain regularly support more than 20 000 birds; in December 1992 a count of both habitats yielded 46 234 waterbirds.

Total waterbird numbers are strongly influenced by the influx of Palearctic migrants and more than 8 000 migrant waders, especially Curlew Sandpiper *Calidris ferruginea* and Little Stint *C. minuta*, are regularly present in summer. Among resident waders, Kittlitz's Plover *Charadrius pecuarius* is most abundant, but large numbers of the Afro-tropical resident population of Pied Avocet *Recurvirostra avosetta* are also present when conditions are favourable. The open mudflats support a small population of African Black Oystercatcher *Haematopus moquini*.

The commercial salt pans hold many breeding species, including very large numbers of Caspian Tern *Sterna caspia*, incorporating up to 13% of the South African breeding population. Greater Flamingo *Phoenicopterus roseus* and Lesser Flamingo *Phoeniconaias minor* have attempted to breed at the salt pans in recent years and Chestnut-banded Plover *Charadrius pallidus* breeds here regularly. Kelp Gull *Larus dominicanus* and Hartlaub's Gull *Chroicocephalus hartlaubii* are resident at the Berg River and occur in large numbers, breeding in mid-summer and early winter respectively. Swift Tern *Thalasseus bergii* breeds here sporadically. Large mixed-tern roosts are occasionally seen on the floodplain and the small islands in the middle estuary. Substantial numbers of Great White Pelican *Pelecanus onocrotalus* occur regularly on the lower Berg River, which is a key foraging and roosting area for the Dassen Island (IBA SA109) breeding population during the non-breeding season.

Great Crested Grebe *Podiceps cristatus* and Black-necked Grebe *P. nigricollis* breed occasionally. South African Shelduck *Tadorna cana* uses the estuary in large numbers as a moulting site and also breeds regularly. Yellow-billed Duck *Anas undulata*, Cape Teal *A. capensis*, Cape Shoveler *A. smithii* and Red-knobbed Coot *Fulica cristata* breed in the inundated salt marshes in the upper estuary. This area is also one of the few remaining breeding sites for Greater Painted-snipe *Rostratula benghalensis* in the Western Cape.

A large heronry c. 1 km west of the Kersefontein farmhouse is known to have existed for the past 300 years. It holds 13 breeding species, including substantial numbers of Grey Heron *Ardea cinerea*, Black-headed Heron *A. melanocephala*, Western Cattle Egret *Bubulcus*

ibis, Yellow-billed Egret *Egretta intermedia* and African Spoonbill *Platalea alba*, as well as Glossy Ibis *Plegadis falcinellus*, which appears to be increasing. The reed marsh immediately adjacent to the floodplain is important for breeding African Marsh Harrier *Circus ranivorus*, especially below Die Plaat. African Fish Eagle *Haliaeetus vocifer* and an isolated European Bee-eater *Merops apiaster* population occasionally breed along the river. There is a significant roosting site for four of South Africa's cormorant species – Crowned *Phalacrocorax coronatus*, Cape *P. capensis,* Bank *P. neglectus* and White-breasted *P. lucidus* – in the area, which also provides a night roost for certain species, with estimates of up to 60 000 Cape Cormorants coming in to roost in the evenings, as well as significant numbers of different tern species.

The numbers of Cape, Bank and Crowned cormorants have reduced significantly and it is suggested that the density of wader species using the area is also decreasing year on year due to alterations in habitat quality and other disturbances. Of particular concern is the number of species that no longer meet the population limits for the congregatory category of the IBA criteria.

IBA trigger species
Globally threatened species are Cape Cormorant (maximum 1 787 individuals), Crowned Cormorant (maximum 70 individuals), Lesser Flamingo, African Black Oystercatcher, Black Harrier *Circus maurus* and Chestnut-banded Plover. Regionally threatened species are Greater Flamingo, Great White Pelican, Caspian Tern, African Marsh Harrier, Lanner Falcon*Falco biarmicus* and Greater Painted-snipe. Biome-restricted species common in the IBA include Cape Spurfowl *Pternistis capensis* and Cape Bulbul *Pycnonotus capensis*, while Karoo Lark *Calendulauda albescens* is locally common.

Red-knobbed Coot (maximum 1 400 individuals) meets the 1% or more congregatory threshold, and African Spoonbill and Chestnut-banded Plover meet the 0.5% or more congregatory threshold. Species that have not met the 1% or more threshold but should be on probation and reviewed in future assessments are Cape Shoveler, Kittlitz's Plover, Curlew Sandpiper, Pied Avocet, Kelp Gull, Hartlaub's Gull, Swift Tern, Sandwich Tern *Thalasseus sandvicensis* and White-winged Tern *Chlidonias leucopterus*. Species that should be reviewed for the 0.5% or more threshold are Great Crested Grebe, Black-necked Grebe, Little Stint and South African Shelduck.

Threats
The principal threat to this estuary stems from inadequate water flow volumes and an unnatural flow regime of fresh water coming down the Berg River from its catchment, due to high levels of water abstraction along the river's course and to the Berg River Dam. In 1998, water supplied to the Greater Cape Town metropolitan area from the Berg River and additional abstraction for agricultural use had reduced the mean annual run-off of water by 23%. Further reductions are likely to have occurred as a result of the construction of the Berg River Dam, which stores water and supplies it to the growing population of Cape Town.

Abstraction at the dam and increased, unregulated abstraction of water along the river's length have a major impact on the water levels and flow regime of the estuary.

The dam was built so that specific volumes of water could be released at certain intervals in order to maintain the natural flow regime of the river. However, these flow regimes will not entirely mimic a natural system. Winter inundation of the floodplain, either naturally or through controlled releases, is essential for the continued ecological functioning of the floodplain and estuary. Lack of winter flooding may result in the development of hyper-saline conditions and consequent biological sterility on the floodplain. The most important threat to this wetland is therefore further reduction in the mean annual run-off, which would significantly affect seasonal water flow patterns and volumes.

The mean annual run-off may also be reduced by a proposed impoundment upstream of the estuary. In addition, water volumes will almost certainly be diminished by the construction of the Corex steel smelter (Saldanha Steel) and the associated spin-off industries near Saldanha Bay, which will require considerable quantities of water for their operation. It has been proposed that water be abstracted from the Berg River for these purposes. The Saldanha Bay Industrial Development Zone and the associated industries planned for the area may further exacerbate water abstraction issues in this system.

A second threat is hyper-salinity in the estuary, which occurs when the sediments at the river mouth are dredged to allow boats access to what has become a fully constructed harbour in place of the natural estuary and river mouth. Dredging increases the velocity of the tidal flow, the turbidity of the water and the penetration of salt water upstream, and intensifies erosion within the system. The increased penetration of salt water – a result of reduced freshwater flow as well as dredging – changes the ecological character of the estuary, impacting primarily on the vegetation types and invertebrate fauna of the area. Alterations in the plant and invertebrate community in turn impact on the foraging wader and other waterbird species.

Eutrophication of the estuary and wetlands due to the run-off of excess fertilisers and other chemicals from agricultural activities along the Berg River's course to the sea can have a major negative impact on the ecology of the wetland system. Greater nutrient loading may be another cause of the increase in algal and plant material that seems to be affecting wader foraging habitat. Light, noise and other pollutants from upstream activities, the harbour, salt-mining operations and the urban area can lead to further degradation of the sensitive estuarine environment.

Human activities, such as boating on the river, and disturbance factors from the nearby towns, harbour and factories also pose a threat to the birds of this site. Birds breeding and foraging in the wetlands are likely to be affected and may be forced out of highly disturbed areas. Proposed developments in certain parts of the estuary will also lead to an irreversible loss of habitat and increased disturbance in adjacent areas.

In the terrestrial environment, the occurrence of alien vegetation such as *Sesbania punicea* and Australian *Eucalyptus* and *Acacia* species constitute further threats as they transpire more than indigenous vegetation does and thus use substantially more water. The aquatic water hyacinth *Eichhornia crassipes* has invaded and poses a significant threat to the open-water system and floodplain, changing the character of the tidal mudflats that provide essential foraging habitat for migratory and resident shorebirds and waders.

2.5. AVIAN SITE SENSITIVITY MAP

The avian site sensitivity map (Figure 9) was generated by integrating avian microhabitats present on site, avifaunal information collected during the site visit as well as the topography of the study area, as this is important in determining risk associated with a power line development (i.e. collision risk). It is important to delineate sensitive avian microhabitats within the study area in order to ensure the development does not have a long term negative impact on these habitats. Important avian microhabitats play an integral role within the landscape, providing nesting, foraging and reproductive benefits to the local avifauna.

The location for the proposed CCGT power plant has been identified as being of *Low* avian sensitivity due to the fact that it is located adjacent to the ArcelorMittal Steelworks and in an area that has been heavily disturbed. The *Strandveld shrubland* habitat unit which surrounds the proposed plant location was homogenous, lacking structural and compositional variation, and did not support a high diversity and abundance of bird species.

The entire length of the proposed 400 kV overhead power line has been assessed as being of *High* avian sensitivity due to the fact that numerous red-listed, threatened or priority species are expected to traverse the area, between the aforementioned IBAs or various ephemeral pans (Greater and Lesser Flamingo and Great White Pelican) and between resource areas in the study area (Blue Crane and Southern Black Korhaan). Two priority species – Lanner Falcon and Martial Eagle – have already been recorded interacting with existing power infrastructure in the study area and as such, it is of paramount importance that new infrastructure includes mitigation measures so as not to exponentially increase the risk to these and other priority species.

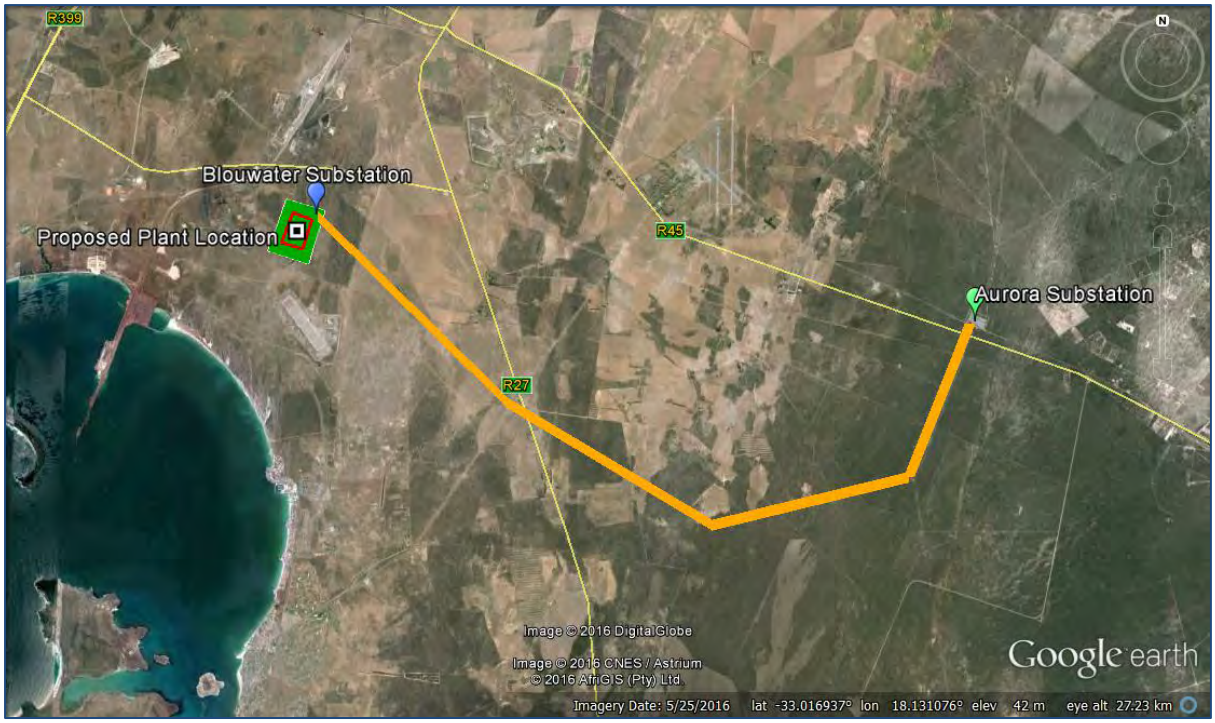

Figure 9: Avian site sensitivity map of the proposed ArcelorMittal CCGT power plant and 400 kV overhead power line. Avifaunal sensitivity: Green = *Low* and Orange = *High.*

3. ASSESSMENT OF IMPACTS

3.1. GENERAL DESCRIPTION OF BIRD INTERACTIONS WITH POWER PLANTS AND ASSOCIATED POWER INFRASTRUCTURE

While alternative energy sources are important to the future development of power generation and hold great potential, they are not without their environmental risks and negative impacts. Poorly sited or designed plants can have negative impacts on not only vulnerable species and habitats, but also on entire ecosystem functioning. These impacts are extremely variable, differing from site to site, and are dependent on numerous contributing factors which include the design and specifications of the plant, the importance and sensitivity of avian microhabitats present on site and the diversity and abundance of the local avifauna.

3.1.1. Impacts of CCGT power plants

Habitat loss

Although the degree of this impact is dependent on the location and scale of the development, this is potentially the most significant impact associated with the construction and operation (maintenance) of any plant. Extensive areas of vegetation (habitat) are cleared to accommodate the considerable amount of infrastructure required at these facilities, reducing the amount of habitat available to birds for foraging, roosting and

breeding (Smallie, 2013). This impact is likely to affect smaller bird species (i.e. larks and pipits) with small home ranges, as entire territories could be removed during construction activities.

Disturbance and displacement

Construction of CCGT power plants requires a significant amount of machinery and labour to be present on site for a period of time. For shy, sensitive species or ground-nesting birds resident in the area, construction activities are likely to cause a temporary disturbance or even result in displacement from the site entirely. In addition, but to a lesser extent, ongoing maintenance activities at the operational facility are likely to cause some degree of disturbance to birds in the general vicinity.

Human conflict

Certain bird species may seek to benefit from the plant, using the erected structures as prominent perches, sheltered roost sites or even nesting sites, and possibly foraging around the infrastructure. This may result in the fouling of critical components of the plant, bringing local bird populations into conflict with facility operators.

3.1.2. Impacts of associated power infrastructure

Due to their large size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocutions of birds and birds colliding with power lines (Ledger & Annegran, 1981; Ledger, 1983; Ledger, 1984; Hobbs & Ledger, 1986a; Hobbs & Ledger, 1986b; Ledger, Hobbs & Smith, 1992; Verdoorn, 1996; Kruger & Van Rooyen, 1998; Van Rooyen, 1998; Kruger, 1999; Van Rooyen, 1999; Van Rooyen, 2000). Other problems include displacement caused by disturbance and habitat destruction during construction and maintenance activities and electrical faults caused by bird nests and excrement when roosting or breeding on electricity infrastructure (Van Rooyen & Taylor, 1999).

Electrocution of birds

Avian electrocutions occur when a bird perches or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the gap between live phases and earth components (phase-earth electrocution) or two live phases (phase-phase electrocution) (Van Rooyen, 2004b; Lehman *et al*., 2007). Electrocution risk is strongly influenced by the power line voltage, the design of the pole structure and the size of the bird, with mainly larger, perching species such as vultures, eagles and storks being affected as they are capable of spanning the spaces between energised components.

Birds colliding with power lines

Power lines pose a significant collision risk to birds, affecting a particular suite of collision prone species. These are mostly heavy-bodied birds such as bustards, cranes, storks, large eagles and various species of waterbirds that have limited manoeuvrability in flight, which

makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (Anderson, 2001; Van Rooyen 2004a; Jenkins *et al.,* 2010).

Body size and morphology are key predictive factors of collision risk, with large-bodied birds with high wing loadings (the ration of body weight to wing area) most at risk (Bevanger, 1998; Janss, 2000). These birds must fly fast to remain airborne, and do not have sufficient manoeuvrability to avoid unexpected obstacles.

Vision and the visual capacity of birds is another key factor, with many collision-prone birds principally using lateral vision to navigate in flight, when it is the lower resolution and often restricted, forward vision that is useful to detect obstacles (Martin & Shaw, 2010; Martin, 2011; Martin et al., 2012). More so than that, recent research has shown that birds can render themselves blind in the direction of travel during flight through voluntary head movements (Martin & Shaw, 2010).

Behaviour and experience are also important, with birds flying in flocks, at low levels and in crepuscular or nocturnal conditions at higher risk of collision as well as migratory and nomadic species that spend much of their time in unfamiliar locations (Bevanger, 2002; Anderson 2002). Juvenile birds have also been reported as being more collision-prone than adults (Henderson et al., 1996).

Topography and weather conditions affect how birds use the landscape and power lines in sensitive bird areas e.g. those that separate feeding and roosting areas or cross flyways, can be very dangerous (Bevanger, 1994). Lines crossing the prevailing wind conditions can pose a problem for large birds that use the wind to aid take-off and landing (APLIC, 1994; Bevanger, 1994). Inclement weather can disorient birds and reduce their flight altitude, and strong winds can result in birds colliding with power lines that they see but do not have enough flight control to avoid (APLIC, 1994).

Displacement caused by disturbance and habitat destruction

During the construction phase and maintenance of power lines, some habitat destruction and transformation inevitably takes place. This happens with the construction of access roads and the clearing of servitudes and the levelling of substation or switching yards. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimise the risk of fire under the line, which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through transformation of habitat which could result in temporary or permanent displacement.

Electrical faults caused by bird nests and excrement

Bird nests may cause faults through nest material protruding and constituting an air gap intrusion (Van Rooyen, 2000; Van Rooyen, 2001). Crows in particular often incorporate wire and other conductive material into their nests. Similarly so, a fault can occur when long streams of excrement released by large birds, either perched or in flight near a power line, can cause a flashover (Van Rooyen, 2000; Van Rooyen, 2001). A streamer that bridges the gap between the earth components, namely the steel tower and a bird perched on it above the insulator, and the nearest live component, acts as a fuse and results in an electrical fault. Physiologically, only larger birds are capable of causing this.

3.2. PROJECT SPECIFIC ASSESSMENT OF IMPACTS

Specific impacts of the proposed ArcelorMittal CCGT power plant and 400 kV overhead power line are most likely to be manifested in the following ways:

- Disturbance and displacement of local endemic passerines - from nesting and/or foraging areas by construction, operation and maintenance of the proposed CCGT power plant, new overhead power line and underground pipeline.
- Disturbance and displacement of resident or visiting large terrestrial species – Blue Crane, Southern Black Korhaan and Secretarybird – from nesting and/or foraging areas by construction, operation and maintenance of the proposed CCGT power plant and underground pipeline, and/or mortality of these species in collisions with new overhead power lines whilst flying *en route* to distant resource areas.
- Disturbance and displacement of resident or visiting raptors – Martial Eagle, Lanner Falcon and Black Harrier – from foraging areas by construction, operation and maintenance of the proposed CCGT power plant and underground pipeline, and/or mortality of these species in collisions with new overhead power lines or by electrocutions when perched on power infrastructure.
- Injury or mortality of transient waterbirds – Greater Flamingo, Lesser Flamingo and Great White Pelican – using possible flight paths in and out of resource areas in the broader impact zone in collisions with new overhead power lines.

Generally, however, the anticipated impacts on avifauna of the proposed development are not considered to be of any great significance if mitigation measures are applied. There will be some habitat loss for endemic passerines, some species – endemic passerines, large terrestrial species and raptors – may be displaced from a broader area either temporarily by construction, operation and maintenance activities, or more permanently by the disruptive, activities at the operational development, and some species - large terrestrials, raptors and transient waterbirds - may be killed in interactions (collisions and electrocutions) with the new overhead power lines and power infrastructure, but numbers affected are likely to be low. This assessment is largely based on the fact that the vegetation surrounding the proposed location for the CCGT power plant is already heavily degraded and disturbed by

the nearby ArcelorMittal Steelworks and that the new overhead power line feeds into and runs parallel to the existing Eskom servitude and in doing so, does not pose an altogether new threat to avifauna in the area.

3.3. SIGNIFICANCE OF IDENTIFIED IMPACTS OF THE PROPOSED ARCELORMITTAL CCGT POWER PLANT AND 400 KV OVERHEAD POWER LINE

3.3.1. Assessment methodology

The assessment criteria used in the assessment are described below and are drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism in terms of the Environmental Conservation Act No. 73 of 1989.

For each impact the following are described:

Nature of the impact. A description of positive or negative effects of the project on the affected environment, including who or what would be affected and how.

Extent of the impact. This includes assessing the spatial scale of the impact using the following scale:

- **On-site** – impacts that are limited to the site boundaries.
- **Local** – impacts that affect an area in a radius of 5 km around the site.
- **Regional** – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries or habitat type/ecosystem.
- **National** – impacts that affect nationally important environmental resources or affect an area that is nationally important or has macro-economic consequences.
- **Transboundary/International** – impacts that affect internationally important resources such as areas protected by international conventions.

Duration of the impact. The lifespan of the impact is assessed as follows:

- **Temporary** – impacts are predicted to be of short duration, intermittent or occasional.
- **Short-term** – impacts that are predicted to last only for the duration of the construction period.
- **Long-term** – impacts that will continue for the life of the project, but cease when the project stops operating.
- **Permanent** – impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the project lifetime.

Intensity or magnitude of the impact. The intensity or severity of the impact would be indicated as either:

- **Negligible** – the impact on the environment is not detectable.
- **Low** – the impact affects the environment in such a way that natural functions and processes are not affected.
- **Medium** – where the affected environment is altered but natural functions and processes continue, albeit in a modified way.
- **High** – where natural functions or processes are altered to the extent that it will temporarily or permanently cease.

Potential for impact on irreplaceable resources. This refers to the potential for an environmental resource to be replaced, should it be impacted. A resource could possibly be replaced by natural processes (e.g. by natural colonisation from surrounding areas), through artificial means (e.g. by reseeding disturbed areas or replanting rescued species) or by providing a substitute resource, in certain cases. In natural systems, providing substitute resources is usually not possible, but in social systems substitutes are often possible (e.g. by constructing new social facilities for those that are lost). Should it not be possible to replace a resource, the resource is essentially irreplaceable e.g. red-listed or threatened species that are restricted to a particular site or habitat of very limited extent.

Probability of occurrence. The likelihood of the impact actually occurring would be indicated as either:

- **Improbable** – the possibility of the impact materialising is very low as a result of design or historic experience.
- **Probable** – there is a distinct possibility that the impact will occur.
- **Highly Probable** – it is most likely that the impact will occur.
- **Definite** – the impact will occur regardless of the implementation of any prevention or mitigation measures.

Significance of the impact. Based on a synthesis of the information contained in the criteria above, the potential impact would then be described according to the following significance criteria:

- **Negligible** – An impact of negligible significance is where the magnitude is negligible, low or medium and the likelihood of the impact occurring is unlikely or likely. An impact of negligible significance is where a resource or receptor will not be affected in any way by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background levels.
- **Minor** – An impact of minor significance is where the magnitude of the impact is low but the likelihood of the impact occurring is likely or definite. An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value.

- **Moderate** – An impact of moderate significance is where the magnitude is medium to high and the likelihood of the impact occurring is likely or definite. An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that "moderate" impacts have to be reduced to "minor" impacts, but that moderate impacts are being managed effectively and efficiently.
- **Major** – An impact of major significance is where the magnitude of the impact is medium to high and the likelihood of the impact occurring is also likely or definite. An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource receptors. A goal of the EIA process is to get to a position where the project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts even after all practicable mitigation options have been exhausted (i.e. ALARP has been applied).

SIGNIFICANCE RATING

	LIKELIHOOD	Unlikely	Likely	Definite
MAGNITUDE	**Negligible**	Negligible	Negligible	Minor
	Low	Negligible	Minor	Minor
	Medium	Minor	Moderate	Moderate
	High	Moderate	Major	Major

Confidence. The level of confidence in predicting the impact can be described as:

- **Low** – where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving ecosystem or inadequate information.
- **Medium** – where there is a moderate level of confidence in the prediction.
- **High** – where the impact can be predicted with a high level of confidence.

Cumulative Impact. Consideration is given to the extent of any accumulative impact that may occur sue to the proposed development. Such impacts are evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

Mitigation. The objective of mitigation is to firstly avoid and minimise impacts where possible and where these cannot be completely avoided, to compensate for the negative

impacts of the development on vegetation and animal habitats and to maximise re-vegetation and rehabilitation of disturbed areas. For each impact identified, appropriate mitigation measures to reduce or otherwise avoid the potential impacts are suggested. All impacts are assessed without mitigation and with the mitigation measures as suggested appropriately implemented.

3.3.2. ArcelorMittal CCGT power plant and underground pipeline - construction phase impacts

Habitat loss due to construction

Impact Nature

All construction activities would result in a loss of vegetation and habitat affecting endemic passerines, large terrestrial species and raptors through site clearance, the construction of internal roads and the establishment of auxiliary buildings.
The habitat is however already degraded to varying degrees across the developable area and the habitat is not unique within the landscape.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	On-site	Long-term	High	Low	High	Definite	Major	High
With mitigation	Negative	On-site	Long-term	Medium	Low	Medium	Definite	Moderate	High

Mitigation

- All construction activities must be carried out according to the generally accepted environmental best practise and the temporal and spatial footprint of the development should be kept to a minimum.
- Existing roads must be used as much as possible for access during construction.
- The boundaries of the development area are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint.
- Provide adequate briefing for site personnel.
- Any bird nests that are found during the construction phase must be reported to the Environmental Control Officer (ECO).
- The above measures must be covered in a site specific EMPr and controlled by an ECO.

Residual Impact

The vegetation within the development area can be rehabilitated after the life time of the facility if proposed mitigation measures are put in place.

Cumulative Impact

The development is situated in an area identified for industrial development according to the Saldanha Bay Municipal Spatial Development Framework. As such, there has already been a lot of degradation to the natural habitat within the area through industry and agriculture. The cumulative impact of the proposed development would therefore be small and the overall significance minor.

Disturbance during construction

Impact Nature

All construction activities would result in a disturbance impact affecting endemic passerines, large terrestrial species and raptors through the noise and movement of construction equipment and personnel.

It must however be noted, that species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during the construction phase.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	Local	Short-term	High	Medium	High	Definite	Moderate	Medium
With mitigation	Negative	Local	Short-term	Medium	Medium	Medium	Highly Probable	Minor	Medium

Mitigation

- Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.
- During construction, if any priority species identified in this report are observed to be roosting and/or nesting and breeding in the vicinity, the ECO must be notified.
- The construction camps and laydown areas and site offices etc. must be as close to the site as possible.
- Contractors and working staff should stay within the development area and movement outside these areas especially into sensitive avian microhabitats must be restricted.
- Driving must take place on existing roads and a speed limit of 50 km/h must be implemented on all internal roads.

Residual Impact

Some disturbance during the construction phase is inevitable. It is likely that some species will be disturbed and potentially displaced by the development.

Cumulative Impact

The development is situated in an area identified for industrial development according to the Saldanha Bay Municipal Spatial Development Framework. As such, there has already been a lot of disturbance within the area through industry and agriculture. The cumulative impact of the proposed development would therefore be small and the overall significance minor.

3.3.3. ArcelorMittal CCGT power plant and underground pipeline - operational phase impacts

Disturbance during operation

Impact Nature

All maintenance and operational activities would result in a disturbance impact affecting endemic passerines, large terrestrial species and raptors through the noise and movement of maintenance equipment and personnel.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	Local	Long-term	Medium	Medium	Medium	Highly Probable	Moderate	High
With mitigation	Negative	Local	Long-term	Low	Medium	Low	Probable	Minor	High

Mitigation

- If birds are nesting on power infrastructure and cannot be tolerated due to operational risks of fire, electrical short or other problems, birds should be prevented from accessing nesting sites by using mesh or other means of excluding them. Birds should not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds already with eggs and chicks should be allowed to fledge their chicks before nests are removed.
- If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.
- Contractors and working staff should stay within the development area and movement outside these areas especially into sensitive avian microhabitats must be restricted.
- Driving must take place on existing roads and a speed limit of 50 km/h must be implemented on all access roads.

Residual Impact

Some disturbance during the operational phase is inevitable. It is likely that some species will be disturbed and potentially displaced by the development.

Cumulative Impact

The development is situated in an area identified for industrial development according to the Saldanha Bay Municipal Spatial Development Framework. As such, there has already been a lot of disturbance within the area through industry and agriculture. The cumulative impact of the proposed development would therefore be small and the overall significance minor.

3.3.4. ArcelorMittal CCGT power plant grid connection - construction phase impacts

Habitat loss due to power line construction

Impact Nature

All construction activities would result in a loss of vegetation and habitat affecting endemic passerines, large terrestrial species and raptors through site clearance for substations and power line infrastructure and servitudes which have to be cleared of excess vegetation at regular intervals in order to allow access to power lines for maintenance and to prevent vegetation from intruding into the legally prescribed clearance gap, minimising the risk of fire.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	On-site	Long-term	Low	Medium	Low	Improbable	Minor	High

With mitigation	Negative	On-site	Long-term	Low	Medium	Low	Improbable	Minor	High

Mitigation

Mitigation

- All construction activities must be carried out according to the generally accepted environmental best practise and the temporal and spatial footprint of the development should be kept to a minimum.
- Existing roads must be used as much as possible for access during construction.
- The boundaries of the development area are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint.
- Provide adequate briefing for site personnel.
- Any bird nests that are found during the construction phase must be reported to the Environmental Control Officer (ECO).
- The above measures must be covered in a site specific EMPr and controlled by an ECO.

Residual Impact

The vegetation within the development area can be rehabilitated after the life time of the facility if proposed mitigation measures are put in place.

Cumulative Impact

The proposed 400 kV overhead power line is to be routed within the Aurora to Blouwater 132 kV feeder servitude (existing power lines) and as such, will not result in significant losses of natural vegetation as the area has already been degraded for the development of the existing power infrastructure.

Avifaunal disturbance due to grid connection construction activities

Impact Nature

All construction activities would result in a disturbance impact affecting endemic passerines, large terrestrial species and raptors through the noise and movement of construction equipment and personnel.

It must however be noted, that species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	Local	Long-term	Medium	High	Medium	Definite	Moderate	High
With mitigation	Negative	Local	Long-term	Low	High	Low	Highly Probable	Minor	High

Mitigation

- Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.
- During construction, if any priority species identified in this report are observed to be roosting and/or nesting and breeding in the vicinity, the ECO must be notified.
- The construction camps and laydown areas and site offices etc. must be as close to the site as possible.
- Contractors and working staff should stay within the development area and

movement outside these areas especially into sensitive avian microhabitats must be restricted.
- Driving must take place on existing roads and a speed limit of 50 km/h must be implemented on all internal roads.

Residual Impact
Some disturbance during the construction phase is inevitable. It is likely that some species will be disturbed and potentially displaced by the development.

Cumulative Impact
The proposed 400 kV overhead power line is to be routed within the Aurora to Blouwater 132 kV feeder servitude (existing power lines) and as such, will not result in significant disturbances to avifauna as the area has already been degraded for the development of the existing power infrastructure.

3.3.5. ArcelorMittal CCGT power plant grid connection - operational phase impacts

Disturbance along power line

Impact Nature
All maintenance and operational activities would result in a disturbance impact affecting endemic passerines, large terrestrial species and raptors through the noise and movement of maintenance equipment and personnel.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	On-site	Intermittent	Low	High	Low	Probable	Minor	Medium
With mitigation	Negative	On-site	Intermittent	Negligible	High	Negligible	Improbable	Negligible	Medium

Mitigation
- If birds are nesting on power infrastructure and cannot be tolerated due to operational risks of fire, electrical short or other problems, birds should be prevented from accessing nesting sites by using mesh or other means of excluding them. Birds should not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds already with eggs and chicks should be allowed to fledge their chicks before nests are removed.
- If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.
- Contractors and working staff should stay within the development area and movement outside these areas especially into sensitive avian microhabitats must be restricted.
- Driving must take place on existing roads and a speed limit of 50 km/h must be implemented on all access roads.

Residual Impact
Some disturbance during the operational phase is inevitable. It is likely that some species will be disturbed and potentially displaced by the development.

Cumulative Impact
The proposed 400 kV overhead power line is to be routed within the Aurora to Blouwater 132 kV feeder servitude (existing power lines) and as such, will not result in additional

disturbances to avifauna as the area has already been degraded for the development of the existing power infrastructure and will be subject to regular disturbance anyway to service existing lines.

Avian electrocutions on power infrastructure

Impact Nature

Electrocutions of birds on associated power infrastructure results in injuries or death and could potentially affect large, perching species in the area such as raptors and storks.

Avian electrocutions occur when a bird perches or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the gap between live components and/or live and earthed components (van Rooyen, 2004b; Lehman *et al.,* 2007).

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	Local	Long-term	Medium	Medium	Medium	Probable	Moderate	High
With mitigation	Negative	Local	Long-term	Low	Medium	Low	Improbable	Minor	High

Mitigation

- A "Bird Friendly" structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower infrastructure.
- All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting, 2002).
- Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie, 2006; Prinsen *et al*., 2012).

Residual Impact

The power line infrastructure will be within the area over a long period of time, if not permanently. However, if the power line infrastructure is removed the impacts associated (avian injuries and mortalities) will cease.

Cumulative Impact

The proposed 400 kV overhead power line is to be routed within the Aurora to Blouwater 132 kV feeder servitude where existing power lines occur. As such, the additional lines will not exponentially increase the risk of avian electrocutions as this risk already occurs (no new threat).

Avian collisions with power lines

Impact Nature

Collisions are the single biggest threat posed by power lines in South Africa (van Rooyen, 2004). Avian species most susceptible and impacted upon are large, heavy-bodied birds such as bustards, storks, korhaans and certain raptors.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	Regional	Long-term	Medium-High	Medium	Medium	Highly Probable	Moderate	High
With mitigation	Negative	Regional	Long-term	Medium-Low	Medium	Low	Probable	Minor	High

Mitigation

- High sensitivity sections of the power line should be marked with Bird Flight Diverters (BFDs), on the earth wire of the line, 5 metres apart, alternating black and white to increase the visibility of the power line and reduce the likelihood of collisions (Jenkins *et al.,* 2010).
- In order to mitigate the risk of collisions for transient birds at night, it is recommended that markers be painted with glo-in-the-dark paint. Although this measure has only had limited success, it is the best option at the moment. *It is understood, from personal communication, that the Endangered Wildlife Trust – Wildlife and Energy Programme is working on developing solar-powered LED markers, but these are not available as of yet. If however these become available before construction begins or if mortalities are recorded once the development is operational, it would be recommended to use these to combat collisions of transient birds at night.*
- Power lines in a servitude should be kept to a similar height and structure to avoid increasing the spatial extent of threat.
- The power line route should be scanned at least twice a month for the first year after construction to identify and locations of high impact. All mortalities along the power line route should be recorded and if there are any sites where repeated mortalities have occurred, an avifaunal specialist should be consulted for advice on additional mitigation measures to be implemented.

Residual Impact

The power line infrastructure will be within the area over a long period of time, if not permanently. However, if the power line infrastructure is removed the impacts associated (avian injuries and mortalities) will cease.

Cumulative Impact

The proposed 400 kV overhead power line is to be routed within the Aurora to Blouwater 132 kV feeder servitude where existing power lines occur. As such, the additional lines will not exponentially increase the risk of avian collisions with power as this risk already occurs (no new threat).

3.4. SUMMARY ASSESSMENT

A summary assessment of the above impacts is provided below with reference to the different phases of the project (construction and operation) as well as without and with mitigation. The majority of impacts can be reduced to a low level through avoiding the sensitive receptors and implementing relatively simple mitigation measures.

Impact	Pre-construction		Post-construction	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Habitat loss	Major	Moderate	Minor	Minor
Disturbance	Moderate	Minor	Minor	Negligible
Electrocutions	Negligible	Negligible	Moderate	Minor
Collisions	Negligible	Negligible	Moderate	Minor

3.5. CUMULATIVE IMPACTS

Cumulative impacts arise from the combined presence of several similar developments within an area which affect ecological processes operating at broader scales or which each have a small impact which becomes significant when combined. The proposed development area is located within an area identified for industrial development according to the Saldanha Bay Municipal Spatial Development Framework and as such, has already experienced high levels of disturbance and degradation due to industry as well as past and present agricultural practises in the surrounding areas. Future proposed developments are highlighted below (Figure 10) and will contribute to the cumulative impacts on avifauna in the study area and broader impact zone of the development. These developments include:

- The IDZ development;
- Afrisam Cement Plant;
- LPG storage facilities – Sunrise and Avidia;
- Vredenburg Industrial Development
    - Frontier Separation Plant
    - Chlor-Alkali Facility
- Desalination plant; and
- One additional 1 000 MW gas-fired power plant.

Figure 10: Future proposed developments considered in the assessment of cumulative impacts on avifauna.

Impact Nature

The cumulative impact of all development in the study area and surrounds is likely to impact on avifauna through increased habitat loss and disturbance as well a greater likelihood of injury or mortality by electrocutions or collisions on power infrastructure due to increased exposure.

Impact	Nature	Extent	Duration	Intensity	Reversibility	Impact on irreplaceable resources	Probability	Significance	Confidence
Without mitigation	Negative	Regional	Long-term	Medium-High	Medium	Medium	Highly Probable	Moderate	High
With mitigation	Negative	Regional	Long-term	Medium-Low	Medium	Low	Probable	Minor	High

Mitigation

- Refer to mitigation measures listed per impact in section 3.3 above.
- Each development will impact on avifauna in a different way and as such, would require its own unique suite of mitigation measures. In order to ensure the cumulative impacts of the various developments do not exponentially impact on avifauna, it is imperative that each development in isolation abide by the prescribed mitigation measures set by the specialist working on the impact assessment.

The development would contribute to the habitat loss through transformation and disturbance of avifauna and their habitats however this contribution would be minor when the extent of the development is considered. Similarly so, the cumulative impact of additional overhead power lines in the area would not greatly enhance the risk to avifauna due to the fact that the proposed 400 kV overhead power line is to be routed in the existing feeder servitude and as such, will not pose a new impact threat. As such, the cumulative impact of this development is considered to have a **moderate** significance without mitigation and a **minor** significance if all proposed developments abide by the various mitigation measures prescribed by the respective specialists.

4. CONCLUSIONS

The proposed ArcelorMittal CCGT power plant, 400 kV overhead power line to the Eskom Aurora substation ± 22 km to the east of the development and 4.6 km underground pipeline to the Port of Saldanha has been assessed as being of **moderate** sensitivity from an avifaunal perspective due to the presence of priority species, the general avifauna occurring in the study area and broader impact zone of the development and the nearby proximity of two IBAs.

The development will pose several impacts to avifauna, which after mitigation, include: a **moderate** and **minor** displacement impact caused respectively by habitat loss and disturbance associated with the construction and maintenance activities of the various features of the development; a **minor** impact of electrocutions of birds on power

infrastructure; and a **minor** impact of avian collisions with overhead power lines due to the fact that the new overhead power lines are routed in an existing feeder servitude and therefore do not result in an altogether new impact threat.

The development is however likely to have little, if any significant long-term impact on the avifauna of the wider area, especially after mitigation, and as such, is considered to have acceptable levels of impact overall.

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6. APPENDIX

Appendix 1: Consolidated species list of the proposed ArcelorMittal CCGT power plant and 400 kV overhead power line, including SABAP 1, SABAP 2 and field visit data. Species highlighted in bold are those that were recorded during the field visit.

Common name	Scientific name	Conservation status	Regional endemism	Suscepitibility to		
				Collision	Electrocution	Disturbance / habitat loss
Avocet, Pied	*Recurvirostra avosetta*	-	-	-	-	-
Apalis, Bar-throated	***Apalis thoracica***	**-**	**-**	**-**	**-**	**Moderate**
Barbet, Acacia Pied	*Tricholaema leucomela*	-	Near-endemic	-	-	Moderate
Batis, Cape	*Batis capensis*	-	Near-endemic	-	-	Moderate
Bee-eater, European	*Merops apiaster*	-	-	-	-	Moderate
Bishop, Southern Red	*Euplectes orix*	-	-	-	-	Moderate
Bishop, Yellow	*Euplectes capensis*	-	-	-	-	Moderate
Bittern, Little	*Ixobrychus minutus*	-	-	-	-	Moderate
Bokmakierie	***Telophorus zeylonus***	**-**	**Near-endemic**	**-**	**-**	**Moderate**
Boubou, Southern	*Laniarus ferrugineus*	-	Endemic	-	-	Moderate
Bulbul, Cape	***Pcynonotus capensis***	**-**	**Endemic**	**-**	**-**	**Moderate**
Bunting, Cape	***Emberiza capensis***	**-**	**Near-endemic**	**-**	**-**	**Moderate**
Bunting, Lark-like	*Emberiza impetuani*	-	Near-endemic	-	-	Moderate
Bustard, Ludwig's	*Neotis ludwigii*	Endangered	Endemic	High	-	High
Buzzard, Common	*Buteo buteo*	-	-	Moderate	Moderate	-
Buzzard, Jackal	***Buteo rufofuscus***	**-**	**Endemic**	**-**	**Moderate**	**Moderate**
Canary, Black-headed	*Crithagra alario*	-	Endemic	-	-	Moderate
Canary, Brimstone	***Crithagra sulphurata***	**-**	**-**	**-**	**-**	**Moderate**
Canary, Cape	*Serinus canicollis*	-	Endemic	-	-	Moderate
Canary, White-throated	***Crithagra albogularis***	**-**	**Near-endemic**	**-**	**-**	**Moderate**

Canary, Yellow	***Crithagra flaviventris***	**-**	**Near-endemic**	**-**	**-**	**Moderate**
Chat, Ant-eating	*Myrmecocichla formicivora*	-	Endemic	-	-	Moderate
Chat, Familiar	*Cercomela familiaris*	-	-	-	-	-
Chat, Karoo	*Cercomela schlegelii*	-	Near-endemic	-	-	Moderate
Chat, Sickle-winged	*Cercomela sinuata*	-	Endemic	-	-	Moderate
Cisticola, Cloud	*Cisticola textrix*	-	Near-endemic	-	-	Moderate
Cisticola, Grey-backed	***Cisticola subruficapilla***	**-**	**Near-endemic**	**-**	**-**	**Moderate**
Cisticola, Levaillant's	*Cisticola tinniens*	-	-	-	-	-
Cisticola, Zitting	*Cisticola juncidis*	-	-	-	-	Moderate
Coot, Red-knobbed	*Fulica cristata*	-	-	-	-	-
Cormorant, Bank	*Phalacrocorax neglectus*	Endangered	Near-endemic	-	-	-
Cormorant, Cape	*Phalacrocorax capensis*	Endangered	Near-endemic	-	-	-
Cormorant, Crowned	*Phalacrocorax coronatus*	Near-threatened	Near-endemic	-	-	-
Cormorant, Reed	*Microcarbo africanus*	-	-	Moderate	-	-
Cormorant, White-breasted	*Phalacrocorax lucidus*	-	-	Moderate	-	-
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Near-endemic	-	-	Moderate
Crake, Black	*Amaurornis flavirostris*	-	-	-	-	-
Crane, Blue	*Anthropoides paradieus*	Near-threatened	Endemic	High	-	-
Crombec, Long-billed	*Sylvietta rufescens*	-	-	-	-	Moderate
Crow, Cape	*Corvus capensis*	-	-	-	-	-
Crow, Pied	***Corvus ablus***	**-**	**-**	**Moderate**	**Moderate**	**-**
Cuckoo, Diederick	*Chrysococcyx caprius*	-	-	-	-	Moderate
Cuckoo, Klaas's	*Chrysococcyx klaas*	-	-	-	-	Moderate
Curlew, Eurasian	*Numenius arquata*	Near-threatened	-	-	-	-
Darter, African	*Anhinga rufa*	-	-	Moderate	-	-
Dove, Cape Turtle	***Streptopelia capicola***	**-**	**-**	**-**	**-**	**-**
Dove, Laughing	*Spilopelia senegalensis*	-	-	-	-	-
Dove, Namaqua	*Oena capensis*	-	-	-	-	Moderate
Dove, Red-eyed	*Streptopelia semitorquata*	-	-	-	-	Moderate

Dove, Rock	*Columba livia*	-	-	-	-	-
Drongo, Fork-tailed	*Dicrurus adsimilis*	-	-	-	-	Low
Duck, African Black	*Anas sparsa*	-	-	Moderate	-	-
Duck, Maccoa	*Oxyura maccoa*	Near-threatened	-	Moderate	-	-
Duck, White-backed	*Thalassornis leuconotus*	-	-	Low	-	-
Duck, White-faced	*Dendrocygna viduata*	-	-	Moderate	-	-
Duck, Yellow-billed	*Anas undulata*	-	-	Moderate	-	-
Eagle, African Fish	*Haliaeetus vocifer*	-	-	Moderate	Moderate	-
Eagle, Booted	*Hieraaetus pennatus*	-	-	Moderate	-	Moderate
Eagle, Martial	***Polemaetus bellicosus***	**Endangered**	**-**	**High**	**High**	**Moderate**
Eagle, Verreaux's	*Aquila verreauxii*	Vulnerable	-	High	-	High
Eagle-Owl, Cape	*Bubo capensis*	-	-	Moderate	-	-
Eagle-Owl, Spotted	*Bubo africanus*	-	-	-	High	Moderate
Egret, Great	*Ardea alba*	-	-	Moderate	-	-
Egret, Little	*Egretta garzetta*	-	-	Low	-	-
Egret, Western Cattle	*Bubulcus ibis*	-	-	Low	-	-
Egret, Yellow-billed	*Egretta intermedia*	-	-	Low	-	-
Falcon, Lanner	***Falco biarmicus***	**Vulnerable**	**-**	**High**	**Moderate**	**-**
Falcon, Peregrine	*Falco peregrinus*	-	-	Moderate	-	-
Fiscal, Common	***Lanius collaris***	**-**	**-**	**-**	**-**	**-**
Flamingo, Greater	*Phoenicopterus ruber*	Near-threatened	-	High	-	-
Flamingo, Lesser	*Phoenicopterus minor*	Near-threatened	-	High	-	-
Flufftail, Red-chested	*Sarothrura rufa*	-	-	-	-	Moderate
Flycatcher, African Dusky	*Muscicapa adusta*	-	-	-	-	Moderate
Flycatcher, African Paradise-	*Terpsiphone viridis*	-	-	-	-	Moderate
Flycatcher, Fairy	*Stenostira scita*	-	Endemic	-	-	Moderate
Flycatcher, Fiscal	*Sigelus silens*	-	Endemic	-	-	Moderate
Flycatcher, Spotted	*Muscicapa striata*	-	-	-	-	-
Francolin, Grey-winged	*Scleroptila africana*	-	Endemic	Moderate	-	Moderate

Gannet, Cape	*Morus capensis*	Vulnerable	Near-endemic	Low	-	-
Godwit, Bar-tailed	*Limosa lapponica*	-	-	-	-	-
Godwit, Hudsonian	*Limosa haemastica*	-	-	-	-	-
Goose, Egyptian	***Alopochen aegyptiaca***	**-**	**-**	**High**	**High**	**-**
Goose, Spur-winged	*Plectropterus gambensis*	-	-	High	Moderate	-
Goshawk, African	*Accipiter tachiro*	-	-	Low	-	-
Goshawk, Southern Pale Chanting	*Melierax canorus*	-	Near-endemic	-	Moderate	Moderate
Grassbird, Cape	*Sphenoeacus afer*	-	Endemic	-	-	Moderate
Grebe, Black-necked	*Podiceps nigricollis*	-	-	-	-	-
Grebe, Great Crested	*Podiceps cristatus*	-	-	-	-	-
Grebe, Little	*Tachybaptus ruficollis*	-	-	-	-	-
Greenshank, Common	*Tringa nebularia*	-	-	-	-	-
Guineafowl, Helmeted	***Numida meleagris***	**-**	**-**	**Moderate**	**-**	**-**
Gull, Black-headed	*Chroicocephalus ridibundus*	-	-	Low	-	-
Gull, Grey-headed	*Chroicocephalus cirrocephalus*	-	-	Low	-	-
Gull, Hartlaub's	*Chroicocephalus hartlaubii*	-	Endemic	Low	-	-
Gull, Kelp	*Larus dominicanus*	-	-	Low	-	-
Gull, Sabine's	*Xema sabini*	-	-	Low	-	-
Hamerkop	*Scopus umbretta*	-	-	Moderate	Moderate	-
Harrier, African Marsh	*Circus ranivorus*	Endangered	-	Low	-	High
Harrier, Black	***Circus maurus***	**Endangered**	**Near-endemic**	**-**	**-**	**High**
Harrier-Hawk, African	*Polyboroides typus*	-	-	Moderate	Moderate	-
Heron, Black-headed	*Ardea melanocephala*	-	-	Moderate	Moderate	-
Heron, Goliath	*Ardea goliath*	-	-	Moderate	-	-
Heron, Grey	*Ardea cinerea*	-	-	High	High	-
Heron, Purple	*Ardea purpurea*	-	-	Moderate	Moderate	-
Honeyguide, Greater	*Indicator indicator*	-	-	-	-	Moderate
Honeyguide, Lesser	*Indicator minor*	-	-	-	-	Moderate
Hoopoe, African	*Upupa africana*	-	-	-	-	Moderate

Ibis, African Sacred	***Threskiornis aethiopicus***	**-**	**-**	**Moderate**	**-**	**-**
Ibis, Glossy	*Plegadis falcinellus*	-	-	Moderate	-	-
Ibis, Hadeda	***Bostrychia hagedash***	**-**	**-**	**Moderate**	**Moderate**	**-**
Jaeger, Parasitic	*Stercorarius parasiticus*	-	-	-	-	-
Kestrel, Greater	*Falco rupicoloides*	-	-	-	Moderate	Moderate
Kestrel, Lesser	*Falco naumanni*	-	-	High	-	Moderate
Kestrel, Rock	*Falco rupicolus*	-	-	-	-	Moderate
Kingfisher, Giant	*Megaceryle maxima*	-	-	-	-	-
Kingfisher, Malachite	*Alcedo cristata*	-	-	-	-	-
Kingfisher, Pied	*Ceryle rudis*	-	-	-	-	-
Kite, Black-shouldered	*Elanus caeruleus*	-	-	Moderate	-	Moderate
Kite, Yellow-billed	*Milvus parasitus*	-	-	Moderate	-	-
Knot, Red	*Calidris canutus*	-	-	Low	-	-
Korhaan, Southern Black	***Afrotis afra***	**Vulnerable**	**Endemic**	**High**	**-**	**Moderate**
Lapwing, Blacksmith	*Vanellus armatus*	-	-	-	-	-
Lapwing, Crowned	***Vanellus coronatus***	**-**	**-**	**-**	**-**	**-**
Lark, Cape Clapper	*Mirafra apiata*	-	Endemic	-	-	High
Lark, Cape Long-billed	*Certhilauda curvirostris*	-	Endemic	-	-	Moderate
Lark, Karoo	*Calendulauda albescens*	-	Endemic	-	-	High
Lark, Karoo Long-billed	*Certhilauda subcoronata*	-	Endemic	-	-	High
Lark, Large-billed	*Galerida magnirostris*	-	Endemic	-	-	High
Lark, Red-capped	***Calandrella cinerea***	**-**	**-**	**-**	**-**	**Moderate**
Longclaw, Cape	*Macronyx capensis*	-	Endemic	-	-	Moderate
Martin, Banded	*Riparia cincta*	-	-	-	-	-
Martin, Brown-throated	*Riparia paludicola*	-	-	-	-	Moderate
Martin, Common House	*Delichon urbicum*	-	-	-	-	-
Martin, Rock	*Ptyonoprogne fuligula*	-	-	-	-	Moderate
Martin, Sand	*Riparia riparia*	-	-	-	-	Moderate
Masked-Weaver, Southern	*Ploceus velatus*	-	-	-	-	Moderate

Moorhen, Common	*Gallinula chloropus*	-	-	-	-	-
Mousebird, Red-faced	*Urocolius indicus*	-	-	-	-	Moderate
Mousebird, Speckled	*Colius striatus*	-	-	-	-	Moderate
Mousebird, White-backed	*Colius colius*	-	Endemic	-	-	Moderate
Neddicky	*Cisticola fulvicapilla*	-	-	-	-	Moderate
Night-Heron, Black-crowned	*Nycticorax nycticorax*	-	-	-	-	-
Nightjar, Fiery-necked	*Caprimulgus pectoralis*	-	-	-	-	Moderate
Openbill, African	*Anastomus lamelligerus*	-	-	Low	-	-
Osprey, Western	*Pandion haliaetus*	-	-	Low	-	-
Ostrich, Common	***Struthio camelus***	**-**	**-**	**-**	**-**	**-**
Owl, Marsh	*Asio capensis*	-	-	High	-	Moderate
Owl, Western Barn	*Tyto alba*	-	-	Moderate	High	-
Oystercatcher, African Black	*Haematopus moquini*	-	-	-	-	-
Oystercatcher, Eurasian	*Haematopus ostralegus*	-	-	-	-	-
Pelican, Great White	*Pelecanus onocrotalus*	Vulnerable	-	Low	-	-
Penguin, African	*Spheniscus demersus*	Endangered	Endemic	-	-	-
Petrel, White-chinned	*Procellaria aequinoctialis*	Vulnerable	-	-	-	-
Phalarope, Red-necked	*Phalaropus lobatus*	-	-	-	-	-
Pigeon, African Olive	*Columba arquatrix*	-	-	-	-	Moderate
Pigeon, Speckled	*Columba guinea*	-	-	-	-	Moderate
Pipit, African	***Anthus cinnamomeus***	**-**	**-**	**-**	**-**	**Moderate**
Pipit, Long-billed	*Anthus similis*	-	-	-	-	Moderate
Pipit, Plain-backed	*Anthus leucophrys*	-	-	-	-	Moderate
Plover, Caspian	*Charadrius asiaticus*	-	-	-	-	-
Plover, Chestnut-banded	*Charadrius pallidus*	Near-threatened	-	-	-	-
Plover, Common Ringed	*Charadrius hiaticula*	-	-	-	-	-
Plover, Grey	*Pluvialis squatarola*	-	-	-	-	-
Plover, Kittlitz's	*Charadrius pecuarius*	-	-	-	-	-
Plover, Lesser Sand	*Charadrius mongolus*	-	-	-	-	-

Plover, Pacific Golden	*Pluvialis fulva*	-	-	-	-	-
Plover, Three-banded	*Charadrius tricollaris*	-	-	-	-	-
Plover, White-fronted	*Charadrius marginatus*	-	-	-	-	-
Pochard, Southern	*Netta erythrophthalma*	-	-	Moderate	-	-
Prinia, Karoo	*Prinia maculosa*	-	Endemic	-	-	Moderate
Quail, Common	*Coturnix coturnix*	-	-	-	-	Moderate
Quelea, Red-billed	*Quelea quelea*	-	-	-	-	-
Rail, African	*Rallus caerulescens*	-	-	-	-	-
Raven, White-necked	*Corvus albicollis*	-	-	Moderate	Moderate	-
Redshank, Common	*Tringa totanus*	-	-	-	-	-
Robin-chat, Cape	*Cossypha caffra*	-	-	-	-	-
Ruff	*Philomachus pugnax*	-	-	-	-	-
Sanderling	*Calidris alba*	-	-	-	-	-
Sandgrouse, Namaqua	*Pterocles namaqua*	-	Near-endemic	-	-	Moderate
Sandpiper, Baird's	*Calidris bairdii*	-	-	-	-	-
Sandpiper, Broad-billed	*Limicola falcinellus*	-	-	-	-	-
Sandpiper, Common	*Actitis hypoleucos*	-	-	-	-	-
Sandpiper, Curlew	*Calidris ferruginea*	-	-	-	-	-
Sandpiper, Marsh	*Tringa stragnatilis*	-	-	-	-	-
Sandpiper, Terek	*Xenus cinereus*	-	-	-	-	-
Sandpiper, Wood	*Tringa glareola*	-	-	-	-	-
Saw-wing, Black	*Psalidoprocne holomelaena*	-	-	-	-	Moderate
Scrub-Robin, Karoo	***Erythropygia coryphaeus***	**-**	**-**	**-**	**-**	**Moderate**
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	High	-	Moderate
Seedeater, Streaky-headed	*Crithagra gularis*	-	-	-	-	Moderate
Shearwater, Sooty	*Puffinus griseus*	-	-	-	-	-
Shelduck, South African	*Tadorna cana*	-	Endemic	Moderate	-	-
Shoveler, Cape	*Anas smithii*	-	Near-endemic	Moderate	-	-
Shrike, Red-backed	*Lanius collurio*	-	-	-	-	Moderate

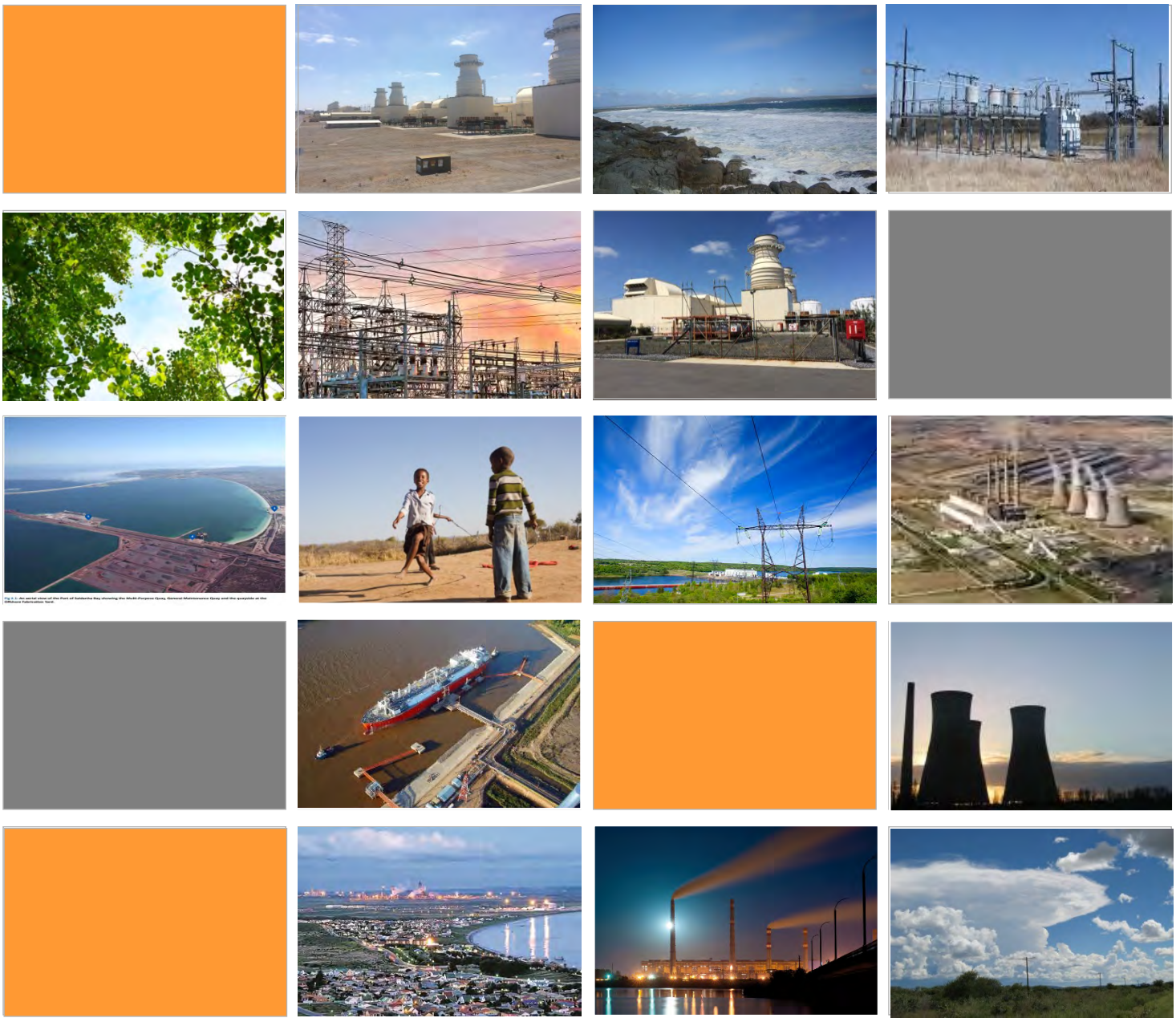
Siskin, Cape	*Crithagra totta*	-	Endemic	-	-	Moderate
Snipe, African	*Gallinago nigripennis*	-	-	Low	-	-
Sparrow, Cape	***Passer melanurus***	**-**	**Near-endemic**	**-**	**-**	**-**
Sparrow, House	*Passer domesticus*	-	-	-	-	-
Sparrow, Southern Grey-headed	*Passer diffusus*	-	-	-	-	-
Sparrowhawk, Black	*Accipiter melanoleucus*	-	-	Moderate	-	-
Sparrowlark, Grey-backed	*Eremopterix verticalis*	-	Near-endemic	-	-	Moderate
Spoonbill, African	*Platalea alba*	-	-	Moderate	-	-
Spurfowl, Cape	***Pternistis capensis***	**-**	**Endemic**	**Moderate**	**-**	**-**
Starling, Common	***Sturnus vulgaris***	**-**	**-**	**-**	**-**	**-**
Starling, Pied	***Lamprotornis bicolor***	**-**	**Endemic**	**-**	**-**	**Moderate**
Starling, Red-winged	*Onychognathus morio*	-	-	-	-	Moderate
Starling, Wattled	*Creatophora cinerea*	-	-	-	-	Moderate
Stilt, Black-winged	*Himantopus himantopus*	-	-	-	-	-
Stint, Little	*Calidris minuta*	-	-	Low	-	-
Stint, Red-necked	*Calidris ruficollis*	-	-	-	-	-
Stonechat, African	*Saxicola torquatus*	-	-	-	-	-
Stork, Black	*Ciconia nigra*	Vulnerable	-	High	Moderate	-
Stork, White	*Ciconia ciconia*	-	-	High	High	-
Sugarbird, Cape	*Promerops cafer*	-	Endemic	-	-	Moderate
Sunbird, Dusky	*Cinnyris fuscus*	-	Near-endemic	-	-	Moderate
Sunbird, Malachite	*Nectarinia famosa*	-	-	-	-	Moderate
Sunbird, Orange-breasted	*Anthobaphes violacea*	-	Endemic	-	-	Moderate
Sunbird, Southern Double-collared	***Cinnyris chalybeus***	**-**	**Endemic**	**-**	**-**	**Moderate**
Swallow, Barn	*Hirundo rustica*	-	-	-	-	Moderate
Swallow, Greater-striped	*Cecropis cucullata*	-	-	-	-	Moderate
Swallow, Pearl-breasted	*Hirundo dimidiata*	-	-	-	-	-
Swallow, White-throated	*Hirundo albigularis*	-	-	-	-	Moderate
Swamphen, African Purple	*Porphyrio madagascariensis*	-	-	-	-	-

Swamp-Warbler, Lesser	*Acrocephalus gracilirostris*	-	-	-	-	-
Swift, African Black	*Apus barbatus*	-	-	-	-	-
Swift, Alpine	*Tachymarptis melba*	-	-	-	-	-
Swift, Common	*Apus apus*	-	-	-	-	-
Swift, Horus	*Apus horus*	-	-	-	-	-
Swift, Little	*Apus affinis*	-	-	-	-	-
Swift, White-rumped	*Apus caffer*	-	-	-	-	-
Teal, Cape	*Anas capensis*	-	-	Moderate	-	-
Teal, Red-billed	*Anas erythrorhyncha*	-	-	Moderate	-	-
Tern, Antarctic	*Sterna vittata*	Endangered	-	-	-	-
Tern, Arctic	*Sterna paradisaea*	-	-	-	-	-
Tern, Black	*Chlidonias niger*	-	-	Low	-	-
Tern, Caspian	*Hydroprogne caspia*	Vulnerable	-	-	-	-
Tern, Common	*Sterna hirundo*	-	-	-	-	-
Tern, Little	*Sterna albifrons*	-	-	-	-	-
Tern, Sandwich	*Thalasseus sandvicensis*	-	-	-	-	-
Tern, Swift	*Thalasseus bergii*	-	-	-	-	-
Tern, Whiskered	*Chlidonias hybrida*	-	-	Low	-	-
Tern, White-winged	*Chlidonias leucopterus*	-	-	Low	-	-
Thick-knee, Spotted	*Burhinus capensis*	-	-	Moderate	-	Moderate
Thick-knee, Water	*Burhinus vermiculatus*	-	-	Low	-	Moderate
Thrush, Cape Rock	*Monticola rupestris*	-	Endemic	-	-	Moderate
Thrush, Karoo	*Turdus smithii*	-	Endemic	-	-	Moderate
Thrush, Olive	*Turdus olivaceus*	-	-	-	-	Moderate
Tit, Cape Penduline-	*Anthoscopus minutus*	-	Near-endemic	-	-	Moderate
Tit, Grey	*Parus afer*	-	Endemic	-	-	Moderate
Tit, Southern Black	*Parus niger*	-	-	-	-	Moderate
Tit-Babbler, Chestnut-vented	*Sylvia subcaerulea*	-	Near-endemic	-	-	Moderate
Tit-Babbler, Layard's	*Sylvia layardi*	-	Endemic	-	-	Moderate

Turnstone, Ruddy	*Arenaria interpres*	-	-	-	-	-
Vulture, Cape	*Gyps coprotheres*	Endangered	Near-endemic	High	High	Moderate
Wagtail, Cape	*Motacilla capensis*	-	-	-	-	-
Warbler, African Reed	*Acrocephalus baeticatus*	-	-	-	-	-
Warbler, Little Rush	*Bradypterus baboecala*	-	-	-	-	-
Warbler, Namaqua	*Phragmacia substriata*	-	Endemic	-	-	Moderate
Warbler, Rufous-eared	*Malcorus pectoralis*	-	Endemic	-	-	Moderate
Waxbill, Common	*Estrilda astrild*	-	-	-	-	Moderate
Weaver, Cape	***Ploceus capensis***	**-**	**Endemic**	**-**	**-**	**Moderate**
Wheatear, Capped	***Oenanthe pileata***	**-**	**-**	**-**	**-**	**Moderate**
Wheatear, Mountain	*Oenanthe monticola*	-	Near-endemic	-	-	Moderate
Whimbrel	*Numenius phaeopus*	-	-	-	-	-
White-eye, Cape	*Zosterops capensis*	-	Endemic	-	-	Moderate
Whydah, Pin-tailed	*Vidua macroura*	-	-	-	-	Moderate
Woodpecker, Cardinal	*Dendropicus fuscescens*	-	-	-	-	Moderate

Appendix 2: Response to comments with regards to avifauna.

Comment 1 The ArcelorMittal site is an important flight path for birds. More specifically, there is a need to understand flight paths at night using radar.
Response 1 *It is understood that the proposed development area is within an important flight path for birds between the West Coast National Park and Saldanha Bay Islands IBA and the Berg River Estuary IBA, however the risk of birds colliding with overhead power lines is not expected to exponentially increase as a result of this development as the proposed power line route feeds into the existing servitude between the Eskom Blouwater and Eskom Aurora substations and therefore will not pose an altogether new risk to avifauna in the area.*
Comment 2 The preferred site B lies across one of the main flyways for waterbirds and migrant waders, travelling between St. Helena Bay/Lower Berg River and Langebaan Lagoon. For periods of the year thousands of Kelp Gulls commute daily through the site. The route is western end of the SFF Oil Tanks, East of Orex, Vredenburg landfill site and the switching yard (gravel road) at the corner where the St. Helena Bay road joins the R399 approximately longitude 18.03 east. In order to accurately determine this narrow route, a radar survey would be necessary because migrant waders and waterbirds fly at night. A simple mitigation would be to move the western boundary towards the eastern boundary to miss the flyway, possibly about 100 metres.
Response 2 *The proposed site location is situated between numerous industrial developments such as the ArcelorMittal steel works, the Eskom Blouwater substation and the Vredenburg landfill site. As such, the area has already been affected by high levels of transformation and therefore the added impacts of habitat loss and disturbance of the proposed development will not significantly alter avian behaviour in the area.* *In terms of mitigating the risks of collisions with overhead power lines, refer to previous comment and to the "Mitigation" section of the "Avian collisions with power lines" impact table.*
Comment 3 An avian impact analysis should be carried out into the effect of an increased number of power lines in the area, especially the proposed 400 kV line to the Aurora Switching Station. There are currently 5 large power lines using the servitude, also the effect at Aurora with additional lines going in and out.
Response 3 *This study looks at the effect of an increased number of power lines in the area, specifically within the Blouwater to Aurora servitude, and does not expect any additional power lines to result in an exponential increase in risk of electrocution or collision for avifauna in the area. The reasoning behind this is that the threat already exists and the addition of new power lines running parallel to and at the same height as will not result in an altogether new risk. There will however be a degree of habitat loss and disturbance, although the proposed route is already subject to this from the existing power lines and therefore the cumulative impact of additional power lines will be minimal.*



ArcelorMittal

Greenhouse Gas (GHG) Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Draft Report V0.2
ArcelorMittal
September 2016
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Greenhouse Gas (GHG) Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Environmental Resources Management

Draft Report

Client: ArcelorMittal	Project No: 0315829
Summary and version history: V0.2 An assessment of the potential greenhouse gas (GHG) emissions as a result of the operation of the proposed gas-fired power plant was undertaken. The potential impact of GHG emissions are assessed in the context of South African and international benchmarks, and South Africa's energy and climate change policies.	Date: 06 September 2016 Approved by: Charles Allison

1	Draft Report
	Compiled by: Sarah Bonham Reviewed by: Charles Allison & Stuart Heather-Clark

Distribution: Public

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LIST OF ACCRONYMS

CCGT	Combined cycle gas turbine
CCS	Carbon capture and storage
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COP	Conference of Parties (under UNFCCC)
CSP	Concentrated Solar Power
DEA	(South African) Department of Environmental Affairs
DoE	(South African) Department of Energy
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EP	Equator Principles
ERA	(South African) Electricity Regulation Act
ESIA	Environmental and Social Impact Assessment
FOLU	Forestry and other land uses
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GUMP	(South Africa's) Gas Utilisation Master Plan
GW	Gigawatt
GWC	Growth without constraints (emissions trajectory under DEA's Mitigation Potential Analysis study)
GWP	Global Warming Potential
HRSG	Heat Recovery Steam Generator
IDZ	(Saldanha Bay) Industrial Development Zone
IEA	International Energy Agency
IEP	(South Africa's) Integrated Energy Plan
IFC	International Finance Corporation
INDC	Intended Nationally Declared Contribution (under UNFCCC)
IPCC	Intergovernmental Panel on Climate Change
IPCSA	International Power Consortium South Africa
IPP	Independent Power Producer
IPPPP	Independent Power Producer Procurement Program
IRP	Integrated Resource Plan for Electricity (South Africa)
kW(h)	Kilowatt (hour)
LHV	Lower heating value
LTMS	(South Africa's) Long Term Mitigation Scenarios
Mt	Megatonne (1 000 000 tonnes)
MW(h)	Megawatt (hour)
NCCRP	National Climate Change Response Policy (South Africa)
NDP	National Development Plan (South Africa)
OCGT	Open cycle gas turbine
PPA	Power Purchase Agreement
PPD	Peak, Plateau and Decline (GHG emissions trajectory)
PS	Performance Standard (PS1, PS2, etc. within the IFC

	Performance Standards)
PV	Photovoltaic
SC	Supercritical (steam conditions)
SO_2	Sulphur dioxide
tCO_2e	Tonnes of Carbon Dioxide equivalent
t	Tonne (1000 kg)
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WAM	'With Additional Measures' (emissions trajectory under DEA's Mitigation Potential Analysis study)
WEM	'With Existing Measures' (emissions trajectory under DEA's Mitigation Potential Analysis study)
WOM	'Without Measures' (emissions trajectory under DEA's Mitigation Potential Analysis study)
WRI	World Resources Institute

Combined Cycle Gas Turbine (CCGT)	CCGT is the dominant gas-based technology for intermediate and base-load power generation. CCGT plants have basic components the same as the OCGT plants but the heat associated with the gas turbine exhaust is used in a heat recovery steam generator (HRSG) to produce steam that drives a steam turbine and generates additional electric power. Over the last few decades, impressive advancement in technology has meant a significant increase of the CCGT efficiency by raising the gas-turbine inlet temperature, with simultaneous reduction of investment costs and emissions.
GHG (Greenhouse Gas)	A gas that contributes to the greenhouse effect by absorbing infrared radiation. Unless indicated otherwise, GHG emissions are made up of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6.
Emissions factor	The average emission rate of a given GHG for a given source, relative to units of activity (e.g. tonnes CO_2e per litre diesel; tonnes CO_2e per kWh; etc.)
Equator Principles	A risk management framework adopted by financial institutions for determining, assessing and managing environmental and social risk in projects.
HRSG	A heat recovery steam generator or HRSG is an energy recovery heat exchanger that recovers heat from a hot gas stream. It produces steam that can be used in a process (cogeneration) or used to drive a steam turbine (combined cycle).
INDC (Intended Nationally Declared Contribution)	Term used under the United Nations Framework Convention on Climate Change (UNFCCC) for reductions in greenhouse gas emissions that all countries that signed the UNFCCC were asked to publish in the lead up to the 2015 United Nations Climate Change Conference held in Paris, France in December 2015.
National Communications (to UNFCCC)	Reports that must be submitted by all Parties to the UNFCCC in order to provide information on their GHG inventory and actions taken to address climate change.
Open Cycle gas Turbine (OCGT)	Open cycle gas turbines (OCGT) for electricity generation were introduced decades ago for peak-load service. Simple OCGT plants consist basically of an air compressor and a gas turbine aligned on a single shaft connected to an electricity generator. Filtered air is compressed by the compressor and used to fire natural gas in the combustion chamber of

	the gas-turbine that drives both the compressor and the electricity generator.
tCO_2e	Tonnes of carbon dioxide equivalent, a measure that expresses the impact of non-CO_2 greenhouse gases (CH_4, N_2O etc.) in terms of the equivalent amount of CO_2 that would create the same warming.

1 INTRODUCTION

This Report sets out an assessment of the greenhouse gas (GHG) emissions (carbon footprint) associated with the *1 507 MW Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay* (The Project) in Saldanha, Western Cape Province, South Africa. The power plant is proposed by the International Power Consortium South Africa (IPCSA) as a solution to the requirement for stable, economical electricity over the long term at ArcelorMittal's Saldanha Steel site in Saldanha Bay. The Project is being developed as an independent power plant and, as required, will be developed as part of the South African Department of Energy (DoE)'s Gas to Power Programme (further information provided in *Section 3.1.2*). The impact of these GHG emissions (and therefore the impact of the Project in terms of contribution to global climate change) is assessed by way of comparing estimated annual GHG emissions from the plant with South Africa's baseline and projected annual GHG emissions, through reference to GHG magnitude scales for projects from various lender standards, and through the benchmarking of the project's emissions and energy performance against other gas-fired power stations as well as the current GHG intensity of the South African electricity grid. In addition, the degree to which the planned Project is consistent with South Africa's stated climate change and energy policy is also considered.

The Report also includes an assessment of measures for improving operational efficiency at the power plant, and highlights options to manage and reduce project-related GHG emissions during its operation.

Figure 1.1 illustrates the location of the proposed facility near Saldanha, Western Cape Province, South Africa. The Project will comprise two phases, namely:

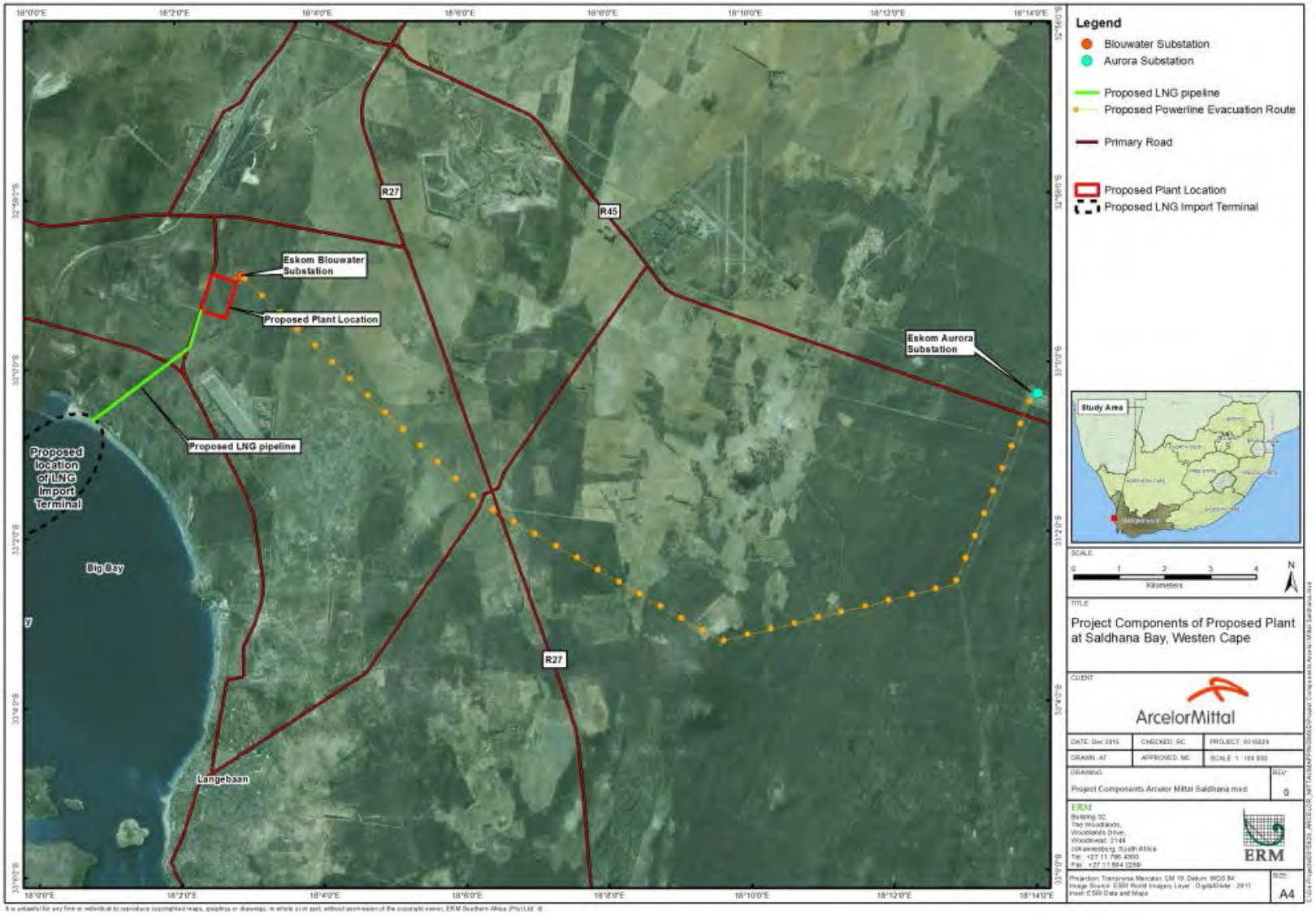
- Phase 1, in which six Siemens Trent60 open cycle gas turbines (OCGT, also known as simple cycle), each with a capacity of 42 MW at site conditions, will be installed in order to supply power to the Saldanha Steel site. Current plans are for five of these six turbines to operate at any one time, so total capacity for Phase 1 is 210 MW, with some redundancy to ensure continuous supply (1). It should be noted that thought will be given to converting at least two units to combined cycle for better efficiency at a later stage (2); and
- Phase 2, in which three Siemens SGT5-4000F combined cycle gas turbines (CCGT) will be installed, each with a capacity of 439.1 MW (total capacity 1 317.3 MW) at site conditions (3) (1). Power generated that

(1) Response to ERM's GHG data request from PowerConsult, dated 26 June 2016.
(2) As per information provided in the 'Updated Information for EIA Input and Consideration – 1 500 MW Saldanha Gas-to-Power Project' from PowerConsult, dated 12 June 2016.
(3) Response to ERM's GHG data request from PowerConsult, dated 26 June 2016.

is surplus to Saldanha Steel's requirements will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

(1) Note that the total capacity according to the 210 MW (Phase 1) + 1 317.3 MW (Phase 2) is 1 527.3 MW. The slight discrepancy between this figure and the 1 507 MW mentioned for the whole plant is due to the estimated parasitic loads of the plant. This value will be confirmed upon final selection of the power plant equipment, and this report refers to an overall capacity of 1 507 MW.

Figure 1.1 Location of the proposed Gas-fired Power Plant at Saldanha, Western Cape Province



1.1 ABOUT ERM

ERM is a leading provider of sustainability services, covering the full spectrum of environmental, health and safety, risk and social consulting issues. ERM established a permanent presence in Sub-Saharan Africa in 2003 and has offices in South Africa (Cape Town, Durban, and Johannesburg), Kenya (Nairobi) and Mozambique (Maputo). ERM has over 180 staff involved in environmental and social projects throughout the continent.

ERM Southern Africa's Air Quality and Climate Change Practice comprises a team dedicated professionals with experience in a wide range of climate change mitigation and adaptation services. Since ERM established a presence in South Africa, we have developed over 60 carbon footprints in South Africa alone. In addition, we have reviewed South Africa's National Greenhouse Gas Inventory for two different reporting periods, financially quantified the physical risks of climate change for clients and assisted others with identifying realistic and achievable energy savings opportunities. ERM has supported numerous clients with GHG assessments in capital project development as part of the Environmental Impact Assessment (EIA) process in South Africa and globally, applying a methodology that draws on guidance from international lender standards including the International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD) and Equator Principles (EP). The authors of this study have undertaken quantitative GHG emissions assessments across the power, oil and gas, mining and infrastructure sectors, and have significant experience in the development and application of GHG and energy management strategies more broadly. The main author of this study was Sarah Bonham, a Senior Consultant in ERM South Africa's Air Quality and Climate Change Practice, with David Mercer, a Technical Director in the same team, and Charles Allison, Partner for ERM UK's Air Quality and Climate Change team, providing support and reviews. Sarah Bonham joined ERM in 2010 and is a senior consultant in the Sustainability and Climate Change practice, based in Johannesburg, South Africa. Her experience spans the climate change mitigation and adaptation fields.

In the climate change mitigation field, Sarah has extensive experience in conducting carbon footprint studies for corporate clients in order to calculate Scope 1, 2 and 3 GHG emissions arising from their global operations, and in supporting clients with the annual disclosure on their climate change performance to the Carbon Disclosure Project (CDP). She has also conducted project-based GHG assessments as part of the ESHIA process.
In the adaptation field, her work involves assisting clients with assessing climate change risk on business assets and operations, and managing that risk through adaptation measures. She has worked on site-specific climate risk and adaptation assessments (e.g. as part of the ESHIA process), as well as assessments that cover global portfolios of assets and operations. Sarah holds an MSc in Environmental Technology (specialism: Business and Sustainability) from Imperial College London and a BA in Biological Sciences from Oxford University.

2 METHODOLOGY

2.1 IMPACT ASSESSMENT METHODOLOGY

A traditional impact assessment is conducted by determining how the proposed activities will affect the state of the environment prior to development of a project. In the case of GHG emissions, this process is complicated by the fact that the impact of GHG emissions on the environment cannot be quantified within a defined space and time.

The greenhouse effect occurs on a global basis and the geographical source of GHG emissions is irrelevant when considering the future impact on the climate. It is not possible to link emissions from a single source – such as the Project - to particular impacts in the broader study area.

As such, this specialist study does not consider the physical impacts of climate change resulting from increasing GHG emissions, but instead will assess the impact of the Project's GHG emissions by way of:

- Understanding the scale of the Project's GHG emissions by comparing total emissions to GHG magnitude ratings and scales for projects (developments) that have been developed by various international lender organisations or groupings, including the IFC, the EBRD, and the EP;
- Assessing the GHG performance of the Project relative to reference benchmarks on the GHG intensity of electricity production, including the GHG intensity of South Africa's grid electricity and of other gas-fired power plants; and
- Understanding of the impact of the Project on South Africa's national GHG emissions inventory, and consideration of the alignment of the Project with the country's climate policy and international GHG reduction commitments.

The 'Project' in the context of this study refers to the proposed (final) 1507 MW Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, and the Project's impact, in terms of GHG emissions (and contribution to global climate change), reflects GHG emissions from the operation of this power station.

2.1.1 *Approach to Assessing Impact Significance*

The following criteria are used in order to assess impacts for the purposes of the specialist studies within the Saldana Gas-fired Power Station EIA:

- **Type**: A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect);
- **Extent**, indicating the 'reach' of the impact;

- **Duration**, indicating the time period over which a resource / receptor is affected;
- **Scale**, indicating the size of the impact; and
- **Frequency**, giving a measure of the constancy or periodicity of the impact.
- The **magnitude**, which a function of extent, duration, scale and frequency and describes the degree of change that the impact is likely to impart on the resource / receptor; and
- The **sensitivity/vulnerability/importance** of the impacted resource/receptor.

Significance is subsequently assessed on the basis of the magnitude rating of the impact, and the sensitivity/vulnerability/importance rating for the resource/receptor, and ranked as either Negligible, Minor, Moderate, or Major.

In the context of climate change impacts associated with GHG emissions from the Project (this study), extent, duration, and frequency are the same irrespective of the Project context and the scale of its GHG emissions, and therefore do not form a good basis on which to assess the significance of the impacts associated with GHG emissions. Specifically, the extent of GHG (climate change) impacts is global, the duration of the impact is permanent (CO_2 has a residence time in the atmosphere of approximately 100 years), and the frequency of the impact is constant since GHG emissions will be produced throughout the lifetime of the plant.

As such, GHG impact significance is determined on the basis of the assessment of the scale of the GHG emissions from the plant using benchmarks from international lender standards, further informed by reference benchmarks on the GHG intensity of electricity production for similar facilities and according to the grid emissions factor in South Africa, as well as an analysis of the Project's alignment with South Africa's energy and climate change policies, as described above and also in *Section 4.2*.

2.2 *CARBON FOOTPRINT METHODOLOGY*

A carbon footprint is a measure of the estimated GHG emissions produced directly and indirectly by an individual, organisation, facility or product. The calculation of a carbon footprint generally involves the following equation.

Carbon footprint emissions = Activity data x Emissions factor x Global warming potential

- *Activity data* relates to the emission-causing activity, e.g. the combustion of fuel (gas, coal, diesel etc.);
- *Emission factors* ('EFs') convert the activity data into tonnes of the relevant GHG emitted; and

- *Global warming potentials* ('GWPs') [1] are applied to non-CO_2 GHGs to convert the result to carbon dioxide equivalent ('t CO_2e').

Good practice for calculating a carbon footprint dictates that actual activity data (e.g. m^3 of natural gas or litres of diesel consumed) for a financial year is used. Given that this project involves an estimation of a future carbon footprint for activities yet to begin, a series of assumptions have been made in order to forecast the activity data required to undertake this calculation. Activity data has been sourced from PowerConsult Engineering Ltd., the project engineers, using an excel-based GHG information request template issued by ERM and through follow-up communications by email.

The following methodologies have been used in order to estimate the GHG emissions from the plant:

- Greenhouse Gas (GHG) Protocol: Corporate Accounting & Reporting Standard (World Resources Institute/World Business Council for Sustainable Development);
- Intergovernmental Panel on Climate Change (IPCC) 2006 GHG Inventory guidelines; and
- American Petroleum Institute's (API) 2009 Compendium of Greenhouse Gas Emissions.

The latter (API Compendium) informed a material balance approach to calculating emissions from the combustion of natural gas at the power plant, based on fuel usage data and fuel carbon analyses. More detail on this methodology, as well as the data sources and any assumptions made, is given in *Section 4.1.*

2.3 *SCOPE OF THE CARBON FOOTPRINT*

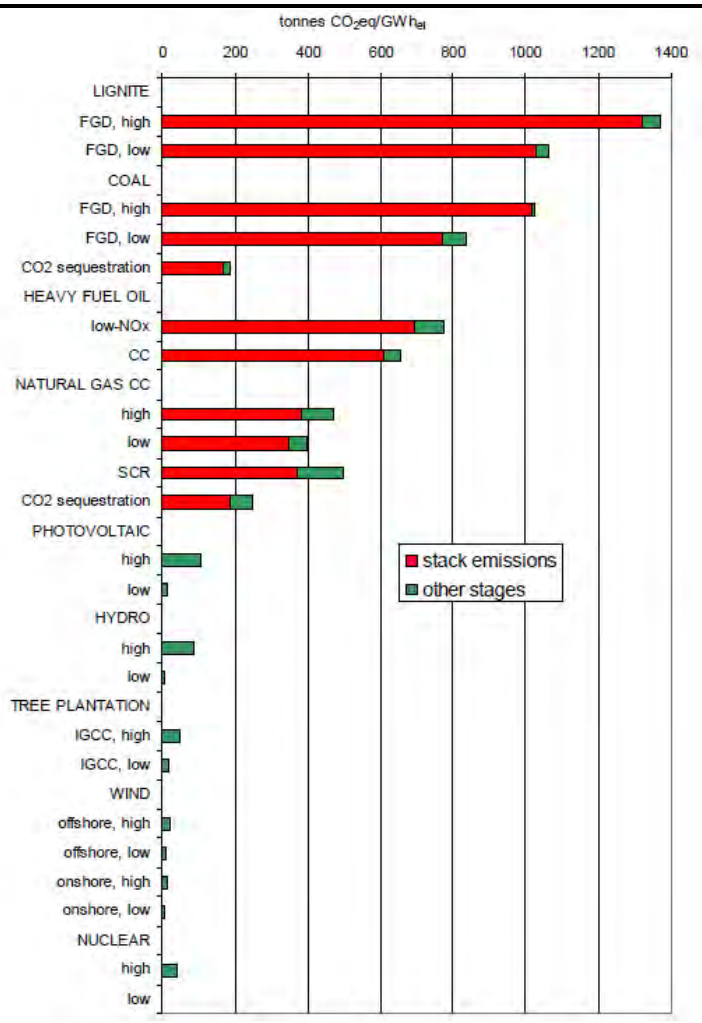
The carbon footprint includes all direct GHG emissions from sources owned or under the operational control of the Project ('Scope 1' emissions). Indirect emissions from the consumption of purchased electricity ('Scope 2' emissions) are not relevant because electricity needs for the power plant (i.e. for power plant auxiliary power) will be derived from the plant itself.

Emissions have been calculated for (total) 1 507 MW Project for the operational phase only. Emissions associated with the construction and eventual decommissioning of the Project are excluded from the assessment, since these are likely to be insignificant in the context of the Project's operational emissions arising from the combustion of CNG or LNG for power generation (World Energy Council, 2004). *Figure 2.1* illustrates the significance of the contribution

(1) A number of different gases contribute to the greenhouse effect. The effect that they have varies according to their relative ability to trap and retain radiant energy arriving at the Earth. These differences are reflected in the gases' global warming potentials (GWP), which are a measure of their greenhouse effect 'strength' relative to CO_2 The GWP of CO_2 is 1, methane (CH_4) is 25, and nitrous oxide (N_2O) is 298 for a 100 year time horizon. Figures are taken from the IPCC's Fourth Assessment Report, in line with the GHG Protocol.

of direct (stack) emissions to overall life cycle emissions from combined-cycle natural gas plants, in comparison to non-stack emissions from other life cycle stages.

Figure 2.1 ***Comparison of direct (stack) vs. indirect (other life cycle stages) emissions from different energy systems***



SCR = Selective catalytic reduction; CC = Combined cycle; and 'High' and 'Low' represent the highest (high) and lowest (low) values from various LCA studies assessed.
Source: World Energy Council (2004)

The timeframe for the phases of the Project (specific to the power plant itself) are illustrated in *Table 2.1* below, together with confirmation of which phases are in the scope of the GHG assessment.

Table 2.1 ***Project Phases in Scope***

Phase	Timeframe	Duration	In / Out of Scope
Construction – Phase 1: Total installed capacity of 252 MW • Installation of six open cycle Siemens Industrial Trent 60 gas turbines (T1, T2, T3, T4, T5 and T6), each with 42 MW capacity, to provide peak power.	Early 2017 to September 2018	15 – 18 Months	Out of Scope

Phase	Timeframe	Duration	In / Out of Scope
Construction – Phase 2: Total installed capacity 1 317 MW • Installation of three Siemens SGT5-4000F single shaft combined-cycle gas turbines each with 439.1 MW capacity.	2017/18 to 2019/20	18 - 20 months	Out of Scope
Operations – Phase 1: • 252 MW generating capacity but with five of the total six Trent 60 turbines running at any one time	September 2018	Approx. 30 years*	In Scope
Operations – Phase 2: • 1 317 MW generating capacity from the three Siemens SGT5-4000F combined-cycle gas turbines	Around 2020	Approx. 30 years*	In Scope
Decommissioning	(Estimated based on 30 years' operating life of plant): Around 2050	Not yet known	Out of Scope

*Initial plant life will be designed for 25 to 30 years. Upgrades during the life of the plant can increase the design life to 50 years.

Emission estimates for the future activities of the plant cover those activities which are under their direct operational control. The GHG Protocol divides emissions into three 'Scopes'. For the purposes of this study, only Scope 1 emissions have been estimated since Scope 2 emissions are not applicable (the plant will use its own electricity rather than grid electricity). The emission Scopes are defined as:

- Scope 1 – direct emissions from sources owned or under the operational control of the company;
- Scope 2 – indirect emissions from the consumption of purchased electricity; and
- Scope 3 – indirect emissions an optional reporting category allowing for other indirect emissions associated with, but not controlled by the company.

The concept of emission Scope is further illustrated in Figure 2.2.

Figure 2.2 GHG Scope Illustration

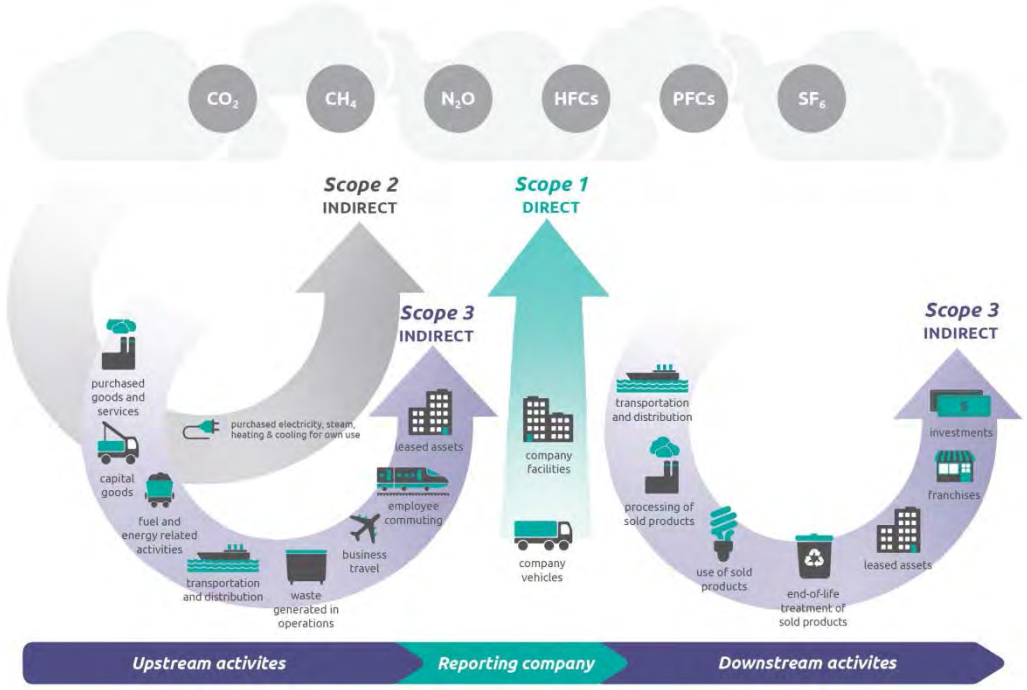


Figure courtesy of GHG Protocol

The following sources of Operational Phase emissions arising from activities under the operational control of the Project are included in the assessment:

- Scope 1 stationary combustion emissions from the combustion of natural gas to produce power (electricity); and
- Scope 1 stationary combustion emissions from the combustion of LPG used for cold start-ups at the power station in the event of all turbines cutting out (black start).

The following sources of Operational Phase emissions arising from activities under the operational control of the Project are *excluded* from the assessment, as these are considered to be negligible in comparison to the above emissions from the combustion of natural gas and LPG:

- Scope 1 emissions from non-energy products associated with the use of lubricants for machinery;
- Scope 1 emissions associated with on-site transport related activities;
- Scope 1 emissions associated with any physical or chemical process activity on site, such as processing of waste; and
- Fugitive emissions, such as fuel leakage from equipment and plant.

2.4 ASSUMPTIONS

The following should be noted with respect to any assumptions made for the purposes of this assessment:

- This study uses information and data on the Project given in the Scoping Report and given in response to ERM's GHG data request.
- This study refers to a variety of policy documents published by the South African government in order to undertake an analysis of South Africa's energy and climate policy, to describe South Africa's current national GHG emissions and inventory, and to project the country's GHG emissions forward to 2050 (done as part of the *Baseline Description*). In the absence of any information to suggest otherwise, the study assumes that existing policies and plans for both the energy sector and with respect to climate change mitigation will be implemented as described in existing policy documents. Any key assumptions made either in the policy documents or in any related analysis have been stated in the report.

2.5 *LIMITATIONS*

The limitations associated with the study are outlined below:

- As part of the Impact Assessment, the study gives a long-term view of GHG emissions from the Project, and in order to understand the implications of the Project on South Africa's current and future national GHG emissions, and the impact on the country's climate change mitigation commitments and reduction targets, GHG emissions from both the Project and South Africa as a whole are projected forward to 2050. The study uses information in published policy documents and plans to inform South Africa's future GHG trajectory, and assumes that the plant will operate as planned in the Scoping Report to 2050 (i.e. follows a constant GHG trajectory where annual GHG emissions are constant over time). Any changes with respect to national energy policy and planning, and with respect to the specific operating context and mandate for the Project, will affect the analysis in this study.
- This study does not include an assessment of emissions associated with the construction phase, or an assessment of Scope 3 emissions associated with the production and transport of fuel (LNG and CNG) to the plant. As discussed above, emissions from the construction phase are likely to be minimal compared to the emissions associated with the combustion of natural gas during operations. Emissions associated with the production and transport of fuel could be significant, but represent a source of indirect emissions that are not under the Project's operational control (Scope 3), and at present details on the source and transport of gas have not yet been confirmed. Considering the information available, the likely magnitude of the different emissions sources (with the bulk of life cycle emissions likely coming from the combustion of natural gas for power generation), and also guidance from the IFC Performance Standards (Performance Standard 3 on Resource Efficiency and Pollution Prevention states that '*the client will quantify direct emissions from the facilities owned or controlled within the physical project boundary, as well as indirect emissions associated with the off-site production of energy used by the project'* and therefore focuses on Scope 1 and 2 emissions), this

study therefore focuses on an assessment of direct GHG emissions from the plant.

2.6 *CONTENT OF THE SPECIALIST REPORT CHECKLIST*

The content of this report has been prepared in terms of Regulation GNR 982 of 2014, Appendix 6, as shown in *Table 2.2.*

Table 2.2 Specialist Report Checklist

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	**Cross-reference in this report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.1 (About ERM) in the GHG assessment report
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Attached to this report
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Sections 1 (Introduction) and 2 (Methodology) of the full GHG Study
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A – no site visit was required for the GHG assessment. Section 4.1 and 2.2 of the full GHG study sets out the desk-based data collection process
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 2 (Methodology) in the full GHG study
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	N/A – it is not posisble to link GHGs from the project to local, site-specific impacts so no site sensitivity assessment is undertaken. The specific GHG impact assessment methodology is described in Section 2 of the full GHG study
(g) an identification of any areas to be avoided, including buffers;	N/A – see (f) above
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A – see (f) above
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2.4 (Assumptions) and 2.5 (Limitations) in the full GHG study
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	The study results are presented in Section 4 (Impact Assessment). Mitigation measures are presented in Section 5 (Emissions Management Measures). It is not possible to identify alternatives in the context of this project for the reasons outlined in Section 5.6, and within the response to the DEA's comments, refer to Comments and Responses Report, Annex B of EIA.
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Annex B of EIA
(p) any other information requested by the competent authority.	N/A

3 BASELINE DESCRIPTION

This section presents the context in which the analysis of the Project's GHG emissions should be understood, and against which the Project's GHG and climate change impacts will be assessed. Specifically, it presents:

- South Africa's energy policy context, including the rationale for the IPP Procurement Programme (and specifically the Gas to Power IPP Programme, applicable to this Project);
- The country's climate policy context, including the national GHG emissions inventory, international GHG emission reduction commitments, and a future GHG trajectory under a range of scenarios;
- Reference benchmarks on the GHG intensity of gas-fired power plants using different technologies, and on the GHG intensity of South Africa's grid electricity; and
- Reference benchmarks from various international lender standards on the magnitude of GHG emissions from a project or development.

The above analysis is used to contextualise the Project's emissions and to assess the climate change impact of the Project in terms of GHG emissions into the atmosphere and contribution to global climate change, in addition to its contribution to South Africa's climate change commitments.

3.1 SOUTH AFRICA'S ENERGY LANDSCAPE

The 2013 National Development Plan (NDP) defines a long term vision for South Africa to 'Eliminate poverty and reduce inequality by 2030' and presents a range of national development priorities (e.g. education, provision of energy, and infrastructure) to achieve this. Various government departments contribute to the process and their agendas must be considered jointly to understand the dynamic between economic, social and environmental goals. From an energy perspective, the DoE is tasked with developing energy regulation, which comprises policy, action plans, and legislative directives, to ensure security of energy supply at the right price.

3.1.1 Energy Planning

White Paper on Energy Policy (1998)

The *White Paper on the Energy Policy of the Republic of South Africa (1998)* (hereafter 'White Paper') was prepared and finalised in 1998 in order to clarify the South African Government policy for the entire energy system, covering both supply and demand of energy for a decade. The major objectives stipulated in the White Paper included stimulating economic development, managing energy-related environmental impacts, and securing supply through diversity.

The White Paper specifically noted the Government's intention to allow for the entry of multiple players into the electricity generation market, to further the development of renewable energy technologies, and to allow for privately owned distribution (see *Section 3.1.2* for a discussion of the entry of IPPs into the energy market). The White Paper confirmed the potential for significant growth in South Africa's gas industry and nuclear energy.

From 1998 to 2008 however, no significant investments in additional electricity generation were made which resulted in an energy crisis and South Africa experiencing rolling electricity black outs in 2008. At this time, there was a shift to focus on demand-side management opportunities in the short-term whilst ensuring supply-side initiatives through the implementation of cross sector energy planning (Henneman et al., 2015). An overview of some of the key plans and policies that comprise Government's response to the energy crisis, and which are intended as a framework to create stability within the energy sector going forward, is presented below.

Integrated Resource Plan for Electricity 2010-2030 (2011)

In 2011 the DoE promulgated the first iteration of the *2010-2030 Integrated Resource Plan (IRP) for Electricity* ('IRP') (DoE, 2011). The IRP 2010-2030 (2011) constitutes a 20 year electricity capacity plan, formulated to guide decision making around electricity policy and the future make up of South Africa's total generation capacity between 2010 and 2030 in terms of the proportion of total electricity to be sourced from coal, nuclear, hydro/pumped storage, imported gas, wind, and solar, including Concentrated Solar Power (CSP) and Photovoltaic (PV). The IRP 2010-2030 (2011), having been promulgated by parliament in 2011 and published as a notice under the Electricity Regulation Act (ERA) No. 4 of 2006, provides the adopted legal basis for Government's electricity planning. It also aims to provide clarity around the Government's plans for acquisition of least-cost energy resources. The IRP 2010-2030 (2011) factored in GHG emissions more fully than previous plans for the electricity sector, through factoring in the GHG emissions limits specified in South Africa's Long term Mitigation Scenarios (LTMS) 2007 study (see *Section 3.2.1*), whilst also taking into account the impacts of the 2008 economic recession on electricity demand.

In 2010, 90% of South Africa's energy consumption was generated using coal, 5% using nuclear and 5% using hydropower (DoE, 2011). The IRP 2010-2030 (2011) proposed that South Africa would reduce its dependence on coal based electricity generation from 90% to 65% by 2030 and transition to alternative generation options, so that electricity generated using nuclear power would comprise 20% of the total electricity share in 2030, and 14% would be generated from renewables including wind and hydropower (5% each), PV (3%), and CSP (1%) [(1)]. This transition was intended to be supported by a shift in new build options expected to come on stream over the period 2010-2030,

(1) Renewables as defined per the IRP 2010-2030 (2011)

with coal expected to make up 29% (including Medupi and Kusile [(1)]), renewables (including imported hydropower and pumped storage) 40%, nuclear 17%, and gas 4% of the additional 56 539 capacity [(2)] (net 45 637 MW, including decommissioning of 10 902 MW) planned between 2010 and 2030 [(3)].

IRP 2010-2030 Update (2013)

The IRP 2010-2030 (2011) was designed to be a 'living document' with a two year review cycle. As such, in November 2013 the DoE issued a draft update of the document, hereafter IRP 2010-2030 (2013), for public comment. The original date set for Cabinet's final approval of the IRP 2010-2030 (2013) was established as March 2014 (DoE, n.d.1). Given the delay in finalising the update, both Eskom and the DEA's 2014 GHG Mitigation Potential Analysis study (see *Section 3.2.3*) defer to the data contained in the promulgated IRP 2010-2030 (2011) in the analysis applied to current and future electricity planning.

The draft update of the IRP 2010-2030 (2011) in 2013 followed a prolonged period of depressed economic growth which has a direct correlation to electricity demand in the country. The 2013 update estimated an overall peak generation demand of 6 600 MW less than the first iteration of the IRP and a different contribution from electricity generation technology options.

Table 3.1 below illustrates the proposed electricity generation mix for South Africa in 2030 based on the IRP 2010-2030 (2013) (column 3) and contrasts this to the original IRP 2010-2030 (2011), and existing electricity capacity as of 2010 (columns 1 and 2). The data presented in the table for 2030 (columns 2 and 3) reflect the 'base case' for 2030 as defined in the IRP process.

Table 3.1 Proposed electricity generation mix for 2030 based on the IRP 2010-2030 produced in 2011 and 2013 against 2010 baseline capacity

Energy Technology Option in 2030	**2010 Baseline capacity in MW** (DoE, 2011) [(4)]	**IRP 2010-2030 (2011) Generation mix for 2030 in MW**(DoE, 2011) [(5)]	**IRP 2010-2030 (2013) Generation mix for 2030 in MW** (DoE, 2013b) [(6)]
Existing Coal*	34 435	34 821	36 230
New Coal**	N/A	6 250	2 450
CCGT (Combined Cycle Gas Turbine)	0	2 370	3 550
OCGT (Open Cycle Gas Turbine)	2 400	7 330	7 680
Hydro Imports***	0	4 109	3 000
Hydro Domestic	600	700	690

(1) Medupi and Kusile are two new large coal-fired power stations currently under construction by Eskom. Each will have a capacity of approximately 4 800 MW.
(2) The remaining 15% of planned new capacity comprises diesel Open Cycle Gas Turbines (OCGT) and co-generation.
(3) Note that the IRP factors in decommissioning of 10 902 MW, bringing net new build to 41 346 MW.
(4) Table 27 – Existing South African Generation Capacity Assumed for IRP
(5) Table 4 – Policy-adjusted IRP Capacity
(6) Table 2 – Technology options arising from IRP 2010 and the Update Base Case in 2030.

Energy Technology Option in 2030	**2010 Baseline capacity in MW** (DoE, 2011) [4]	**IRP 2010-2030 (2011) Generation mix for 2030 in MW**(DoE, 2011) [5]	**IRP 2010-2030 (2013) Generation mix for 2030 in MW** (DoE, 2013b) [6]
PS (Pumped Storage) (incl. Imports)***	1 400	2 912	2 900
Nuclear	1 860	11 400	6 660
PV (Photo-voltaic)	0	8 400	9 770
CSP (Concentrating Solar Power)	0	1 200	3 300
Wind	0	9 200	4 360
Other	730	890	640
Non-Eskom***	3 260	N/A	N/A
Total Installed Capacity (Eskom)	**40 635**	**N/A**	**N/A**
Total Installed Capacity *(Eskom and non-Eskom)*	**43 895**	**89 532**	**81 230**

**Existing Coal in 2030 (columns 2 and 3) includes Medupi and Kusile (Eskom power stations currently under construction), which is do not play a role in 2010 Baseline Capacity. Existing coal indicated for 2030 in columns two and three therefore takes into account the decommissioning of older power stations*
***Including Coal Baseload IPP Programme*
****For the 2010 Baseline capacity as per IRP 2010-2030 (2011), imports for Hydro and Pumped Storage are incorporated into non-Eskom installed capacity. Based on detail in the draft updated IRP 2010-2030 (2013), non-Eskom installed capacity as of 2010 includes imported hydro (45%), coal-fired power plants (28%), co-generation (11%), medium-term power purchase program (8%), pumped storage (5%) and diesel temporary plants (3%)*

Additional cases are considered within the IRP 2010-2030 (2013) driven by varying assumptions for example around technology costs, economic growth, and potential extension of the lifespan of the existing Eskom fleet, though the 'base case' serves as the reference for planning.

Draft 2012 Integrated Energy Plan (IEP)

The purpose and objectives of the Integrated Energy Plan (IEP) are informed by the National Energy Act, 2008 (Act No. 34 of 2008) [1]. The core purpose of the IEP is to guide the development of energy policies, the selection of appropriate technology to meet energy demand, and to guide investment in these technologies. It also aims to assist energy policy makers in understanding how energy policies contribute to other national policy imperatives (such as those espoused in the NDP). The focus of the IEP is not to ensure if or how energy needs are met, but rather a long term vision of for how energy can be optimally used. The IRP can be considered a sub-set of the IEP as it only focuses on electricity, with the IRP as an input into the IEP.

The IEP analyses the results of a Base Case, and five Test Cases with respect to future energy demand to 2050 in South Africa (DoE, 2013a). These cases integrate the data available on South Africa's energy and electricity landscape (including current policy implications) in order to model various scenarios for future energy use. The Base Case represents 'business as usual' where

(1) Specifically, Chapter 3 *Integrated Energy Planning* As per the Act, the Integrated Energy Plan must deal *inter alia* with issues relating to the supply, transformation, transport, storage of and energy demand – over a 20 year time horizon.

prevailing energy policy conditions are projected into the future, whilst the Test Cases model policy alternatives, including:

- The Peak, Plateau, Decline (PPD) Emissions trajectory (*PPD Emissions Limit Test Case*);
- Influence of no nuclear energy builds in future electricity mix (*Emissions Limit – No Nuclear Build Programme Case*);
- Influence of varying renewable energy targets (*Renewable Energy Target Case*);
- Influence of replacing nuclear with natural gas (*Emissions Limit Natural Gas Case*); and
- Influence of the constraints imposed by carbon taxes (*Carbon Taxes Case*).

These Test Cases are intended to integrate the objectives of a range of policies impacting the energy sector [(1)] including the broad goals of the NDP, the IRP and South Africa's National Climate Change Response Policy ('NCCRP', discussed in *Section 3.2*) and highlight their implications, for example through the introduction of a carbon tax, on future energy options and costs. The analysis produced in the IEP reveals that coal technologies continue to play an important role in energy generation across all test cases up to 2030, when the existing fleet of coal power plants are assumed to begin entering retirement. New coal generation, e.g. constructed after the IEP publication date, continues to contribute to electricity supply up to 2050 in only two of the cases (50 GW by 2050 in the Base Case and 30 GW in the Renewable Energy Target Case). Carbon Capture and Storage (CCS) technologies were not considered as options due to their relatively high cost (DoE, 2013a).

The importance of renewables in Government's energy planning are notable, given that wind and solar energy feature prominently across all test cases underpinning the IEP in terms of the final contribution these sources make to the total energy mix. New natural gas options do not feature prominently in any of the test cases. The DoE is however in the process of finalising a Gas Utilisation Master Plan (GUMP) for South Africa (IPP Gas, 2016) (further details below) [(2)]. The IEP was made available for public consultation in 2013 and is still in the process of being finalised. The development of South Africa's electricity generation in recent years has been done against the promulgated IRP 2010-2030 (2011) (DoE, 2013a).

(1) The IEP identifies eight key objectives that form the basis of the criteria against which the IEP evaluates different policy alternatives and proposals, six of which are relevant to the energy sector, specifically;

1. Security of energy supply.
2. Minimise cost of energy.
3. Increase access to energy.
4. Diversify supply sources and primary energy carriers.
5. Minimise emissions from the energy sector.
6. Improve energy efficiency (reduce energy intensity of the economy).

(2) The GUMP has been conceived as a roadmap for the development of a gas economy in South Africa and aims to stimulate local demand for gas through a 'Gas to Power Programme'. Government anticipates that in alignment with the GUMP, the Gas to Power Programme will enable the development of South Africa's gas sector.

3.1.2 *Delivery of additional energy capacity: the Independent Power Producers Procurement Programme*

In May 2011, the DoE gazetted the Electricity Regulations on New Generation Capacity under the Electricity Regulation Act (ERA) of 2006 (No. 4 of 2006). The new regulations establish both the guidelines and rules pertaining to the procurement of energy from IPPs, as well as the structure and process of an IPP Bid Programme (Eskom, 2015). Specifically Section 34 (1) of the ERA notes that 'The Minister of Energy may, in consultation with the Regulator:

- determine that new generation capacity is needed to ensure the continued uninterrupted supply of electricity; an
- require that new generation capacity must-
    - be established through a tendering procedure which is fair, equitable, transparent, competitive and cost-effective, and
    - provide for private sector participation.'

The objectives of these regulations include the regulation of entry by a buyer and an IPP into a power purchase agreement (PPA), the facilitation of fair treatment and the non-discrimination between IPP generators and the buyer. The IPP Procurement Programme (IPPPP) Office was established in 2010 by the DoE, National Treasury and the Development Bank of Southern Africa (DBSA) with the primary mandate to procure energy from IPPs. The introduction of IPPs into South Africa's generation mix is deemed critical to ensure security of supply for South Africa. During the period of rolling blackouts in 2008 Eskom was operating at a reserve margin estimated at around 8% or lower, whilst global energy experts note that ideally a 10-15% reserve margin is required in a stable electricity system and South Africa is not currently operating within this range (Eberhard, 2008).

The procurement mandate of the IPPPP is aligned to the capacity allocated to the various electricity generation sources in the IRP 2010-2030 (2011) [(1)]. As of 31 December 2015, six bidding rounds had been completed (comprising various bidding 'windows'), with 6 376 MW procured from renewable resources and 2 021 MW operationalised across 40 separate IPPs (IEEJ, 2016). The IPPPP Office has in addition indicated its intention to commence with the procurement of gas to power energy resources through the Gas to Power Programme and implementation of the GUMP, discussed in more detail in the section that follows.

Another imperative of the IPPPP is to introduce competitive pricing with respect to energy procurement. Whilst details of the IPP Gas procurement framework have yet to be finalised, it is likely that bidders will be obliged to convey the price at which capacity/energy will be sold and then evaluated on

(1) Some energy projects were developed prior to the gazetting of the New Generation Regulations, these include Eskom's current new build programme, the medium term power purchase programme (~400MW) and the DoE's open cycle gas turbine (OCGT) IPP project (~1020MW) (Eskom 2016).

a comparative basis (as per IPP Coal, 2016). Bidders will also be required to comply with South Africa's Broad Based Black Economic Empowerment (BBBEE), including ownership requirements (1), as well as to South Africa's environmental regulations.

The IPPPP mandate regarding capacity to be procured and progress of bidding processes and commercial operation dates are summarised in *Table 3.2* below. As indicated, the stage of bidding process and commercial date achieved or planned for operations vary across the energy carriers. The Renewable Energy IPPPP has achieved greatest maturity, as of December 2015 100% of the projects submitted in the first bid window had achieved financial close and grid connection, with a further 89% (window 2) and 5.8% (window 3) connected to the grid. This represents approximately 2 021 MW of connected capacity. In addition, 6 377 MW of renewable (wind, solar PV, solar CSP, landfill gas, biomass and small hydro) projects were procured between November 2011 and December 2015 (IEEJ, 2016).

Table 3.2 Overview of IPPPP to Date

Type of Energy Source	Total Planned Capacity (MW)	Stage of Bids	Commercial Operation Date
Renewable Energy*	13 225	Various Stages: Bids 1-3 have achieved financial close	Grid Connection across bid windows 1-3– new capacity to be added in phased approach
Imported Gas to Power	3 000	Preparation Phase	2021
Coal *local and cross border*	2 500	Bid Completed	2021 Onwards
Cogeneration	1 800	Bid Completed	2016 –2018
Floating Power Plants		Conceptualisation Phase – Project on Hold	N/A
Domestic and Piped gas	126	Preparation Phase	2018-2019
Peaking Power	1 020	Bid Completed	2015-2016

Source: IEEJ, 2016

The Gas to Power Programme and GUMP

The Ministers determinations require that 3 126 MW of baseload and/or mid-merit energy generation capacity is needed from gas-fired power generation to contribute towards energy security. The gas required for such power generation will be from both imported (3 000 MW) and domestic (126 MW) gas resources (DoE, n.d.2) (IEEJ, 2016). This forms the basis of the Gas to Power Programme.

(1) Specifically, 51% equity participation by South Africans and at least 30%of the shares in the project company owned by black South Africans.

The Gas to Power Programme is informed by the GUMP, which in turn supports the objectives of the IEP. The GUMP is a 30 year roadmap for the development of a gas economy in South Africa, outlining the potential and opportunity, and a plan for how this can be achieved.

A key challenge in developing the country's gas sector relates to bringing both gas demand and supply on stream at the same time. The Gas to Power programme aims to create significant demand for gas and enable the initial development of South Africa's gas industry. With the current absence of indigenous gas resources, gas will initially need to be imported in the form of liquefied natural gas (LNG) or compressed natural gas (CNG) by ship or by pipeline. In the longer term, the development of indigenous gas sources including shale gas, offshore production, and coalbed methane are targeted.

The procurement framework for both the domestic and imported gas programmes under the Gas to Power programme has now been developed, and a request for information (RFI) released and responses analysed in July 2015 in order to inform the request for proposals which is due to be released in the second quarter of the 2016/17 financial year (IEEJ, 2016) (IPP Projects, 2016). It should be noted that the proposed Project was initially developed outside of the Gas to Power Programme, primarily driven by the need to meet the power requirements of ArcelorMittal's Saldanha Steel plant. However, as required, the Project will be aligned with the Gas to Power Programme, and its implementation is aligned more broadly with the requirement to add additional capacity to the South African grid since it will help to reduce the load on the grid, and in Phase 2 will likely directly feed power into the grid.

3.2 SOUTH AFRICA'S CLIMATE CHANGE LANDSCAPE

The Department of Environmental Affairs (DEA) is responsible for ensuring delivery of South Africa's climate change commitments as laid out in the National Climate Change Response Policy (NCCRP), published in October 2011, and confirmed through South Africa's recent commitments to the United Nations Framework Convention on Climate Change (UNFCCC).

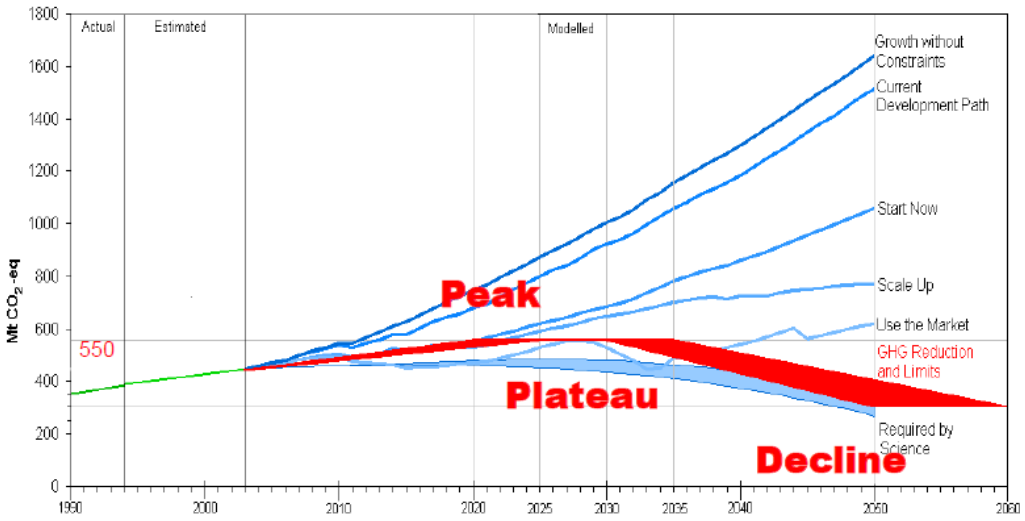
3.2.1 National Climate Change Response Policy 2011

The NCCRP establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) emissions trajectory. The NCCRP establishes the PPD as the benchmark against which South Africa's future mitigation actions will be measured (DEA, 2011). The research underpinning the PPD trajectory and its implications for future electricity generation are described in further detail in the sections below.

South Africa PPD Emissions Trajectory

In 2007, the Government commissioned the Long term Mitigation Scenarios (LTMS) report to investigate potential pathways for South Africa to mitigate its GHG emissions (DEAT, 2007). The Government published the results of the LTMS in 2008, and in 2009 used the PPD trajectory that emerged from the process (illustrated in *Figure 3.1*) to define its first climate mitigation pledge under the UNFCCC's Copenhagen Accord. The pledge stated the intention to 'take nationally appropriate mitigation action to enable a 34% deviation below the Business As Usual (BAU) emissions growth trajectory by 2020 and a 42% deviation below the BAU emissions growth trajectory by 2025' (DEA, 2010).

Figure 3.1 South Africa's 'Peak, Plateau and Decline' Trajectory



Source: South African Department of Environmental Affairs

Based on the PPD, South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter. The South African Copenhagen pledge was conditional on a fair, ambitious and effective agreement being reached in the international climate change negotiations as well as the provision of financial resources, the transfer of technology, and capacity building support from developed countries to developing countries.

3.2.2 South Africa's Intended Nationally Determined Contribution (INDC)

Further to South Africa's Copenhagen pledge, the Government agreed to submit its Intended Nationally Determined Contribution (INDC) to the UNFCCC (1) in advance of the 21st Conference of Parties (COP) which took place at the end of 2015 in Paris, when 148 countries worldwide submitted

(1) INDCs refer to the overall reduction in the annual quantum of GHG emissions a country seeks to achieve over an agreed period of time. Preparation of INDCs is mandated by UNFCCC decisions 1/CP.19 and decision 1/CP.20, the latter specifying information for mitigation (paragraph 14); and in paragraph 12 providing options to communicate an adaptation component of an INDC (A-INDC), or "undertakings in adaptation planning". South Africa has submitted a single INDC, including adaptation, mitigation and an indicative required means of implementation for both.

their GHG reduction pledges to the UNFCCC, setting out the extent to which they intend to reduce their national GHG emissions.

South Africa's INDC submission takes account of the country's development imperatives. The 2025 target in the INDC corresponds to the same 2025 emissions target from the previous pledge. However, the 2009 pledge did not specify a BAU emissions scenario, whilst the INDC specifies an intended emissions range up to 2030 and includes an emissions 'peak', after which emissions will decline in absolute terms thereafter (DEA, 2015) (WRI, 2015).

South Africa's INDC notes that 'South Africa will use five-year periods of implementation at the national level, specifically, 2016-2020 focused on developing and demonstrating the mix of policies and measures that will be deployed in order to meet South Africa's Copenhagen pledge, and the periods 2021-2025 and 2026-2030 to achieve the INDC' (DEA, 2015) (1). The Government believes that this will enable South Africa's GHG emissions to peak between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter. Within the INDC, there is no specific discussion of the process that should be put in place to ensure that proposed developments will enable the delivery of South Africa's commitments.

3.2.3 South Africa's National GHG Inventory

Information on South Africa's annual GHG emissions has been derived from South Africa's GHG Inventory 2000-2010 (DEA, 2014b), and South Africa's INDC (UNFCCC, 2015). The Government, as a signatory to the UNFCCC, is obliged to submit a regular inventory of its GHG emissions. The first GHG inventory was prepared in 1998. The latest GHG inventory was produced for the period 2000-2010 (and submitted in 2014) and is aligned to the 2006 IPCC guidelines for National GHG Inventories.

South Africa's 2010 GHG emissions by sector are described in *Table 3.3.* In total, South Africa's GHG emissions in 2010 were estimated to be 544 million tonnes (Mt) CO_2e, excluding forestry and other land uses (FOLU) which are estimated as net carbon sinks. Including FOLU, total GHG emissions in 2010 are 518 Mt CO_2e. The energy sector is a large contributor to GHG emissions in South Africa, predominantly as a result of fossil fuel combustion. The GHG emissions from the energy sector alone in 2010 were 428 Mt CO_2e, which accounted for 78.7% of the total national GHG emissions (excluding emissions from FOLU (DEA, 2014b) (UNFCCC, 2015). Eskom accounted for 55% of South Africa's total accumulated emissions over the period 2000-2010.

Table 3.3 South Africa 2010 GHG Emissions by Sector

Sector	Emissions (t CO_2e)	% total emissions (excl. FOLU) by sector

(1) Achieving the PPD/INDC commitments suggests that a combination of investment in abatement technologies, taxes and incentives will be required to meet South Africa's future emissions targets. A discussion of these aspects is however out of the scope of the GHG impact assessment.

Sector	Emissions (t CO_2e)	% total emissions (excl. FOLU) by sector
Energy	428 368 000	79%
Industrial processes*	44 351 000	8%
Agriculture Forestry and Other Land Uses (excl. FOLU)	51 789 000	10%
Agriculture Forestry and Other Land Uses (incl. FOLU)	25 714 000	5%
Waste	19 806 000	4%
Total (excluding FOLU)	*544 314 000*	
Total (including FOLU)	*518 239 000*	

Source: DEA, 2014b

*Note coal used for metallurgic processes is accounted for under industrial processes to avoid double counting

**Emissions per sector calculated against total (excluding FOLU)

As described, under the INDC, national emissions in 2025 and 2030 will be limited to between 398 and 614 Mt CO_2e (compared to 544 Mt CO_2e excluding FOLU / 518 Mt CO_2e including FOLU in 2010). The Government has stated in the INDC that the long term objective is to reduce GHG emissions to 428 Mt CO_2e by 2050, after having declined in absolute terms from 2036 onwards. It should be noted that the Government has also stated that these goals could change as and when new information becomes available. The baseline from which these reductions are to be achieved is established as 2016 (DEA, 2015).

South Africa's projected GHG emissions up to 2050 to meet the INDC (or PPD) were unbundled by the DEA in a GHG Mitigation Potential Analysis for South Africa (DEA, 2014a). The study presented the projection of national GHG emissions into the future, based on economic growth projections aligned to the medium term growth scenario defined in the IEP of 4.2% per annum and long term projection of 4.3% as per the 2012 Medium Term Budget Policy Statement (DEA, 2014a), as well as power sector commitments as defined the IRP 2010-2030 (2011). Both the upper and lower range of the INDC commitments are reflected in *Table 3.4* below.

Table 3.4 Projected GHG Emissions for South Africa based on its INDC to the UNFCCC

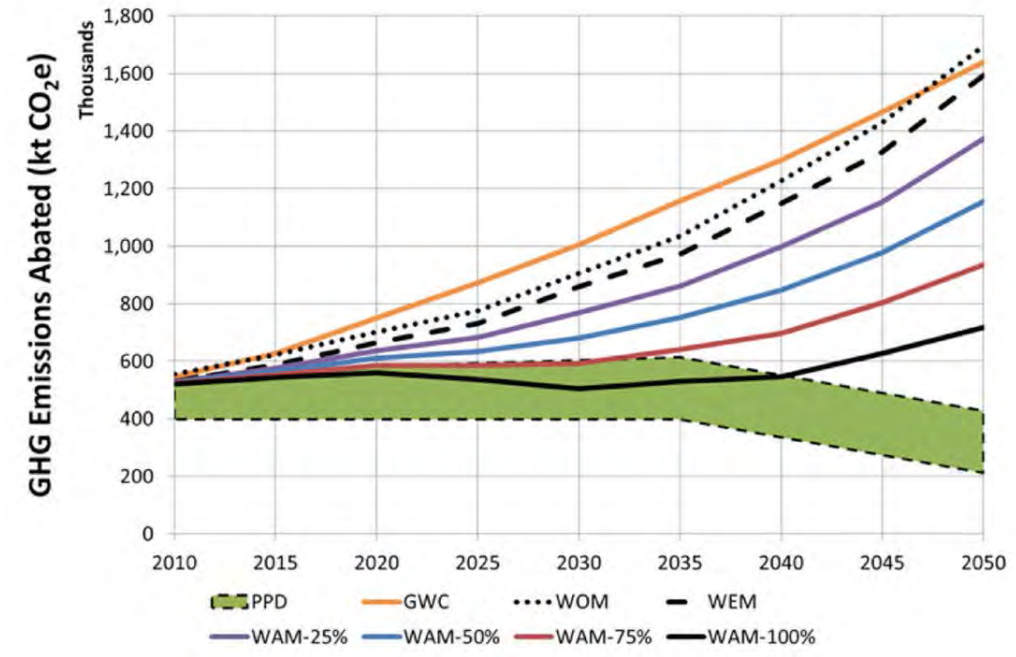
Year	Estimated annual emissions – South Africa (t CO_2e) - PPD Lower Range	Estimated annual emissions – South Africa (t CO_2e) - PPD Upper Range
2020	398 000 000	583 000 000
2025	398 000 000	614 000 000
2030	398 000 000	614 000 000
2035	398 000 000	614 000 000
2040	336 000 000	552 000 000
2045	274 000 000	490 000 000
2050	212 000 000	428 000 000

Source: DEA (2011); DEA (2014a). Based on PPD emissions trajectory and assuming linear decline to INDC targets by 2050 from 2035 levels.

In the DEA's 2014 GHG Mitigation Potential Analysis study, the potential GHG abatement available to South Africa was considered against the PPD/ INDC commitments to 2050. The analysis presented numerous GHG emissions trajectories that assumed the implementation of identified

mitigation options to varying degrees, specifically: 'Growth without Constraints' (GWC) [(1)], 'Without Measures' (WOM) [(2)], 'With Existing Measures' (WEM) [(3)], and 'With Additional Measures' (WAM) [(4)], and compared these against the PPD trajectory (DEA, 2014a). *Figure 3.2* illustrates the results of the assessment.

Figure 3.2 National GHG Emissions Trajectories



Source: DEA, 2014a.

The results illustrate a gap between the PPD trajectory, and the country's emissions trajectory under the various mitigation scenarios. Only the WAM-75% (which implements 75% of national mitigation potential) and the WAM-100% (which implements 100% of national mitigation potential) track within the defined limits of the PPD trajectory for a period of time:

- WAM-75% tracks within the upper range up until 2030; and
- WAM-100% tracks within the PPD trajectory up until 2040.

Beyond 2040, the emissions trajectories from all the mitigation scenarios (including WAM-100%) cease to track the PPD trajectory, suggesting that the current national mitigation potential identified is not sufficient to bring about the PPD trajectory. However, it should be noted that the Mitigation Potential Analysis considered the IRP 2010-2030 (2011) projections for the energy sector, and since the planning horizon for the IRP 2010-2030 (2011) is established at 20

(1) GWC refers to growth without constraints imposed by GHG emissions reduction targets (i.e. without applying mitigation measures). The GWC trajectory was developed as part of the LTMS study referenced in *Section* ***Error! Reference source not found.***.

(2) The WOM is a projection of emissions from 2000 to 2050 which assumes that no climate change mitigation actions have taken place, i.e. does not take into account the mitigation actions actually implemented to date.

(3) WEM incorporates the impacts of climate change mitigation actions including climate change policies and measures implemented to date. The projections follow the actual path of observed emissions for the period 2000 to 2010.

(4) National abatement pathways based on WAM projection assume different levels of implementation of the national mitigation potential (100%, 75%, 50%, and 25%).

years, coal and non-coal based energy sources were assumed to hold constant after this time. However, as stated in *Section 3.1,* specific targets have been established for the decommissioning of old Eskom coal fired power stations by 2025 and the decommissioning of power stations once they have reached the end of a 50 year lifespan (DoE, 2011). It is assumed that with subsequent revisions of the IRP, a longer time horizon will be considered, and (as indicated in the IEP) when factoring in the retirement of some of the existing coal-fired power station fleet beyond 2030, these trajectories may start to track the PPD more closely. The Mitigation Potential Analysis study concluded that more 'aggressive decarbonisation' of South Africa's energy supply will be needed in future iterations of the IRP if the targets set out in the PPD are to be achieved (DEA, 2014a).

3.3 *EMISSIONS INTENSITY OF THE SOUTH AFRICAN GRID AND OF GAS-FIRED POWER PLANTS*

The emissions intensity of electricity production varies depending on how the electricity is produced. The burning of carbon-rich fossil fuels in coal or natural gas fired thermal power plants produces significant GHG emissions, whereas renewable technologies (such as wind or solar) produce very little emissions during operation. The carbon or emissions intensity of electricity can be assessed by measuring and comparing the GHG emissions per unit of electricity produced, i.e. t CO_2e per MWh, across different plants. This metric (emissions intensity) is correlated to the heat rate and thermal efficiency of the plant, i.e. the amount of energy used by the plant to produce one kWh of electricity (a higher thermal efficiency means that a higher proportion of the energy consumed by the plant is converted into electricity for distribution to the grid).

Since the mix of energy sources used to generate electricity for the grid varies across geographies, so does the emissions intensity of each country's electrical grid. The grid emissions factor reflects the amount of GHGs (expressed as tonnes of CO_2e) emitted per MWh electricity generated. The African average grid emissions factor was 0.596 kg CO_2e per kWh for 2011 (using the latest published data). Specific countries, for example Mozambique which has historically relied on hydropower to produce grid electricity (1), have a much lower factor (0.001 kg CO_2e /kWh for the same year). In light of national commitments made under the UNFCCC to reduce GHG emissions, many countries, including South Africa, are developing policies and plans to reduce the use of high carbon energy sources for grid electricity production and increase the use of renewables in their generation mix (see *Section 3.1.1*). As such, and key in assessing the GHG impact of this Project, it is important to understand how the emissions intensity of a proposed power plant compares relative to other, similar power plants using the best available technology, and how it will affect the current and future grid emissions intensity for the country. These reference benchmarks for the Project are presented below.

(1) IEA, 2013. IEA Statistics: CO_2 emissions from Fuel Combustion – Highlights, 2013 Edition

3.3.1 South African Electrical Grid Emissions Factor

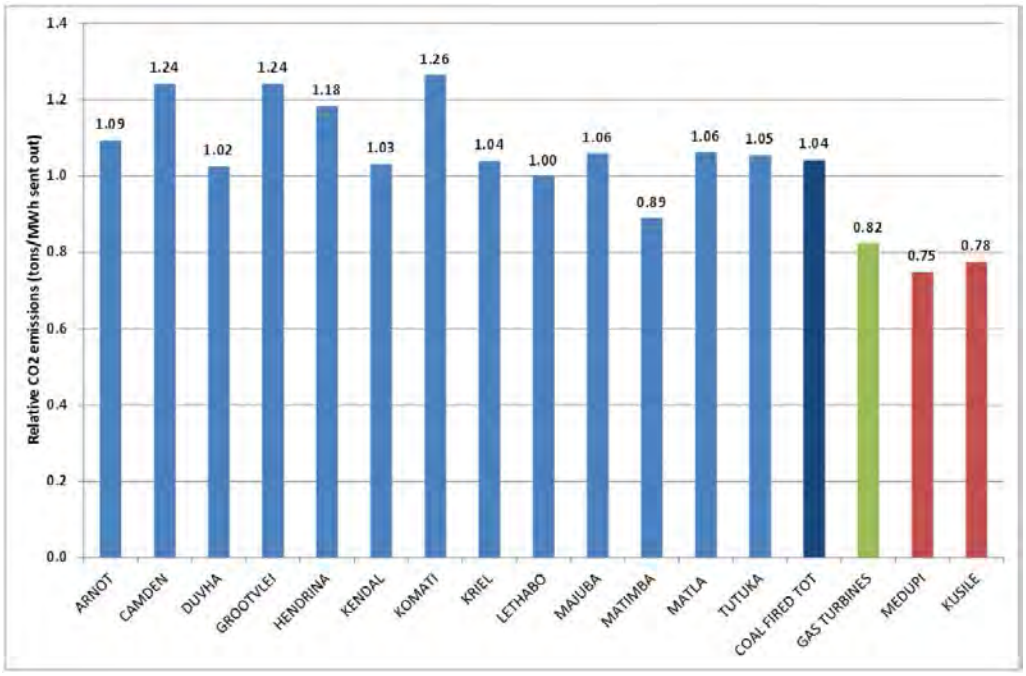
In South Africa, the national electricity grid is owned and operated by Eskom, a state-owned company. Eskom generates approximately 95% of the country's electricity, and is responsible for electricity transmission and distribution to consumers across the country (Eskom, 2015). Approximately 90% of Eskom's electricity comes from coal fired power plants (Eskom, 2016). Eskom has an aging fleet, with 81% of the operating coal-fired power plants being older than 20 years as of 2012. Prior to 2015, all of Eskom's coal fleet made use of subcritical steam conditions. The use of supercritical (SC) and ultra-supercritical (USC) coal-fired technologies allows higher efficiencies and lower GHG emissions (per MWh generated). Two major coal fired power plants currently under construction by Eskom: Kusile and Medupi. Kusile (4 800 MW, comprising six 800 MW units) is expected to enter commercial operations in the late 2017, and will use supercritical steam conditions. Medupi (similar capacity and number of units as Kusile) will also use supercritical steam, and the first unit (Unit 6) began feeding power into the South African national grid in 2015 (ESI Africa, 2015).

For the period 1 April 2014 to 31 March 2015, Eskom's published grid emissions factor was **1.01 t CO_2e per MWh** (Eskom, 2015). This factor is based on total emissions of CO_2e associated with production facilities, and total electricity generated (from coal, gas, nuclear, hydropower, pumped storage, and wind energy), excluding that which is consumed by Eskom, and excluding losses from transmission and distribution. There is no publically available information or published emissions factor to account for the overall South African grid emissions intensity (i.e. including the additional 5% generated by IPPs or imported), but, with Eskom responsible for the generation of the bulk of the country's electricity (95%), this is unlikely to make a material difference to the published factor from Eskom.

Eskom published data on the emissions intensity of its different plants in 2010/11, illustrating the emissions (t CO_2e) per MWh sent out (*Figure 3.3*). The average emissions intensity of its existing gas-fired power stations in 2010/11 was **0.82 t CO_2e per MWh** (Eskom, 2011) (1). However, it is important to note that Eskom's gas power plants (comprising Ankerlig, Gourikwa, Acacia and Port Rex) all run on liquid fuels (diesel and kerosene) rather than natural gas.

(1) It is not stated whether MWh sent out used to calculate these metrics includes losses associated with transmission and distribution.

Figure 3.3 ***Emissions intensity of Eskom's coal (individual) and gas (average) power plants in 2010-11***



Source: Eskom (2011)

3.3.2 Emissions Intensity of Gas-Fired Power Plants

The emissions intensity of coal-fired power plants can be assessed through the emissions per kWh or MWh generated (t CO_2e / kWh or t CO_2e / MWh). This is also related to the thermal efficiency rating for a power plant (expressed as a percentage and representing the proportion of fuel input energy converted into kWh). Plants with higher thermal efficiencies have lower CO_2 emissions per unit of electricity generated (IEA, 2014).

The efficiency of gas-fired power plants varies depending on the choice of technology, natural gas properties, local climatic conditions, operating and maintenance practices, and plant age. For example, one study into the energy efficiency of power generation across 12 geographies (1) showed that average gas-fired efficiencies from gas-fired power plants in 2009 to 2011 ranged from 34% (France) to 53% (United Kingdom and Ireland) (Ecofys, 2014). When comparing natural gas to coal, gas-fired power plants have higher thermal efficiencies and emit around half as much GHGs per MWh produced than coal plants (C2ES, n.d.) (IEA ETSAP, 2010).

Key in influencing the thermal efficiency and emissions intensity of gas-fired power plants is the choice of technology used – namely whether the plants use simple or open-cycle (OCGT) or combined-cycle technologies (CCGT). OCGT plants comprise a gas turbine connected to an electrical generator. The gas

(1) The countries included in this study were Australia, China, France, Germany, India, Japan, Nordic countries (Denmark, Finland, Sweden and Norway), South Korea, United Kingdom and Ireland, and the United States. For the comparison of CO_2 intensity, Canada and Italy were added as additional countries.

turbine is composed of a compressor, where air is compressed, a combustion chamber in which fuel is added and combusted, and the gas turbines, in which the hot, compressed air is expanded, driving both the compressor and the electric power generator. CCGT plants also use gas turbines to drive an electrical generator, but unlike OCGT plants recover waste heat from the turbine exhaust in a heat recovery steam generator (HRSG) to generate steam which is run through a separate steam turbine to provide additional electricity. Through the use of both a gas and a steam turbine, the latter harnessing waste heat, CCGT plants can produce up to 50% more electricity from the same fuel than a simple-cycle plant (OCGT) and are therefore significantly more efficient as illustrated in *Table 3.5*. Whilst OCGT plants are less efficient, they are quicker and cheaper to build, and have good operational flexibility (they can be started up quickly, hence why OCGT plants are often used to provide peak load or standby service).

Table 3.5 Thermal efficiency and emissions intensity of OCGT vs. CCGT gas plants

Technology	**Thermal efficiency (LHV, net)**	**CO_2e intensity factor (LHV, net)** t CO_2/ MWh
Open cycle gas turbine (OCGT)	30-40%	0.48 – 0.58
Combined cycle gas turbine (CCGT)	50-60%	0.34 – 0.40

Sources: IEA ETSAP (2010), C2ES (n.d.), IPIECA (n.d.)

Further, more drastic, reduction in GHG emissions from fossil fuel based power plants (and the GHG intensity of the electricity they generate), would require carbon capture and storage (CCS). CCS comprises three integrated stages: the capture and compression of CO_2 emitted from the plant; transport of the (supercritical or dense phase) CO_2, and CO_2 storage through injection into selected geological formations (or storage and utilisation for enhanced oil recovery). CCS applied to coal-fired power plants has the potential to reduce CO_2 emissions to below 100g (0.1kg) CO_2e / kWh (IEA, 2012). However, the use of CCS technologies creates cost challenges, and the increase in plant auxiliary energy consumption for the capture process can result in a reduction in thermal efficiency of 7-10%. Furthermore, demonstration of CCS has, to date, focused on coal rather than natural gas power plants, and the technology has not yet been applied in South Africa. That said, a CCS Roadmap has been developed for South Africa, and CCS demonstration plant is planned, together with the required CCS policies and legal and regulatory frameworks (SACCCS, 2016).

3.4 MAGNITUDE SCALE FROM INTERNATIONAL LENDER STANDARDS

An additional perspective on the magnitude of the Project's GHG emissions is provided by standards that are applied to developments at an international level. *Table 3.6* shows a magnitude scale for project-wide GHG emissions that is derived from, and in line with, a number of current international lender organisations or groupings, such as International Finance Corporation (IFC) standards, the European Bank for Reconstruction and Development's (EBRD) GHG assessment methodology and the Equator Principles (EP).

Table 3.6 Magnitude scale for project-wide GHG emissions based on wider standards

Project-Wide GHG Emissions / annum	Magnitude Rating
>1 000 000 tonnes CO_2e	Very Large
100 000 – 1 000 000 tonnes CO_2e	Large
25 000 – 100 000 tonnes CO_2e	Medium
5 000 – 25 000 tonnes CO_2e	Small
<5 000 tonnes CO_2e	Negligible

IFC reporting thresholds

The IFC's *Performance Standard 3: Resource Efficiency and Pollution Prevention* defines a reporting threshold for annual GHG emissions of 25 000 t CO_2e, and requires clients to '*…consider alternatives and implement technically and financially feasible and cost-effective options to reduce project-related GHG emissions during the design and operation of the project*' (IFC, 2012).

EBRD reporting thresholds

An annual GHG emissions threshold of 25 000 t CO_2e has also been adopted by the EBRD within its new Environmental and Social Policy, which entered into force in November 2014. This updated policy reduces the GHG reporting threshold within projects that the EBRD supports from 100 000 to 25 000 t CO_2e per year, and requires annual client quantification and reporting of these emissions. EBRD guidance on assessment of GHG emissions also defines a series of categories and thresholds for different project types (shown in *Table 3.7)* (EBRD, 2010).

Table 3.7 EBRD GHG Emissions Reporting Categories

GHG Emissions / annum	Magnitude Description
> 1 000 000 t CO_2e	High
100 000 – 1 000 000 t CO_2e	Medium-High
20 000 – 100 000 t CO_2e	Medium-Low
< 20 000 t CO_2e	Low
Not defined	Negligible

Equator Principles reporting thresholds

The EPs require all projects, in all locations, to conduct an alternatives analysis to evaluate less GHG intensive alternatives when combined Scope 1 and Scope 2 operational emissions are expected to be more than 100 000 t of CO_2 equivalent annually. In addition, the EP require that the client (should) report combined Scope 1 and Scope 2 Emissions, publicly on an annual basis, during the operational phase for projects emitting over 100 000 t of CO_2 equivalent annually. It notes further that clients would be 'encouraged' to report publicly on projects emitting over 25 000 t of CO_2e (EP, 2014).

Owing to the limitations associated with assessing the magnitude of GHG emissions from a project using national GHG emissions as a benchmark,

discussed in detail above, the magnitude scale presented in *Table 3.7* will be used in order to assess the magnitude of emissions from the Project.

4.1 GHG EMISSIONS FROM THE PROJECT

As noted in *Section 2.2*, GHG emissions from the Project are assessed by applying emissions factors to activity data relating to any GHG-causing Project activities.

In order to collect the activity data required for the assessment, the following activities were undertaken:

- The Project Scoping Report (1), prepared by ERM and dated 11 April 2016, and updated information on the Project provided in June 2016 (2) was reviewed in order to inform the data request; and
- Based on the review, a detailed GHG Information Request was developed in order to collect the activity data required for the assessment (e.g. quantities of natural gas to be combusted in each Phase).

Using the activity data provided together with the information in the Scoping Report and further information provided in response to ERM's GHG data request, the relevant GHG emissions factors were applied in order to estimate total emissions of GHGs from the Project in each Phase, expressed as 'carbon dioxide equivalents' (CO_2e), per year.

It should be noted that the emissions factor specific to the natural gas that will be used by the plant (i.e. based on the composition of different carbon containing compounds in the natural gas) was calculated using the API compendium equations (3) (API, 2009), and equated to 2.0255 kg CO_2 / m^3.

Table 4.1 summarises the Project's estimated annual GHG emissions during Operations (Phase 1 and 2). Total estimated annual emissions for the first Phase of the Project (210 MW), assuming 8 400 operating hours per year, are 920 712 t CO_2e (0.92 Mt t CO_2e). For the second Phase (1 317 MW), annual emissions are estimated to be 3 677 050 t CO_2e (3.68 Mt t CO_2e). Cumulatively, after the completion of Phase 2, total annual emissions from both Phases (i.e. with the five 42 MW Trent60s and three 439.1 MW SGT6-4000F turbines running concurrently) are estimated to be 4 597 761 t CO_2e. Assuming the same load factor and operating patterns, and not factoring in a decrease in

(1) ArcelorMittal Scoping Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay. ERM Final Report – 11 April 2016.
(2) Updated Information for EIA Input and Consideration: 1 500 MW Saldanha Gas-to-Power Project. PowerConsult. 12 June 2016
(3) Specifically, Equations 4-9, 4-10, and 4-11 within Section 4.3 'Fuel Combustion Emissions Estimated from Fuel Composition and Usage'.

thermal efficiency over time, total (cumulative) estimated emissions over the 30 year lifetime of the 1 507 MW (1) plant are in the range of 138 Mt CO_2e.

Table 4.1 Estimated GHG emissions arising from the operation of the Power Plant

Operational activity	Estimated Annual Emissions in Phase 1 (210 MW) (t CO_2e)	Estimated Annual Emissions in Phase 2 (1 317 MW) (t CO_2e)	Estimated Annual Emissions Phase 1 + 2 (1 507 MW) t CO_2e)	Data Source, Notes and Assumptions
Natural gas combustion for power production	920 633	3 676 971	4 597 604	Natural gas combustion volumes estimated based on: 16 327 920 GJ per year (Phase 1) and 65 213 074 GJ per year (Phase 2) (Engineer calculation); Lower Heating Value (LHV) for natural gas of 35 924 kJ / Nm^3 (2); and natural gas emissions factor of 2.0255 kg CO_2 / m^3 (ERM calculation based on API Compendium methodology) (API, 2009)
Propane combustion in Gensets for back-up power	79	79	158	Estimated annual propane consumption based on one black start event every 5 years, assuming: average site load 2.5 MW; 220 kg propane per MWh generated; and 10 days' outage per event (Source: Response to ERM GHG data request by PowerConsult (3). Applies IPCC 2006 Net calorific values (47.3 MJ / kg), carbon content (17.2 kg C / GJ, and CH_4 (0.001 kg CH_4 / GJ) and N_2O (0.0001 kg N_2O / GJ) emissions factors for Propane (IPCC, 2006a; IPCC, 2006b).
Total	**920 712**	**3 677 050**	**4 597 761**	

Table 4.2 illustrates the thermal efficiency of the plant, and the emissions intensity of grid electricity generated (using annual estimated emissions above and annual estimated generated electricity in MWh). These metrics are used to inform the benchmarking in *Section 4.2.2* (Impact Assessment chapter).

Table 4.2 Saldanha Gas-Fired Power Plant GHG emissions intensity and thermal efficiency

	Phase 1 (210 MW)	Phase 2 (1 317 MW)	Phase 1 + 2 (1 507 MW)	Data Source, Notes and Assumptions

(1) See *Footnote* 1 on *Page 2* on the slight discrepancy between the 1 507 nameplate capacity, and the sum of capacity from turbines in Phase 1 (5 x 42 MW Trent 60 gas turbines) and Phase 2 (3 x 439.1 MW SGT5-4000F turbines) (sum = 1 527.3 MW).
(2) Response from PowerConsult to ERM on ERM's GHG Data Request – 26 June 2016.
(3) Email to ERM from Adrian Venzo, PowerConsult, 28 June 2016

	Phase 1 (210 MW)	Phase 2 (1 317 MW)	Phase 1 + 2 (1 507 MW)	Data Source, Notes and Assumptions
Total estimated annual emissions (t CO2e)	920 712	3 677 050	4 597 761	Estimated total annual GHG emissions from the plant (calculations in *Table 4.1*)
Total annual electricity generation (MWh)	1 802 598	11 065 320	12 867 918	Plant net power (214.6 MW Phase 1 + 1 317.3 MW Phase 2) * 8 400 (annual operating hours)
Electricity emissions intensity (t CO_2e / MWh, or kg CO_2e / kWh)	**0.51**	**0.33**	**0.36**	Total annual emissions divided by total annual electricity output
Thermal efficiency	**39.93**	**58.30**	**56.51**	Thermal efficiency for Phase 1 and 2 using lower heating values (LHV) (Source: Response to ERM GHG data request) [1]

It should be noted that the GHG intensity factor, 0.36 t CO_2e per MWh for Phase 1 and 2 combined, reflects the emissions intensity of electricity generated by the plant for distribution. The total MWh output used to calculate the emissions intensity excludes auxiliary power consumption by the plant, and excludes losses from transmission and distribution.

Finally, it is important to note that two of the Project's objectives relate to 'Education' and 'Demonstrating Technology', and that the Project plans to install 400 kW of renewable energy – namely solar PV – which will be used to provide stand-by emergency DC power and will power various features and activities including the main building LED lighting as well as the security lighting. The use of renewable (low carbon) energy to power these auxiliary processes will help to further reduce the emissions intensity of the plant.

4.2 GHG IMPACT ASSESSMENT

A traditional impact assessment is conducted by determining how the proposed activities will affect the state of the environment described in the baseline. As noted in *Section 2.1*, in the case of GHG emissions, this process is complicated by the fact that the impact of GHGs on the environment cannot be quantified within a defined space and time. The greenhouse effect occurs on a global basis and the point source of emissions is irrelevant when considering the future impact on the climate. CO_2 has a residence time in the atmosphere of approximately 100 years by which time emissions from a single point source have merged with other anthropogenic and natural (e.g. volcanic) greenhouse gas emissions. Therefore it is not possible to link emissions from a single source – such as the Project – to particular impacts in the broader study area.

(1) Response to ERM's information request from PowerConsult, 23 June 2016

Considering the above, the impact assessment for the Project's GHG emissions is based on an assessment of the magnitude of estimated annual GHG emissions, and the Project's contribution to global climate change. Because South Africa has not specifically defined thresholds to understand GHG emissions impact or magnitude within its Environmental Impact Assessment or National Environmental Management Act legislation, this assessment of magnitude (i.e. the scale of GHG emissions from the Project) is based on a GHG magnitude rating scale developed from international lender standards including IFC, EBRD, and EP. The magnitude of the Project's emissions relative to South Africa's current and future projected GHG emissions is also presented, but owing to the significant limitations associated with using national GHG emissions as a way to understand the magnitude of a project's emissions, this comparison is not used to inform significance.

In addition to the above assessment of the magnitude and therefore significance of the Project's GHG emissions, the GHG impact assessment is informed by the following key aspects:

- Assessing the GHG performance of the Project relative to reference benchmarks on the GHG intensity of electricity production, including the GHG intensity of South Africa's grid electricity and of other gas-fired power plants; and
- Understanding of the impact of the Project on South Africa's national GHG emissions inventory, and consideration of the alignment of the Project with the country's climate policy and international GHG reduction commitments.

4.2.1 Magnitude of the Project's GHG emissions

The estimated annual emissions from Phase 1 (210 MW) and 2 (1 317 MW), individually, are 920 712 t CO_2e and 3 667 050 t CO_2e respectively. Total estimated annual emissions from the final 1 507 MW Project are 4 597 761 t CO_2e during Operations. Further discussion on the magnitude of these emissions compared to South Africa's total GHG emissions, and from the perspective of emissions from a single point-source or project, is given below.

Contribution of the Project to South Africa's national GHG inventory

Table 4.3 illustrates the magnitude of the Project's emissions relative to South Africa's national GHG emissions. Historical emissions data from 2010 is used, and for subsequent (and future) dates, the PPD trajectory (defined in South Africa's NCCRP and forming the basis of South Africa's mitigation commitments within the INDC presented to the UNFCCC in the 21st Conference of Parties (COP21) in Paris, December 2015) is used in order to project national emissions forward to 2050.

Table 4.3 Estimated GHG Emissions from the 1 507 MW Gas-Fired Power Plant Relative to Projected GHG Emissions for South Africa

Year	Estimated annual emissions – South Africa (t CO_2e)– PPD Lower Range	Estimated annual emissions – South Africa (t CO_2e)– PPD Upper Range	Estimated annual emissions – Saldana Gas-Fired 1 507 MW Project (t CO_2e)*	Saldana Gas-Fired 1 507 MW Project % contribution to South Africa's projected national GHG emissions (as a % of upper and lower Range PPD trajectory)
2020*	398 000 000	583 000 000	4 597 761	0.8 – 1.2%
2025	398 000 000	614 000 000	4 597 761	0.7 – 1.2%
2030	398 000 000	614 000 000	4 597 761	0.7 – 1.2%
2035	398 000 000	614 000 000	4 597 761	0.7 – 1.2%
2040	336 000 000	552 000 000	4 597 761	0.8 – 1.4%
2045	274 000 000	490 000 000	4 597 761	0.9 – 1.7%
2050	212 000 000	428 000 000	4 597 761	1.1 – 1.2%

* Assumes Phase 2 will have commenced operations by 2020
Source: DEA (2011) and DEA (2014a) (estimated annual emissions for South Africa using lower and upper ranges of PPD). A linear decline to INDC targets by 2050 from 2035 levels is assumed.

As illustrated above, the Project's GHG emissions are estimated to comprise 0.8 – 1.2% of South Africa's national emissions in 2020, rising to 1.1 – 1.2% in 2050. It should be noted that a number of assumptions are made with respect to estimating the Project's contribution to national GHG emissions:

- It is assumed that South Africa's GHG trajectory follows that set out in the Government's PPD trajectory (i.e. assuming that South Africa meets its commitments under the UNFCCC);
- The GHG trajectory for South Africa also assumes no change to the country's climate policy and INDC; however it should be noted that countries will be required to update their national GHG reduction commitments (INDCs) every five years, and each new submission should be more ambitious than the previous submission (the 'ratchet' mechanism): as such, future emissions trajectories may incorporate increasingly ambitious cuts;
- The GHG trajectory also assumes certain GDP growth rates (which influence national GHG emissions): should actual growth rates deviate significantly from these, the emissions trajectory may also need revising; and
- The Plant is assumed to operate at a baseload of 1 507 MW, 96% load factor (8 400 operating hours per year), through to 2050, and GHG emissions from the plant are also assumed to hold constant over time. It is however possible that future changes to dispatch rules may necessitate load following, weekend shut downs, two-shifting, or other operational changes. Such changes in operating regime will alter GHG emissions: a shift to cycling can result in increased wear on the plant and therefore reduced efficiencies and increased GHG emissions per MWh generated; however total GHG emissions on an annual basis are likely to decrease if there is a reduction in overall operating time.

Whilst the above analysis helps to give a sense of the scale of the Project's emissions relative to South Africa's emissions, there are significant limitations associated with using national GHG inventories to understand the magnitude of a Project's emissions. This is because the greenhouse effect occurs on a global basis, and the geographical source of emissions is irrelevant when considering the future impact on the climate; the climate change impact associated with the emissions of one tonne of CO_2e is the same, regardless of the source or location. Whilst this is true, the contribution of different countries to global GHG emissions varies significantly, and using the scale of a country's GHG emissions to assess the magnitude of GHG emissions from a particular project would suggest that the GHG impacts from a certain project are less significant if it is sited in a country with comparatively large GHG emissions, than if the same project with the same emissions was sited in a country with much smaller GHG emissions. This isn't the case however, for a global impact like climate change. In addition, owing to the nature of the national and global GHG emissions, which result from a vast number of individual projects across many sectors (power, transport, land use, infrastructure, built environment, etc.), individual projects are unlikely to look significant (i.e. represent a material proportion or percentage) of emissions relative to emissions on a national scale.

Bearing this in mind, the above analysis of the Project's GHG emissions relative to South Africa's national GHG emissions helps to add context to the impact assessment, but is not used as the basis for the assessment of the Project's GHG and climate change impacts. Instead, other reference benchmarks are used to inform the impact assessment, discussed in the sections that follow.

Scale of the Project's Emissions relative to GHG Magnitude Scale from Wider Standards

As described in *Section 3.4*, various international lender organisations including the IFC, EBRD and EP, give guidance on the scale of a Project's GHG emissions based on thresholds of annual emissions that trigger requirements for quantifying, reporting and mitigating Project GHG emissions. The magnitude scale derived from these organisations is illustrated in *Table 4.4*.

Table 4.4 Magnitude scale for project-wide GHG emissions based on wider standards

Project-Wide GHG Emissions / annum	Magnitude Rating
>1 000 000 tonnes CO_2e	Very Large
100 000 – 1 000 000 tonnes CO_2e	Large
25 000 – 100 000 tonnes CO_2e	Medium
5 000 – 25 000 tonnes CO_2e	Small
<5 000 tonnes CO_2e	Negligible

Based on the magnitude scale above, and considering the estimated annual GHG emissions from the final 1 507 MW Project (4 597 761 t CO_2e), the magnitude of the project's GHG impact is considered to be **Very Large**. It

should be noted that, in the absence of abatement technologies such as CCS (which has historically almost exclusively been applied to coal – rather than gas - fired power plants), most if not all fossil-fuel based power plants will fall into this category by nature of their significant GHG emissions.

4.2.2 *Benchmarking performance against other gas-fired power stations*

The Project's estimated emissions intensity and stated thermal efficiency are compared to benchmarks for alternative gas-fired power plant technologies in *Table 4.5* below.

Table 4.5 Benchmarking emissions intensity and thermal efficiency of the Project against alternative gas-fired power plant technologies

Coal-fired power plant name / technology	Thermal efficiency (LHV, net)	CO_2e intensity factor (LHV, net)	Reference
The Project	39.93% (Phase 1); 58.30% (Phase 2); 56.51% (combined)	0.51 kg CO_2e / kWh (Phase 1); 0.33 kg CO_2e / kWh (Phase 2); 0.36 kg CO_2e / kWh (combined)	ERM calculations – see *Table 4.2*
Open cycle gas turbine (OCGT)	30 – 40%	0.48 – 0.58 kg CO_2e / kWh	IEA ETSAP (2010), C2ES (n.d.), IPIECA (n.d.)
Combined cycle gas turbine (CCGT)	50 – 60%	0.34 – 0.40 kg CO_2e / kWh	IEA ETSAP (2010), C2ES (n.d.), IPIECA (n.d.)
CCGT with Carbon capture & storage (CCS)*	Reduction of 7-8%	0.04 kg CO_2e / kWh	IEA GHG (2012)

* Based on a techno-economic study on CO_2 capture at natural gas fired power plants modelled using plant simulation software. Reflects results for post-combustion capture technologies.

The results from the benchmarking assessment highlight the following key messages:

- Thermal efficiency for Phase 1 (comprising six Siemens Trent60, 42 MW OCGT plants) is reported to be 39.93% (net), and the emissions intensity is estimated to be 0.51 tCO_2e/MWh. This is within the expected range and is at the higher end of what can be expected (i.e. the proposed plant has relatively high thermal efficiency and low GHG intensity) for OCGT technologies;
- Thermal efficiency for Phase 2 (comprising three Siemens SGT5-4000F 439.1 MW CCGT plants) is reported to be 58.30% (net), and emissions intensity is estimated to be 0.33 tCO_2e/MWh. This is on the higher end of what can be expected for CCGT technologies (i.e. relatively high thermal efficiency and low GHG intensity), and represents a significant improvement on Phase 1 from a GHG emissions perspective; and
- There is the potential for CCS to reduce the GHG intensity of fossil fuelled power plants significantly, though with a penalty on thermal efficiency which decreases due to the additional auxiliary power

required for the carbon capture technologies. However, as noted, CCS technologies have to date almost exclusively been applied at coal-fired power plants, and the technology has not yet been demonstrated in South Africa, so this is not at present considered to be a viable option for the Saldanha Steel gas-fired power plant.

It is important to note the drivers for the selection of the different technologies for the Saldanha Steel gas-fired power plant, notably the choice of OCGT technologies in Phase 1 and CCGT technologies in Phase 2. Whilst CCGT allows for higher thermal efficiencies and lower emissions of GHGs per unit of power produced, OCGT infrastructure can be built more quickly with lower capital costs. Considering the current challenges faced by the Saldanha Steel plant in relation to securing sufficient power at a stable price, OCGT is selected for Phase 1 in order to obtain power in the fastest possible time, whilst CCGT is selected for Phase 2 in order to take advantages of the improved efficiencies offered by this technology (1). As noted previously, thought will be given to converting at least two of the Phase 1 units to combined cycle for better efficiency at a later stage.

4.2.3 Implications of the Project on the South African grid emissions factor

As noted in *Section 4.1*, the GHG intensity factor for the plant is estimated to be **0.51 t CO_2e / MWh** in Phase 1 and **0.33 t CO_2e / MWh** in Phase 2, based on total estimated annual GHG emissions and total electricity generated and sent to the grid (i.e. excluding plant auxiliary consumption and any losses from transmission and distribution). For Phase 1 and 2 combined, based on total estimated annual GHG emissions and total electricity generated, the emissions intensity is estimated to be **0.36 t CO_2e / MWh.**

By comparison, the emissions intensity of the electricity generated by Eskom (representing 95% of electricity generated and distributed in the South African electrical grid), for the period 1 April 2014 to 31 March 2015, as published by Eskom, was **1.01 t CO_2e / MWh** (further discussion in *Section 3.3.1*). This factor is based on total GHG emissions from Eskom facilities (noting that 90% of Eskom's power in 2014-15 was generated from coal and the remaining 10% from low-carbon energy sources), and total electricity generated and sent to the grid, excluding Eskom (auxiliary) consumption and excluding transmission and distribution losses.

The above analysis suggests that the emissions intensity of the electricity generated by the Project represents a significant improvement relative to the current grid emissions factor for South Africa. It also represents an improvement relative to the emissions intensity of Eskom's gas power plants, which have historically run on liquid fuels (diesel and kerosene), and which in 2011 were reported to have an average intensity of **0.82 t CO_2e / MWh.**

(1) Scoping Study for a Gas-fired Independent Power Plant to Supply Saldanha Steel and Other Industries in Saldanha Bay - Final Scoping Report (dated 11 April 2016)

4.2.4 *Alignment with South Africa's climate change policy and international GHG mitigation commitments*

As noted in *Sections 3.1* and *3.2*, the Government has developed a number of energy and climate change focused policies and plans that are relevant to this Project. With the energy sector contributing 79% of South Africa's national GHG emissions in 2010, it is important to consider both energy and climate change policies and plans in conjunction in order to understand how the Project is aligned with South Africa's international GHG mitigation commitments. Drawing on the analysis presented in *Sections 3.1* and *3.2*, the following key points are noted:

- As described South Africa possesses a legacy of electricity management that saw limited investment in new power infrastructure, resulting in the strain on Eskom's existing fleet of power plants and an unstable electricity grid. The impacts of this were most notable during the periods of rolling black-outs and 'load shedding' that occurred between 2007 and 2015 when demand exceeded capacity;
- The promulgated IRP 2010-2030 (2011) represents the legal basis for Government's electricity planning. Despite the fact that the economic and electricity landscape in South Africa has changed substantially since 2011, the data contained in the IRP 2010-2030 (2011) has been adopted by Eskom and in Government's electricity planning documents (albeit with the acknowledgement of these limitations), as well as by the IPP Office, and allows for 3 126 MW of new generation capacity from gas-fired power generation to be installed by 2030 through the Gas to Power Programme, as part of a transition to lower-carbon electricity generation and in order to stimulate South Africa's gas economy;
- In order to understand the extent to which the Project is aligned with South Africa's climate change policy and mitigation commitments, it is important to understand the extent to which the IRP 2010-2030 (2011) (which gives provision for additional gas-fired power plants) and the PPD trajectory set out in the NCCRP (which sets out the country's GHG mitigation commitments) are aligned. Note that this analysis is undertaken on the assumption that this development forms part of the 3 126 MW of additional gas-based energy generation capacity provided for in the IRP 2010-2030 (2011) and that electricity generation and proposed power projects will be aligned to the IRP and not exceed it. The DEA's 2014 Mitigation Potential Analysis study considered potential GHG abatement available to South Africa and mapped future emissions trajectories according to numerous scenarios. The results of the study illustrated that more 'aggressive decarbonisation' of South Africa's energy supply will be needed in future iterations of the IRP if the targets set out in the PPD are to be achieved. Whilst this is true, the following should be noted:
    - The study used the IRP 2010-2030 (2011) generation mix to estimate GHG emissions from the energy sector, and assumed that the generation mix would hold constant after 2030 until

2050. However, future updates of the IRP extending to later time periods e.g. 2040 and 2050 are likely to incorporate measures such as the retirement of some of the existing coal-fired power station fleet which will reduce emissions and may help to ensure emissions are more closely aligned to the PPD trajectory; and

- Whilst the study findings highlight some uncertainty as to the role of coal in the country's generation mix post-2030, the increase in gas-based generation capacity will help to reduce the emissions-intensity of South Africa's grid.

In conclusion, there is a clear mandate from the DoE for the procurement of additional capacity from gas-fired power plants, and whilst there is some uncertainty as to the level of electricity generation that will come from coal post-2030 and how this aligns to the longer-term PPD trajectory for national GHG emissions, the introduction of new gas-based power will help to bring about the transition to a lower carbon energy mix required in order to meet the country's climate change commitments.

4.2.5 Project GHG impact significance rating

The GHG impact significance rating for the plant is based on the magnitude of GHG emissions. This differs to a traditional ESIA study where significance is based on a combination of the magnitude and likelihood of an impact. This is because likelihood is irrelevant in the context of GHG emissions given that increased levels of GHG emissions will result from the project, and given the body of scientific evidence linking GHG emissions to global climate change impacts.

The above analysis shows that the magnitude of the Project's GHG emissions, estimated to be 4 597 761 t CO_2e annually during operations on completion of Phase 2, is '**Very Large**', as per the benchmarks from international lender standards which apply the highest rating ('Very Large') to projects emitting >1 000 000 t CO_2e per annum. Relating this to the impact significance scale being used for the project, this translates to an overall significance rating of **Major (Negative)**. As noted, in the absence of abatement technologies such as CCS, most (if not all) coal and gas power plants will fall into this category by nature of their significant GHG emissions.

Whilst the Project's GHG emissions and therefore climate change impacts are significant, these findings should be considered in the context of the following positive impacts associated with the Project in relation to efficiency and impact on the South African average grid factor:

- The power plant (notably Phase 2 which uses combined cycle technologies) has a high thermal efficiency (Phase 2: 39.93%; Phase 2: 58.3%) and low emissions intensity (Phase 1: 0.51 t CO_2e / MWh; Phase 2: 0.33 t CO_2e / MWh) both in terms of what is achievable for gas-fired

power plants, and also when compared to coal-fired power plants [(1)]; and

- The emissions intensity of electricity generated by the power plant (0.51 t CO_2e / MWh in Phase 1 and 0.33 t CO_2e / MWh in Phase 2, or 0.36 t CO_2e / MWh for Phases 1 + 2 combined) is a significant improvement on the average emissions intensity of Eskom's plants of 1.01 t CO_2e / MWh. With electricity generated in Phase 2 likely to feed into the national grid, this Project will therefore help to contribute to a reduction in the average grid emissions intensity.

Finally, it is also important to note that the Project is being developed in line with South Africa's energy policy, which (through the IRP 2010-2030) seeks to increase installed capacity in order to meet increasing demands on the grid, and which (through the GUMP and the Gas to Power IPP Programme) seeks to initiate the development of South Africa's gas economy.

(1) For comparative purposes, coal-fired power plants have thermal efficiencies in the range of 30 – 38 % (subcritical plants) or 38 – 45 % (plants using supercritical steam technologies), and corresponding emissions intensities of > 0.88 t CO2e / MWh (subcritical plants), or 0.67 – 0.88 t CO2e / MWh (supercritical plants). Source: IEA (2012a), IEA (2012b), and Michener (2012).

5 EMISSIONS MANAGEMENT MEASURES

The 1 507 MW (Phase 1 + 2 combined) Project's annual GHG emissions are estimated to be 4 597 761 t CO_2e during operations. As noted above, whilst the emissions intensity (t CO_2e per MWh) is relatively low and represents a significant improvement on the emissions intensity of Eskom's existing coal and gas-fired power plants, this level of absolute emissions is considered to be 'Very High' when benchmarking against a project-wide emissions magnitude scale based on various international lender standards, as expected for a fossil fuel based power plant. As such, measures should be implemented to monitor and manage energy consumption (thermal efficiency) and GHG emissions. Specific emissions management measures are presented in this section.

5.1 EMISSIONS MANAGEMENT THROUGH OPTIMISATION OF PLANT THERMAL EFFICIENCY

It is important that the plant's thermal efficiency is be maximised throughout the life of the plant in order to reduce the gas consumption and therefore GHG emissions per unit of electricity (i.e. kWh or MWh) generated. The plant should seek to identify specific measures that can be implemented in order to maximise thermal efficiency and therefore minimise GHG intensity over time. This will need to be based on a plant specific assessment informed by the operations and maintenance (O&M) requirements for the equipment in question, and assessments should be carried out upon final selection of the equipment and, subsequent to the commencement of operations, periodically.

5.2 MANAGING POTENTIAL FUTURE CHANGES TO OPERATING PHILOSOPHY

Whilst noting that, at present, the assumption is for the plant to operate for 8 400 hours per year (96% load factor) throughout its lifetime, it will be important to manage any changes to operating philosophy should these arise for example as a result of changes in grid dispatch rules (this will mainly be applicable to the three Siemens SGT5-4000F turbines in Phase 2 which are likely to feed electricity into the grid). Whilst noting that any reduction in the operating time or load factor (i.e. annual power generation in MWh) is likely to result in decreased total annual emissions from the plant, such changes to cycling philosophies could have an adverse impact on thermal efficiency and GHG intensity per MWh generated as a result of increased start-ups and wear and tear on the plant. As such, the potential impact of any future changes in operating philosophy should be investigated and managed for example through upgrades to plant hardware and modifications to operating practices, as applicable.

5.3 CONVERSION OF PHASE 1 OCGTS TO CCGTS

The Project documents note the potential for converting at least two of the 42 MW Trent60 OCGTs in Phase 1 to combined cycle at a later stage for improved efficiency (1). Whilst noting that the technological and economic feasibility of such a change will need to be assessed when that time comes, it is recommended that the option to make such a change is reviewed periodically and implemented when possible, and on as many of the six Trent60 turbines as is feasible. This will allow the Project to benefit from the much improved efficiencies and reduced emissions associated with the use of combined cycle technologies, and will improve the GHG profile of the plant.

5.4 ENERGY AND EMISSIONS MANAGEMENT PLAN

The development and implementation of a GHG management plan is critical if GHG emissions from the plant are to be managed over time. Since GHG emissions are primarily driven by the fuel consumption at the plant and are closely linked to the plant's heat rate and thermal efficiency, this can take the form of a combined thermal efficiency and GHG management plan. Key elements of a thermal efficiency / GHG management plan include:

- Development of an overarching policy statement indicating the Plant's commitments with respect to minimising GHG emissions and implementing actions to ensure optimum emissions management;
- Measuring GHG emissions on an annual basis (2), which will require data on:
    - the total amount of gas consumed, its chemical properties and GHG emissions factor; and the consumption of any other fuels such as LPG for the black starts; and
    - Plant heat rate / thermal efficiency should be closely monitored over time as this is closely correlated to the GHG intensity of the plant.
- Setting short, medium and long-term targets relating to maximising and maintaining heat rate / thermal efficiency and GHG intensity (t CO_2e per MWh generated) over time, against which performance can be assessed;
- Tracking South Africa's evolving GHG and energy related regulations, including the implications / requirements for the Plant of the proposed carbon tax, GHG reporting regulations, and energy reporting regulations, all of which are currently in draft form but likely to be finalised in 2016 or 2017;
- Identifying and implementing heat rate improvement / GHG reduction projects, based on any deviations from expected heat rate and knowledge of required maintenance or upgrades. Internal and

(1) Updated Information for EIA Input and Consideration: 1 500 MW Saldanha Gas-to-Power Project. PowerConsult. 12 June 2016

(2) For example, IFC Performance Standard 3 requires that 'For projects which are expected to or currently produce more than 25 000 tonnes of CO_2e-equivalent annually'… 'Quantification of GHG emissions will be conducted by the client annually in accordance with internationally recognized methodologies and good practice'

external energy audits should be used to help identify opportunities for performance improvement, and a business case can be developed for each area of opportunity to help prioritise projects. More significant projects can be implemented during the major maintenance overhauls as scheduled by the Plant;

- Allocating responsibility to key individuals such that someone (or a team of individuals) is responsible and accountable for managing and reporting on the GHG performance of the plant;
- Communicating the Plan, including its key objective and any actions being taken, to staff working at the plant to ensure buy-in;
- Encouraging employee participation in the GHG management plan, including contribution of ideas relating to opportunities for improvement; and
- Reporting progress over time with respect to annual gas consumption and GHG emissions, GHG reductions / heat rate improvements achieved, and progress against targets set.

The Department Of Energy (DOE) is currently developing an Energy Efficient Monitoring System (EEMS) to track the efficient consumption of energy within South Africa and the trends involved. The DOE will need reliable data from all legal entities operating in the most intensive sectors of the economy and they have set certain thresholds, that if exceeded will require certain steps to be taken:

- Companies using 400 terajoules or more per annum will be required to submit a detailed energy management plan; and
- The energy management plan must include an energy baseline determined in accordance with SANS 50001, as well as areas of energy efficiency savings potential and energy performance indicators. Additionally, it will be required to submit a list of technically and financially viable measures that can be put in place to meet the savings potential

5.5 USE OF ON-SITE RENEWABLE ENERGY

As noted in Section 4.1, the Project plans to make use of solar PV energy to meet some of the plant's auxiliary load requirements. As a low or 'no' carbon form of energy, solar PV provides a means of reducing the emissions intensity of the plant and of the electricity it produces. Renewable energy can play a key role in the site's GHG emissions management plan and further opportunities to install more renewable capacity on-site should be investigated going forwards.

5.6 GHG IMPACT SIGNIFICANCE RATING POST-MITIGATION

The above measures will help to ensure that GHG emissions are minimised as far as possible over the project's lifetime. It is important to note that the only mitigation technology with the potential to achieve deep cuts on GHG emissions from a combined-cycle gas power plant is CCS, which (as

discussed) has yet to be demonstrated in South Africa. Thus, whilst it is important that the above measures are implemented as part of the project's EMP, the residual (post-mitigation) impact rating for the project will remain as Major (Negative).

In the context of the project's climate change impacts (i.e. GHG emissions), cumulative impacts can be considered as the combined impacts that result from the emission of GHGs from this development together with other existing and planned developments. Cumulatively, GHG emissions from developments and human activities across the globe are contributing to global climate change, which impacts ecosystems and communities across the globe in complex and varied ways. Whilst it is beyond the scope of this study to address global climate change impacts, cumulative impacts can be considered in the context of the combined effect of developments at a national level, and implications on South Africa's climate change mitigation commitments.

The cumulative impact with respect to GHG emissions from this project and other developments in South Africa, and implications with respect to South Africa's GHG mitigation commitments, is addressed in Section 4.2.4. The analysis is based on assessing the alignment between the power sector generation plans in the IRP 2010-2030 (2011) and the PPD trajectory that forms the basis of South Africa's climate change mitigation commitments, assuming that this development forms part of the 3 126 MW of additional gas-based energy generation capacity provided for in the IRP 2010-2030 (2011) and that electricity generation and proposed power projects will be aligned to the IRP and not exceed it.

As noted, the DEA's Mitigation Potential Analysis study conducted in 2014 illustrated that, based on the IRP's projections for the energy sector and considering national mitigation potential, the PPD trajectory can only be tracked up to 2040 but after this point national GHG emissions exceed the boundaries depicted in the PPD. However, as noted, the study used the IRP 2010-2030 (2011) generation mix to estimate GHG emissions from the energy sector, and assumed that generation mix would hold constant after 2030 until 2050. It is likely, however, that future updates of the IRP extending to later time periods will incorporate measures to help reduce emissions from the power sector, including the retirement of some of the existing coal-fired fleet and increased low carbon electricity generation. It should also be noted that an updated IRP is due to be promulgated, and will likely depict a different energy outlook on the basis of more up-to-date economic growth forecasts.

Detailed analysis will need to be undertaken on future iterations of the IRP that extend to later time periods in order to make a statement with respect to cumulative GHG impacts from this and other power sector developments, and alignment with South Africa's climate change policies and GHG mitigation commitments.

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environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for environmental authorisation National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bav

Specialist:	Climate change specialist		
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4.2 The specialist appointed in terms of the Regulations_

I, Sarah Bonham , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: 

Name of company (if applicable): ERM Southern Africa

Date: 20 July 2016

Sarah Bonham

Senior Consultant
Sustainability and Climate Change

Sarah Bonham joined ERM in 2010 and is a Senior Consultant in the Sustainability and Climate Change practice, based in Johannesburg, South Africa. She transferred into the practice from the ERM London office in July 2014.

Sarah's main area of experience is in climate change risk and adaptation. Her work involves assisting clients with the assessment climate change risk and vulnerability, and the management of that risk through the identification and implementation of adaptation measures. She has worked on site-specific climate risk and adaptation assessments as well as assessments that cover global portfolios of assets and operations, and has collaborated with various climate modelling institutions through the course of her work. She has also supported clients with water risk assessments and disclosure, and water strategy.

In the climate change mitigation field, Sarah has conducted Greenhouse Gas (GHG) assessments for proposed developments as part of the ESHIA process, and has significant experience in conducting carbon footprint studies for corporate clients in order to calculate Scope 1, 2 and 3 GHG emissions arising from their global operations. She also supports clients with the annual disclosure on their climate change performance to the Carbon Disclosure Project (CDP). Sarah also has experience in corporate GHG, biodiversity and water strategies, and has worked with industry associations on the development of papers relating to policies and incentives around Carbon Capture and Storage (CCS).

Fields of Competence

- Climate Change Risk & Adaptation
- Climate science
- Sustainability Strategy: Energy/Carbon, Water and Biodiversity
- Carbon Footprinting & Disclosure
- GHG Assessments for EIAs

Education

- MSc (Environmental Technology) specialising in Business and Sustainability, Imperial College London, 2010
- MA Oxon (Biological Sciences), University of Oxford, 2009

Languages

- English

Key Industry Sectors

- Power
- Food & Beverage
- Agrichemicals
- Oil & Gas
- Mining

Publications

- Sarah Bonham et al, CO2 Capture Project: *Regulatory Challenges and Key Lessons Learned from Real World Development of CCS Projects*. 2012
- Sarah Bonham et al, CO2 Capture Project: *Local Community Benefit Sharing Mechanisms for CCS Projects*. 2013

Selected Project Experience

Climate Change Specialist Study: Coal-fired Power Plant, South Africa, 2016
Lead Consultant
Sarah conducted a detailed greenhouse gas assessment as part of an EIA for a coal-fired power plant in South Africa. A detailed review of project documentation, including the feasibility study, was undertaken and additional data collected in order to calculate GHG emissions from the plant's operations in accordance with IPCC / GHG Protocol Guidelines. The impact of the plant's emissions was assessed by way of comparing emissions against South Africa's historic and future projected national GHG emissions, comparing performance against GHG intensity benchmarks from similar projects and GHG magnitude benchmarks from numerous international lender standards, and considering the project's alignment with South Africa's energy and climate change policies and GHG mitigation commitments. Emissions and energy management measures were proposed for integration into the EMP. Sarah is currently conducting the climate resilience assessment for the project.

Climate Change Specialist Study: Rail & Port EIA Project, Mozambique, 2014 - 2016
Lead Consultant
Sarah conducted the greenhouse gas assessment as part of the ESHIA for a proposed rail and port project in Mozambique. ESHIA and related project documentation was reviewed to identify key GHG emission sources. Annual GHG emissions were estimated according to IPCC / GHG Protocol Guidelines, after which an assessment of the impact of the GHG emissions associated with the project was conducted, based on a review of Mozambique's GHG emissions and reduction commitments under UNFCCC, and international lender standards relating to GHG emissions. Potential mitigation measures (opportunities to reduce emissions and use resources more efficiently) and GHG management plans were recommended. In addition, an assessment of climate risk was conducted. Climate projections for the project area were analysed (using IPCC AR5 climate model outputs) and an analysis of how the climate projections could affect the Specialist Study impact assessments was undertaken in order to ensure climate change was factored into the remainder of the Impact Assessment.

Carbon and Water Strategy, South Africa, Investment Holding Company, 2015 & 2016.
Project Manager
Sarah is the project manager on numerous work streams for this investment holding company. The program of work is focused on calculating its subsidiaries' carbon and water footprints, identifying climate change and water risks and opportunities across the group, and reporting this as part of its public disclosure to the Climate Change and Water CDP Programmes. In addition, in 2016, Sarah is supporting the company with the setting of GHG intensity metrics and reduction targets and an emissions reduction strategy in order to drive environmental performance improvement across the Group. Carbon and water strategies are being developed for diverse companies spanning the mining, production, beverage, hospitality, and gaming sectors.

Carbon Footprint and Regulatory Analysis, South Africa Mining & Ferro-Alloys Producer, 2015-2016.
Project Manager
Sarah is managing the carbon footprint and regulatory assessment for this global company's South African ferro-alloy mining and smelting operations. GHG emissions from the mines and ferro-alloy smelter were assessed using IPCC and GHG Protocol (WBCSD/WRI) methodologies, and a subsequent assessment of how the operations may be captured by South Africa's upcoming energy and carbon regulations was undertaken.

Climate Risk and Adaptation Assessment Guidelines, Multinational Mining Company, Global, 2013 - 2015
Consultant
ERM was commissioned to develop guidance for the client's global operations on how to assess climate change risks and adaptation options at mining sites in operation and under development across the world. Sarah led on the development case studies of climate risk and adaptation assessments undertaken by existing operations to be used as a basis for the guidance documents. The guidelines and case studies focused on integrating climate change into standard operational risk management procedures in order to ensure risks were logged, tracked, and actively managed over the mines' lifecycles.

Climate change screening tool, Multinational Power Sector Client, Asia, 2015
Lead Consultant
Sarah was the lead consultant and climate change expert working on the development of a GIS-based climate risk screening tool for CLP Group. The tool incorporates historical data on climate and weather events, as well as IPCC AR5 climate change projections according to two scenarios. Sarah led on the development of the Guidelines accompanying the tool, designed to give CLP to have ownership of the tool such that they can run climate risk screenings for existing and new assets.

Climate Change Adaptation Study for Renewable Energy Assets, India and China, CLP Group, 2013 - 2014
Lead Consultant
Sarah was the lead consultant in this study which assessed climate change risk and identified and prioritised climate change adaptation options for selected renewable energy assets, including a hydropower plant in China and a wind farm in India. Sarah was responsible for running the site visits and climate risk workshops for each asset, and undertook the risk and adaptation assessments for each site. ERM, working closely with a team of engineers and with the operations, maintenance, procurement, HSE and finance functions on site, identified a number of adaptation options to address the key risks, and by performing a cost-benefit analysis for each of the proposed adaptation measures was able to prioritise the most cost-effective actions for the site.

Climate Change Risk Assessment, UK, Confidential Global Agrocommodities Client, 2011 & 2015
Consultant
ERM was commissioned by a multinational agribusiness to carry out an assessment of the physical risks of climate change on global operations for the year 2025 including increased costs of asset damage and business interruption arising from extreme weather events; and cost impacts resulting from certain crops losing viability in growing regions (for example due to drought or water scarcity). ERM conducted a quantitative assessment of risks associated with historic impacts from extreme weather and of the impact of climate change on the value at stake. A subsequent assignment in 2015 aimed to update the 2010/11 study as well as to enhance the robustness of the assessment of future climate change through incorporation of more recent climate change projections and engagement with staff to test assumptions made in overlaying climate change projections on existing vulnerabilities.

Climate Change Specialist Study, Oil and Gas EIA, Kazakhstan
Consultant
ERM was commissioned to undertake a Climate Change Specialist Study assessing greenhouse gas emissions and physical climate risks and adaptation options as part of an EIA for the expansion of an oil and gas facility in Kazakhstan. Sarah assisted with the physical climate change risk assessment and identification of adaptation options as part of the study.

Climate Change Risk and Adaptation Assessment, UK, Oil & Gas Producer, 2012 – 2013
Consultant
Sarah was part of a team working to identify climate-related risks for a new oil and gas development and to identify potential risk mitigation measures. The project required a climate baseline to be developed for the area, and local climate change projections to be analysed. The interaction of climate variables with project assets and operations were then analysed in order to identify and prioritise climate risks and to identify risk mitigation and adaptation measures.

Strategic Water Risk Assessment, UK, Global Agribusiness, 2013
Consultant
Sarah was the lead coordinator for this global project with the overarching aim of defining water-related strategic sustainability risks and opportunities with the potential to impact the client's growth strategy over the next 15 years. The work involved risk modelling, workshop engagement and development of future water risk scenarios considering growth plans, likely competition for water resources from other users in existing and future regions of operation, regulatory changes with regards to water abstraction licences, future demographics, and the predicted effects of climate change on water availability.

Carbon footprinting and reporting, South Africa, Multinational Telecommunications Company, 2014 – 2015
Consultant
Sarah supported this multinational telecommunications company (based in Africa) with the calculation of its carbon footprint in 2014-15. Direct (Scope 1) and indirect (Scopes 2 and 3) emissions were calculated for each country of operation using bespoke carbon calculator tools developed by ERM. The emissions data was aggregated at the company level and reported externally. ERM also supported the client with the identification, analysis and quantification of energy efficiency and emission reduction opportunities across its operations.

Strategic Energy Management, South Africa, Confidential Mining and Chemicals Company, 2015
Project Manager
ERM was commissioned to develop a strategic energy management approach and plan for an energy-intensive chemicals company. The work was partly funded by the Private Sector Energy Efficiency (PSEE) programme and involved the development of an Energy Management Plan and Policy (including a 5-year plan to track and implement energy reduction opportunities), an energy awareness

campaign for all staff, energy management training for senior staff, and embedding energy in procurement.

Climate Change Strategy, South Africa, Platinum Producer, 2015
Project Manager
This study involved developing a climate change framework for the client. Existing climate change and sustainability policies and procedures were reviewed, and interviews conducted with key internal stakeholders to understand the current approach to managing climate change risks and opportunities. A detailed review was undertaken of the previously conducted climate change vulnerability assessment, which assessed both direct climate change risks to operations, as well as indirect risks resulting from the impact of climate change on communities, and recommendations made. The resulting climate change framework included a climate change policy statement, the framework, and associated implementation plan.

Local community benefit sharing options for CCS projects, CO2 Capture Project (CCP) (2013)

Sarah was the project manager for this study on local community benefit sharing mechanisms and options for CCS projects. A review of local community benefit sharing experience across the energy, mining, and waste sectors was conducted, and four projects in the energy sector (including one CCS project) were explored in greater detail through interviews in order to gain 'on-the-ground' insights into the benefit sharing process and specific mechanisms employed. Findings were analysed in the context how community benefit sharing might apply for a CCS development.

Review of regulatory issues for carbon capture and storage projects, CO2 Capture Project (CCP) (2012)

Sarah managed this CCS regulatory review commissioned by the CO2 Capture Project. The study focused on the latest regulatory developments in CCS across four jurisdictions (Australia, Canada, U.S. and Europe). Case studies and interviews were used to gain insights from both project developers and regulators on the project approval process and to identify the key gaps and challenges in existing regulatory frameworks, and to make recommendations for project developers going through the approval process.

K2013179818 (Pty) Ltd t/a **CarbEnviro Services**
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Project Title:	Greenhouse Gas (GHG) Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
CES Engagement No.:	ERM_REV_160706
Client Name:	ERM Southern Africa (Pty) Ltd
Client Address:	240 Main Road Cape Town 7780

GHG Assessment Peer Review Report &

Assurance Statement

Report Number	**Date**
Version 01.0	18 July 2016

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DISCLAIMER

K2013179818 (Pty) Ltd, trading as **CarbEnviro Service** exercised all care, skill and diligence in this assurance assessment and our findings and conclusions are based on objective evidence (materials, information, data and other evidence) gathered from sources believed to be reliable and correct and we've truthfully and accurately reflected our verification activities. Whilst every endeavour has been made by CarbEnviro Services to ensure that information provided is correct and relevant, to give confidence to all parties that rely upon a GHG assertion, this report is of necessity, based on information that could reasonably have been sourced within the time period allocated, and is dependent on information provided by the client's management and/or its representatives.

It should, accordingly, not be assumed that all possible and applicable observations and/or measures are included in this report as this assessment report represents a sample of assessable parameters, as designed into the verification and sampling plan to measure the data and information to the level of assurance as agreed with the client to determine if there are any material errors, omissions or misrepresentations.

As a subsequent event, should additional information become available or if any facts that could materially affect the assurance statement are discovered by the GHG Programme, the client for whom the report is prepared, their consultant or CarbEnviro Services after issuance of the assurance statement CarbEnviro Services reserves the right to address the matter and revise the statement, as required.

This report and assurance statement is solely for the benefit and use of ERM and ArcelorMittal, with consent provided for its submission to the competent authority, in order to satisfy the reporting requirement for the environmental impact assessment, but without CarbEnviro Services accepting or assuming any responsibility or liability to any other party who may have access to the peer review report or place reliance on the assurance statement.

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Executive Summary

ERM Southern Africa (Pty) Ltd appointed CarbEnviro Services (registered as K2013179818 (Pty) Ltd) to conduct an independent peer review of the Greenhouse Gas (GHG) Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, as part of the Environmental Impact Assessment being conducted for their client (ArcelorMittal). The aim of the assessment was to verify whether the Scope 1 and Scope 2 emissions determined for the operational phase of the proposed gas fired power plant were accurate, complete, transparent, consistent and relevant. CarbEnviro Services followed the principles and requirements of ISO 14064-3: *Specification with guidance for the validation and verification of greenhouse gas assertions* and considered the guidance provided by the *Greenhouse Gas Protocol, the IPCC GHG Inventory guidelines* and the API *Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Natural Gas Industry* (referred to as the "API *Compendium*") for Limited Assurance. Based on the assessment activities undertaken, CarbEnviro Services provides limited assurance and is of the opinion that there is no evidence that the GHG calculations presented for the operational phase of the gas power plant are not materially correct and are not a fair representation of the GHG data and information and were not prepared in accordance with the principles and requirements of the GHG Protocol Corporate Accounting and Reporting Standard.

CarbEnviro Services verified the information, data, assumptions and emission factors applied from source documents, third party evidence and from expert opinions provided by the project engineers, to verify the GHG emissions calculations, provided in a separate calculation spreadsheet, were accurate and complete.

The methodology applied by CarbEnviro Services used during the peer review assessment included:

- Interviews conducted telephonically with ERM (the carbon service providers);
- Data verification and document review;
- Evaluation of GHG data and integrity assessment of the GHG calculation tool; and
- Peer Review Report and Statement.

The assessment activities performed by CarbEnviro Services included the following:

Action / Activity	Date / Period
Project initiation discussion - telephonic	06 July 2016
Project appointment	13 July 2016
Data verification and document review	13 – 15 July 2016
Peer Review Report & Statement	18 July 2016

The GHG Assessment for the operational phase of the gas power plant included LPG and natural gas combustion in stationary devices, and took indirect GHG emissions into consideration. The Peer Review determined that the GHG assessment for combustion emissions from stationary devices was compiled in accordance with GHG Protocol Corporate Accounting and Reporting Standards (2004) and applied the IPCC (2006) GHG Inventory guidelines and the methodology provided in the API Compendium (2009) for determining the emission factor for the natural gas to be processed. The total GHG emissions reported for the expected 30-year lifetime of the gas plant (**137,932,839 tCO_2e**) could be considered reasonable; taken the overstatement of GHG emissions for Phase 2 (expected to come on-line 12-24 months after Phase 1) and the understatement of other GHG emissions related to the lifecycle of the project, and not included in the draft GHG Assessment.

Known exclusions, not covered by this peer review, include the GHG emissions associated with the construction phase of the proposed gas power plant, the transmission of the gas along the proposed gas pipeline from the harbor in Saldanha Bay, the regasification of the LNG prior to the gas turbines, combustion emissions from mobile equipment on site, process, venting, flaring and fugitive emissions from stationary equipment on site, and other GHG sources, sinks and reservoirs due to the project activity (such as methane emissions from waste water treatment, and reduction of GHG emissions due to the generation and consumption of solar energy on site.

The purpose of an independent peer review of a carbon footprint calculation is to increases the credibility and trust of customers and key stakeholders, while providing project management with confidence for setting realistic targets and making wise investment decisions.

Abbreviations

API	American Petroleum Institute
CH_4	Methane
CO_2	Carbon Dioxide
GHG	Greenhouse gas
GWP	Global warming potential
HFC	Hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organization
kWh	Kilo-watt hour (electricity consumption)
LPG	Liquefied Petroleum Gas
MW	Mega watt
MWh	Mega-watt hour (electricity consumption)
N_2O	Nitrous Oxide
PFC	Perfluorocarbon
SF6	Sulphur Hexaflouride
tCO_2e	Tonnes Carbon Dioxide equivalents

1. Background, Scope & Objectives

ERM Southern Africa (Pty) Ltd appointed K2013179818 (Pty) Ltd, trading as **CarbEnviro Service** to conduct an independent peer review of a GHG assessment performed as part of an environmental impact assessment (EIA) study for establishing a new Gas Power Plant in Saldanha Bay. ERM's client, the Independent Power Producer (IPP), requires peer reviews to be conducted on all specialist studies undertaken for the EIA. ERM has compiled the GHG Assessment in accordance with their internal procedures, as supported by the API Compendium methodology, for the operational phase of the proposed Gas Power Plant. CarbEnviro Services provides this peer review report solely for the benefit of ERM and their client, and consents to the release of the report and review statement to the competent authorities, as required for the EIA process.

The objective of this engagement is to provide an independent peer review of the GHG Assessment compiled by ERM, and to determine whether:

- their client's Terms of Reference are acceptable for this specialist study within the context of the proposed project and site location;
- the methodology is clearly explained and acceptable;
- findings are acceptable, and scientifically defensible (through reviewing data evidence);
- the mitigation measures and recommendation measures proposed are appropriate;
- the literature referenced in the report are appropriate;
- the document is well-written and easy to understand; and
- to describe any shortcoming to this study.

The client's Terms of Reference in the Plan of Study for the EIA was:

- Boundary definition – confirming which phases are in scope (e.g. construction, operations, etc.)
- GHG baseline study – understanding South Africa's current and projected national annual GHG emissions, presenting a magnitude scale for project-wide GHG emissions based on international lender standards to be used in the impact assessment
- Data collection & carbon footprint calculation – review project documentation to identify and quantify key GHG emission sources from the project, and quantifying emissions using emissions factors from IPCC, GHG Protocol and other widely recognized standards;

- Impact assessment – comparing annual GHG emissions from the plant to national emissions, international lender standards, and any available benchmarks, and
- Emission control / mitigation measures – proposing measures to maximize resource efficiency and to minimize GHG emissions.

The peer review scope will include an assessment of the identification of the project boundary, methodologies selected, assumptions applied and the integrity of the GHG calculations. Areas for improvement identified during the course of the peer review assessment are raised as a **Recommendation (REC)** and include instances where the GHG standard (e.g. The GHG Protocol, IPCC GHG Inventory Guideline or the API Compendium) requirements have not been met and/or there is a risk that the project carbon footprint would be determined incorrectly, or where there is insufficient detail or clarity in the documentation to enable a peer review decision to be made.

2. Project Boundaries

ERM elected to apply guidance from the IFC Performance Standards (Performance Standard 3 on Resource Efficiency and Pollution Prevention) which states that '*the client will quantify direct emissions from the facilities owned or controlled within the physical project boundary, as well as indirect emissions associated with the off-site production of energy used by the project*' and therefore focused on determining the direct GHG emissions from the plant during its operational phase, as the project activity would not import energy produced off-site for project consumption. The study did not include an assessment of Scope 3 emissions associated with the production and transport of fuel (LNG and CNG) to the plant emissions. While acknowledging that emissions associated with the production and transport of fuel could be significant, ERM stated that this represent a source of indirect emissions that are not under the Project's operational control (Scope 3), and at present details on the source and transport of gas have not yet been confirmed.

REC01. Further clarity on the ownership of the gas, the marine vessels and proposed new gas pipeline from the harbor to the project site, as well as maintenance responsibilities for the gas pipeline and marine vessels is required to determine whether this infrastructure, equipment and vehicles, and the associated GHG emissions from these would indeed fall outside of the project boundary. GHG emissions would include

a. transit loss emissions (from loading, ballasting and storage emissions) and additional GHG emissions from maintenance of gas pipeline infrastructure (e.g. SF_6 gas to condition pipes);

b. fugitive emissions from valves along the pipeline route;
c. power load required to pump gas to the plant; and
d. Regasification of the LNG once it reaches site.

3. GHG baseline study

The draft GHG Assessment Report presents the context of South Africa's energy and climate policies and includes the current and projected national GHG emissions inventory, South Africa's international GHG emission reduction commitments, the future GHG trajectory under a range of climate and development scenarios, and benchmarks the GHG intensity for the proposed gas-fired power plant against the GHG intensity of South Africa's grid electricity. The magnitude scale for the project's GHG emissions is presented in relation to international lender standards, as used in the impact assessment.

REC02. Further clarity on the project's baseline impacts would demonstrate equivalence in type and level of activity of products/services provided between the project and the baseline scenario (i.e. energy consumption by ArcelorMittal and other users in the absence of the proposed project) and the project's GHG sources, sinks and reservoirs (e.g. the qualification of solar and other renewable energy for on-site use) to enable optimal disbursement of electricity generated by the natural gas. The GHG Protocol for Project Accounting (2005) offers sound guidance on this.

4. Emissions Data & Reporting

CarbEnviro Services assessed whether the GHG assessment calculations were accurate, complete, transparent, consistent, and relevant.

The draft GHG Assessment included emissions from propane combustion in Gensets and emissions from natural gas combustion in the gas turbines operating at maximum capacity (i.e. stationary device combustion sources), and excludes Scope 1 emissions "from non-energy products associated with the use of lubricants for machinery, on-site transport related activities, emissions associated with any physical or chemical process activity on site (such as processing of waste), and fugitive emissions, such as fuel leakage from equipment and plant" (ERM, 2016).

The API Compendium (2009) discusses GHG emissions associated with gas processing plant and states "process vents from dehydration, gas sweetening, pneumatic devices, and non-routine activities may result in CH_4 emissions. Fugitive equipment leaks are also a

source of CH_4 emissions. Combustion sources, such as boilers, heaters, engines, and flares result in CO_2 emissions, as well as smaller quantities of N_2O and CH_4 emissions". Please refer to section 4 (below) for additional information on the review findings on the emissions calculations.

The emission sources for Gas Processing Plants identified in the API (2009) are:

GAS PROCESSING	CO_2	N_2O	CH_4	Peer Review:
COMBUSTION SOURCES – Stationary Devices				**Fuel Type: Natural Gas** The calculations conducted assume gas turbines run at full capacity throughout the year. This is considered to be a conservative calculation. **Fuel Type: LPG** 26.4 tonnes per year (estimation based on average total site load and likelihood of black start event), converted to GJ, "using a calorific value of 47.3 GJ/tonne (Defra 2016)". GHG calculation, based on assumptions and data provided by project engineer.
Boilers/steam generators	X	X	X	
Dehydrator reboilers	X	X	X	
Heaters/treaters	X	X	X	
Fire pumps	X	X	X	
Internal combustion (IC) engine generators	X	X	X	
Reciprocating compressor drivers	X	X	X	
Turbine electric generators	X	X	X	
Turbine/centrifugal compressor drivers	X	X	X	
Flares	X	X	X	
Catalytic and thermal oxidizers	X			
Incinerators	X	X	X	
COMBUSTION SOURCES – Mobile Sources				Fuel consumption for company owned vehicles (mobile sources) are not included in the GHG calculation.
Other company vehicles	X	X	X	
Planes/helicopters	X	X	X	
Supply boats, barges	X	X	X	
INDIRECT SOURCES				GHG emissions from indirect sources are determined as zero correctly, if no Eskom electricity or other heat/stream power is to be imported onto site.
Electricity imports	X	X	X	
Process heat/steam imports	X	X	X	
VENTED SOURCES – Process Vents				GHG emissions from process vents, other vents, maintenance/ turnaround events, and non-routine activities are not calculated separately in the carbon footprint, and may contribute up to 20% of the carbon footprint over the lifecycle of the project – refer to **REC04**.
Dehydration processes	X (*)		X	
Dehydrator Kimray pumps	X (*)		X	
Gas sweetening processes	X (*)		X	
Sulphur recovery units	X			
VENTED SOURCES – Other Venting				
Storage tanks and drain vessels	X (*)		X	
Pneumatic devices	X (*)		X	
Chemical injection pumps	X (*)		X	
VENTED SOURCES – Maintenance/Turnarounds				
Gas sampling and analysis	X (*)		X	
Compressor blowdowns	X (*)		X	
Compressor starts	X (*)		X	
Vessel blowdown	X (*)		X	
VENTED SOURCES – Non-routine Activities				
Emergency shutdown (ESD)/ emergency safety blowdown (ESB)	X (*)		X	
Pressure relief valves (PRVs)	X (*)		X	

Fire suppression				
FUGITIVE SOURCES				GHG emissions from equipment leaks 'from valves, flanges, pump seals, compressor seals, relief valves, sampling connections, process drains, open-ended lines, and other miscellaneous component types' are not calculated separately in the carbon footprint. Methane emissions form waste water treatment could be significant and may prove to be an additional fuel source for the proposed project (refer to **REC02**).
Equipment component leaks	**X (*)**		**X**	
Wastewater treatment	**X**		**X**	
Air conditioning/refrigeration				

Footnotes: X Indicates if CO_2, CH_4, or N_2O emissions may result from the source.
*Emission estimation approach is provided in API (2009), but only applicable to CO_2-rich streams. Significance of these sources depends on the CO_2 concentration and source-specific emission rate.

Other GHG emissions associated with the operation of a gas plant could include emissions of SF_6 from electrical transmission and distribution equipment, and from the use of SF_6 as a tracer gas to detect leaks along gas pipelines. HFC and PFC emissions from refrigeration and air conditioning equipment. These are usually considered significant if they are larger than 5% of the GHG inventory, and would be considered Scope 1 emissions if the equipment is owned or operated by the gas plant.

Other GHG emissions due to the project activity, would include methane emissions from waste water treatment, and may offer an additional source of energy for the project site.

> **REC03**. The GHG Assessment could be updated to include all direct emissions listed by the API (2009) for gas plants, such as the combustion sources from all stationary and mobile devices, vented sources (such as process vents, other vents, maintenance/turnaround vents and non-routine activities), and emissions from fugitive sources, or a conservative adjustment could be applied to account for all Scope 1 emissions.

The draft GHG Assessment Report presented findings from the World Energy Council (2004) to illustrate the significance of the contribution of direct (stack) emissions to overall life cycle emissions from combined-cycle natural gas plants, in comparison to indirect (other life cycle stages) emissions and ERM proposed that GHG emissions from the construction phase as likely to be minimal compared to the emissions associated with the combustion of natural gas during the operational phase. Furthermore, considering the availability of information, the likely magnitude of the different emissions sources (with the bulk of life cycle emissions likely coming from the combustion of natural gas for power generation), and also guidance from the IFC Performance Standards, ERM elected not to determine GHG emissions for the construction phase.

The illustration from the World Energy Council (2004) shows that emissions from 'other life cycle stages' for a Natural Gas Combined Cycle energy system make up 15-20% of the direct (stack) emissions, which would equate to about 20 million tCO_2e (calculated over the lifetime of the project, assumed to be 30 years). While this may be considered small in magnitude in comparison to the project's direct emissions, it is non-the-less contribute significant and would contribute to Earth's global warming impacts, given the cumulative effects of greenhouse gasses accumulated in the atmosphere. It may be argued further that a large proportion of GHG emissions in the construction phase fall within Scope 3, which is considered optional reporting under the GHG Protocol Corporate Accounting and Reporting Standard. The GHG Protocol Guide for Construction Companies (ENCORD, 2012) indicates that the embodied GHG emissions of the materials purchased for the construction phase can make up a significant proportion of the CO_2e emissions and the guide was developed to assist construction projects in capturing and reporting on their key emissions sources, thereby meeting best practice, and to sometimes influence the selection of materials to reduce embodied GHG emissions (through use of natural / renewable materials, increasing recycled content of materials and reducing quantities of energy intensive materials). The project's construction materials to be used are estimated as 35,000 tons of bulk cement and concrete aggregate, 800 tons of re-bar steel and 6,500 tons of equipment and structural steel. The extensive paved areas on the site, proposed for storm water harvesting, will have a substantial carbon footprint due to the amount of cement to be used (as 450,800 m^2 of the site is proposed to be concrete-paved).

REC04. Please consider applying a conservative estimate and report the associated assumptions for determining GHG emissions for the construction phase, as a 15-20% discrepancy in the carbon footprint over the lifecycle of the gas plant could be considered significant.

5. Evaluation of GHG calculations

Interviews were conducted telephonically with the GHG Assessment team and a desk top evaluation of the project documents and GHG calculation spreadsheet revealed the following:

1. The calculations, conversions rate and emission factors applied for electricity production from the natural gas turbines, are correct, with the exception of the final calculation of the total GHG emissions over the lifetime of the power plant (assumed to be 30 years for both Phase 1 and Phase 2). As Phase 2 will be coming on-line 12-24 months after phase one, the total emissions for Phase 2 should be calculated for 28-29 years. Therefore, the GHG emissions reported for electricity generation are overstated by between 3,68 and 7,35 million tCO_2e (refer to **REC05**);
2. The GHG emissions calculation for the operational phase do not include process/vented emissions, fugitive emissions, combustion emissions from mobile sources or other GHG emissions sources due to the project activity, such as methane emissions from waste water treatment (refer to **REC03**). The GHG Assessment may be considered incomplete as emission removals due to energy generated from renewable solar resources (refer to **REC02**) and additional information regarding the project boundary is required (refer to **REC01**);
3. The GHG emissions for the construction phase have not been determined, and therefore the total GHG Assessment report may be understated by up to 20% (refer to **REC04**);
4. The data and assumptions applied in the calculations are as reported by the project engineers and are recorded transparently in the calculation spreadsheet, along with references to other data sources used;
5. The methodology and formulae applied to determine the GHG emissions are not presented transparently in the calculation spreadsheet, making the traceability of these calculations difficult now, and repeatability for future annual reporting could be streamlined (refer to **REC05**).

REC05. Correct the total GHG emissions for the estimated 30-year lifetime of the project to reflect the projected emissions for Phase 2 (for 28-29 years only), and include the steps and equations applied to calculate each parameter and include a transparent description of these.

6. Verification Standard applied

CarbEnviro Services applied the principles and requirements of ISO 14064-3: *Specification with guidance for the validation and verification of greenhouse gas assertions* during the independent peer review of the data reported by ERM in the GHG Assessment for the operational phase of the proposed Gas Power Plant in Saldanha Bay compiled for ArcelorMittal. The GHG Accounting and Reporting Principles were followed to determine whether the GHG assertion represents a faithful, true and fair account of the proposed projects carbon footprint. These principles include:

Relevance: the identification/selection of the inventory boundary and the GHG sources, sinks and reservoirs appropriately reflect those of the project and are included in the calculations.

Completeness: all GHG emission sources and activities within the selected inventory boundary were account for and report, and assessed the disclosure/justification of any specific exclusion.

Consistency: the data collection procedures and methodologies applied to determine the GHG emissions are consistent, which allows for meaningful and repeatable comparisons of emissions over time, and records and documentation of changes to the data, inventory boundary, methods, emission factors and any other relevant factors were maintained.

Transparency: all relevant issues (e.g. monitoring methods, calculations, assumptions, uncertainties) are explained in a factual and coherent manner, allowing for transparent quantification of the GHG emissions.

Accuracy: correct monitoring/measurement, estimates, assumptions, calculations and reporting to ensure that the quantification of GHG emissions is systematically neither over nor under the actual emissions, and that uncertainty in the reported data is minimized.

CarbEnviro Services assessed whether the principles and requirements of the GHG Protocol, the IPCC GHG Inventory Guidelines and the API Compendium of Greenhouse Gas were applied in developing and reporting the project's carbon footprint.

7. Roles and Responsibilities

ERM, a leading sustainability services provider, is conducting an environmental impact assessment (EIA) study for the proposed 1 507 MW Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape Province, South Africa. The power plant is proposed by the International Power Consortium South Africa (IPCSA) as a solution to the requirement for stable, economical electricity over the long term at ArcelorMittal's Saldanha Steel site in Saldanha Bay. (ERM, 2016). The GHG Assessment for the proposed gas power plant was included as part of the EIA study and project team representatives interviewed during the peer review process were:

Client representative	Role
Sarah Bonham	Senior Consultant, Sustainability and Climate Change
Clair Alborough	Senior Consultant, Sustainability and Climate Change
Clemence McNulty	Principal Consultant, Sustainability & Climate Change
Stephan van den Berg	Project Manager, Environmental Impact Assessment
David Mercer	Technical Director, Air Quality and Climate Change

CarbEnviro Services was appointed by ERM to conduct an independent peer review of the GHG Assessment complied for the operational phase of the proposed gas power plant, and the assessment team responsible for conducting the document review, calculation assessment and data analysis was:

Assessment Team	Role
Mandy Momberg	Peer Reviewer

Details and credentials of the peer review team are included in Annex A.

8. Assurance Opinion

CarbEnviro Services conducted an independent peer review of the GHG Assessment compiled for the proposed 1,507 MW Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape Province, South Africa. Based on the information provided and the assessment activities undertaken in the timeframe given CarbEnviro Services is of the opinion that the principles and requirements of the GHG Protocol Corporate Accounting and Reporting Standard were followed by ERM. CarbEnviro Services concluded that there is no evidence to suggest that the data applied in the GHG Assessment calculations are not a faithful, true and fair account of the GHG emissions from combustion sources from stationery device and indirect sources within the boundary of the project. The guidance provided by the API Compendium for determining GHG emissions from the transmission of natural gas to a processing plant and from combustion sources from mobile devices, process emissions, vented sources and fugitive sources within a gas processing plant could be applied to ensure GHG assertion reporting is complete, accurate, relevant and reported transparently and consistently.

To our knowledge the data and information provided for the gas turbines, the LPG consumption and indirect sources of GHG emissions are correct for the operational phase (estimated at 30 years) and known data exclusions, include combustion emissions from other stationery devices and mobile sources, process and venting emissions, emissions from flaring and other fugitive emissions.

9. Assurance Statement

CarbEnviro Services is an independent third-party and provides assurance in accordance with the requirements of the ISO 14064-3: *Specification with guidance for the validation and verification of greenhouse gas assertions* and performs verification functions within the specifications of the ISO 14065:2007, *Greenhouse gases — Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition*. During July 2016 CarbEnviro Services conducted an independent peer review of the GHG Assessment (carbon footprint) compiled by ERM as part of the EIA study for the proposed *1,507 MW Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, Western Cape Province, South Africa*. The GHG Assessment for the operational phase of the gas power plant included LPG and natural gas combustion in stationary devices, and took indirect GHG emissions into consideration. The Peer Review determined that the GHG assessment for combustion emissions from stationary devices was compiled in accordance with GHG Protocol Corporate Accounting and Reporting Standards and applied the IPCC (2006) GHG Inventory guidelines and the methodology provided in the API Compendium for determining the emission factor for the natural gas to be processed. The total GHG emissions reported for the expected 30-year lifetime of the gas plant (**137,932,839 tCO_2e**) could be considered reasonable; taken the overstatement of GHG emissions for Phase 2 (expected to come on-line 12-24 months after Phase 1) and the understatement of other GHG emissions related to the lifecycle of the project, and not included in the draft GHG Assessment.

Known exclusions, not covered by this peer review, include the GHG emissions associated with the construction phase of the proposed gas power plant, the transmission of the gas along the proposed gas pipeline from the harbor in Saldanha Bay, the regasification of the LNG prior to the gas turbines, combustion emissions from mobile equipment on site, process, venting, flaring and fugitive emissions from stationary equipment on site, and other GHG sources, sinks and reservoirs due to the project activity (such as methane emissions from waste water treatment, and reduction of GHG emissions due to the generation and consumption of solar energy on site.

The assurance statement is provided to ERM and ArcelorMittal for submission to the competent authorities, in order to satisfy the terms required for the environmental impact assessment, but without CarbEnviro Services accepting or assuming any responsibility or liability to any other party who may have access to the peer review report or place reliance on the assurance statement.

This assurance statement is issued by:

Peer Reviewer and Engagement Director	
Signed: Mandy Momberg	Date: 18 July 2016

Annex A: Credentials of the Peer Reviewer

Company Profile

CarbEnviro Services offers a range of environmental and climate change related services, with a large component being the auditing and assessment of information and data used for energy, environment and sustainability reporting. The independent validation and/or verification of an organization's greenhouse gas (GHG) inventory, GHG emissions reduction or removals enhancement projects and other environmental parameters (e.g. water use and waste disposal) provides assurance to the intended users of the information. In addition, CarbEnviro Services is in a position to assist businesses with addressing their environmental concerns through implementing environmental management systems, environmental due diligence assessments, compliance audits, environmental impact assessments and waste management strategies.

Quality Management Systems

CarbEnviro Services has implemented and maintains a quality management system internally in accordance with the requirements of *ISO9001 Quality Management Systems Requirements* and also the *ISO 14065 Greenhouse Gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition*, supported by the *ISO 14064-3 Specification with guidance for the validation and verification of greenhouse gas assertions*, with the intention of obtaining SANAS accreditation.

CarbEnviro Services provides consultation and internal review of an organization's management system in accordance with the requirements of international standards, such as:

- *ISO 90001 Quality Management Systems - Requirements*
- *ISO 14001 Environmental Management Systems - Requirements with guidance for use;*
- *ISO17020 Conformity assessments - Requirements for the operation of various types of bodies performing inspection;*
- *ISO 17021 Conformity assessments - Requirements for bodies providing audit and certification of management systems; and the*
- *CDM Validation and Verification Standard*

Greenhouse Gas Inventories and Carbon Footprint Reports

CarbEnviro Services provides assurance of GHG assertions and energy use data, including electricity use and fossil fuels combusted. Confidence in ones data and reporting system is helpful to business owners, investors, corporations and regulators and allows for informed decision making and aids in addressing corporate risks. An understanding of one's carbon baseline and

greenhouse gas emissions enables the identification of energy (and cost) reduction opportunities, target setting for reducing business and corporate GHG emissions and risks and identifying low carbon business opportunities. CarbEnviro Services provides independent third party assessment and verification of greenhouse gas data presented in Carbon Footprint Reports, determined in line with GHG standards such as the *ISO14064-1 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals* and the *GHG Protocol*. As more and more organizations are electing to disclose their greenhouse gas emissions and climate change strategies through the Carbon Disclosure Project (CDP), an independent review and assessment of the data reported and GHG emissions factors applied is beneficial to lend credibility and transparency to the process.

Carbon Tax Verification

CarbEnviro Services is well placed to provide internal and/or external assurance of data, information and systems required for carbon taxation in South Africa, which is due in 2017. A '*carbon tax'* can be considered an environmental tax levied on the carbon content of fuels, and should spark initiatives within businesses to become more energy efficient and environmentally friendly. Businesses will be required to measure and report their fuel consumption and greenhouse gas emissions and the data reported must be supported by credible evidence.

Environmental & Ecological Assessments

CarbEnviro Services provides various environmental assessments for clients in the mining, motor and manufacturing, communications, agriculture and waste industries, including environmental due diligence assessments, financial provisioning for mine closure, environmental impact assessments, environmental management plans and waste management plans and strategies. Ecological assessments include evaluation of veld conditions, wildlife assessments, game stocking plans, predator management plans and biodiversity action plans and species lists.

Environmental Performance Indicators

CarbEnviro Services provides internal and external review and verification of an organization's environmental accounting and reporting system in accordance with the Global Reporting Initiative (GRI) standard and/or internal corporate standards, thus enabling informed decision-making which leads to measurable improvements to a company's triple bottom-line, resulting in even more sustainable and cost-savings practices. The independent assessment of the environmental performance indicators (such as water, energy, greenhouse gasses, hazardous and non-hazardous waste and recycling) leads to an accurate disclosure to external parties (capital shareholders, creditors, authorities and other interested parties) of the organization's non-financial information and sustainability performance.

Validations and Verifications of CDM and other carbon trading projects

CarbEnviro Services is experience in validating and verifying Clean Development Mechanism (CDM) project activities throughout Africa, having sub-contracted as Lead Validator and Verifiers to

accredited Designated Operational Entities like PricewaterhouseCoopers and ERM Certification and Verification Services. Certified Emission Reductions (CERs) are issued for the avoided emissions verified under the CDM programme, enabling emissions trading under the Kyoto Protocol.

BEE Status

CarbEnviro Services is an Exempt Micro Enterprise (EME) with a 100% Recognition as a Level 4 Contributor to B-BBEE.

Engagement Team Profile

Mandy Momberg – Engagement Director & Peer Reviewer

Mandy Momberg has over 25 years' experience in climate change, environmental sustainability and biodiversity related matters. Mandy's climate change experience includes the validation and verification of Clean Development Mechanisms (CDM) projects, verification of greenhouse gas inventories and climate change risk assessments. She had a seven-year tenure in government; dealing with environmental sustainability matters; including the assessment and evaluation of Environmental Impact Assessments (EIAs) and the assessment of Environmental Management Programmes (EMPs) for mining activities. Mandy has experienced in environmental due diligence, assurance assessments, rehabilitation requirements and financial provisions for mine closures. Mandy spent two years in the mining industry and gained hands-on experience in land sterwardship, waste management, closure liabilities and environmental management systems. She designed and implemented the Biodiversity Action Plan for Palabora copper mine, bordering the Kruger National Park, and which forms part of that open ecosystem. Mandy has over 10 years' experience in the conservation industry and designed and implemented the Natural Resource Management Plans for Pilanesberg National Park and the Magaliesberg Protected Natural Environment. Mandy has extensive experience in developing, implementing and maintaining quality management systems for accredited certification and inspection bodies (against the ISO 14065, ISO 17020 and ISO 17021 standards).

Mandy has a BTech: Nature Conservation and further training in various environmental matters; including environmental law, environmental risk assessments, environmental auditing, air pollution control, water pollution control and waste management. Mandy has over 900 audit hours and is a qualified and experienced ISO 14001 Environmental Management Systems assessor, an ISO 9001 Quality assessor, a CDM Validator and Lead Verifier, and a Systems and GHG Technical Assessor for the South African National Accreditation System (SANAS) for the ISO 14065 standard. Mandy is a member of the Climate Reality Leadership Corp, under the Chairmanship of Al Gore (former Vice President of the United States of America), and serves on UNISA's Advisory Board for the EXXARO Chair for Business and Climate Change.

Annex B: Document List

NO	DOCUMENT NAME	DATED
1	API (2009). *Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry*. Compiled by the American Petroleum Institute. Available at: http://www.api.org/~/media/files/ehs/climate-change/2009_ghg_compendium.pdf [Accessed 14 June 2016]	2009
2	ENCORD (2012). Construction C0$_2$e Measurement Protocol – A Guide to reporting against the Greenhouse Gas Protocol for construction companies, Version 1.0. Compiled by ENCORD - European Network of Construction Companies for Research and Development.	May 2012
3	ERM (2016). Greenhouse Gas (GHG) Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay (draft report). Prepared for ArcelorMittal as part of the EIA study for the proposed Gas Power Plant.	June 2016
4	ERM (2016). Saldanha Bay IPP GHG assessment v0.7.xls. Prepared for ArcelorMittal as part of the EIA study for the proposed Gas Power Plant.	June 2016
5	ERM (2016) ToR included in the Plan of Study for the EIA (email extract).	13 July 2016
6	IPCSA (2016), E.I.A. Updated IPCSA 1500 MW Saldanha Bay. Updated Information for EIA Input and Consideration, 1500 MW Saldanha Gas-to-Power. Project Ref. No.: #1026.1.3	12 June 2016
7	IPCC (2006). Guidelines for National Greenhouse Gas Inventories. Volume 2: Energy. Chapter 1 Introduction. Authors Amit Garg (India), Kainou Kazunari (Japan), and Tinus Pulles (Netherlands).	2006
8	IPCC (2006) Guidelines for National Greenhouse Gas Inventories. Volume 2: Energy. Chapter 2. Stationary Combustion. Authors Darío R. Gómez (Argentina) and John D. Watterson (UK). Branca B. Americano (Brazil), Chia Ha (Canada), Gregg Marland (USA), Emmanuel Matsika (Zambia), Lemmy Nenge Namayanga (Zambia), Balgis Osman-Elasha (Sudan), John D. Kalenga Saka (Malawi), and Karen Treanton (IEA).	2006
9	WRI/WBCSD (2004). *Greenhouse Gas (GHG) Protocol: Corporate Accounting & Reporting Standard*. Revised Edition. World Resources Institute/World Business Council for Sustainable Development ISBN 1-56973-568-9.	March 2004
10	WRI/WBCSD (2005). *The GHG Protocol for Project Accounting* World Resources Institute/World Business Council for Sustainable Development ISBN 1-56973-598-0.	November 2005

ERM Johannesburg
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Ref/Project number	0315829 – EIA for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Subject	ERM's response to comments from the Independent Peer Review conducted on the greenhouse gas (GHG) specialist study
Date	19 July 2016

ERM Southern Africa (Pty) Ltd appointed CarbEnviro Services (registered as K2013179818 (Pty) Ltd) to conduct an independent peer review of the Greenhouse Gas (GHG) Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, as part of the Environmental Impact Assessment (EIA) being conducted for ERM's client (ArcelorMittal).

A limited Assurance Statement was provided by CarbEnviro Services, in which several recommendations were provided (shown in bold below). This memo contains ERM's response to the specific recommendations contained within the Peer Review Report.

1. **REC01: Further clarity on the ownership of the gas, the marine vessels and proposed new gas pipeline from the harbour to the project site, as well as maintenance responsibilities for the gas pipeline and marine vessels is required to determine whether this infrastructure, equipment and vehicles, and the associated GHG emissions from these would indeed fall outside of the project boundary. GHG emissions would include:**
    a. **transit loss emissions (from loading, ballasting and storage emissions) and additional GHG emissions from maintenance of gas pipeline infrastructure (e.g. SF6 gas to condition pipes);**
    b. **fugitive emissions from valves along the pipeline route;**
    c. **power load required to pump gas to the plant; and**
    d. **regasification of the LNG once it reaches site.**

At present, detailed information on the suppliers of the natural gas, the transport of the gas to the port, and indeed operations at the gas import terminal (which has yet to be developed) is not available. Furthermore, these activities will fall outside of the project boundary, as per guidance from the IFC that states that such indirect activities do not need to be quantified as part of the GHG assessment for a proposed development.

Whilst the gas pipeline (approximately 5 km) does fall inside the boundary of the broader EIA, detailed studies on fugitive emissions from the pipeline have not been conducted and fugitive emissions were excluded from the scope of the GHG assessment as they are not likely to be material. In addition, the power requirements for pumping gas to the plant and the regasification of

LNG on reaching the site are not considered to be significant sources of GHG emissions relative to the magnitude of emissions arising from the combustion of natural gas at the plant (as per the World Energy Council 2004 study referenced in the report, which indicates that 80% or more of life cycle emissions from gas power plants are direct stack emissions associated with operations). ERM considered that a disproportionate effort would be required in order to include these sources in the assessment, relative to the magnitude of emissions likely to result from these activities.

2. **REC02: Further clarity on the project's baseline impacts would demonstrate equivalence in type and level of activity of products/services provided between the project and the baseline scenario (i.e. energy consumption by ArcelorMittal and other users in the absence of the proposed project) and the project's GHG sources, sinks and reservoirs (e.g. the qualification of solar and other renewable energy for on-site use) to enable optimal disbursement of electricity generated by the natural gas. The GHG Protocol for Project Accounting (2005) offers sound guidance on this.**

The approach taken by ERM for the impact assessment is to assess the baseline environment – in the absence of the project – and then to assess the project's likely impacts on this baseline environment. The power station will provide power to ArcelorMittal's Saldanha Steel power plant and other industries in the area, and this power will be additional to the existing power supplied to the area via the national grid. From a project perspective, the baseline GHG impacts are zero, since the power station does not currently exist. The impact assessment therefore quantifies the estimated GHG emissions from the plant when it is operational, and the impact that of these new and additional GHG emissions on South Africa's national GHG emissions levels and on global climate change. An analysis of the GHG emissions intensity of electricity generated by the plant compared to the GHG emissions intensity of the national grid is included within the report in order to understand how the GHG performance of the power plant compares to baseline grid emissions intensity.

3. **REC03: The GHG Assessment could be updated to include all direct emissions listed by the API (2009) for gas plants, such as the combustion sources from all stationary and mobile devices, vented sources (such as process vents, other vents, maintenance/turnaround vents and non-routine activities), and emissions from fugitive sources, or a conservative adjustment could be applied to account for all Scope 1 emissions.**

At present, detailed information relating to the above listed emissions sources is not available, and detailed studies to generate this data were not requested as part of the GHG information request on the assumption that the emissions arising from these activities are likely to be insignificant relative to the

emissions arising from the combustion of the natural gas for power generation (as per the 2004 World Energy Council life cycle emissions assessment study). ERM notes that the inclusion of such sources will not alter the magnitude rating for the project's GHG emissions ('very large', at > 1 000 000 tCO_2e per annum) or the impact magnitude rating.

4. **REC04: Please consider applying a conservative estimate and report the associated assumptions for determining GHG emissions for the construction phase, as a 15-20% discrepancy in the carbon footprint over the lifecycle of the gas plant could be considered significant.**

ERM notes that the 15-20% discrepancy in the carbon footprint (which reflects the estimated proportion of GHG emissions coming from life cycle stages other than direct GHG emissions from the stack during operations) encompasses all other life cycle stages – including construction, but also fuel extraction and processing, fuel transport, end-of-life processes such as waste incineration and disposal, ancillary infrastructure such as supplier facilities, and transmission and distribution infrastructure and losses. As such, emissions associated with the construction of the power plant will be a portion of these additional emissions, and more detailed studies would be needed to understand the likely percentage contribution specifically associated with construction emissions.

ERM has scoped the GHG assessment such that the focus is placed on the largest source of emissions – namely the combustion of natural gas in the turbines for the generation of electricity. At this stage of the project's development, detailed information on activities taking place across other life cycle stages is not available. For this reason, and also in line with the GHG Protocol's GHG accounting guidance (specifically the guidance relating to boundary-setting according to the operational control approach where indirect value chain emissions are an optional reporting category), other life cycle stages – including construction – are stated exclusions from the assessment. Whilst including an estimate of construction emissions would increase the completeness of the assessment, it will not alter the magnitude rating for the project's emissions (which is 'very large', i.e. >1 000 000 tCO_2e per annum) or the impact magnitude rating, or the findings in relation to the need for mitigation measures.

5. **REC05: Correct the total GHG emissions for the estimated 30-year lifetime of the project to reflect the projected emissions for Phase 2 (for 28-29 years only), and include the steps and equations applied to calculate each parameter and include a transparent description of these.**

ERM notes the following information in the project Scoping Report: 'As the development process of the site is yet to fully begin, detailed decommissioning plans have not yet been formulated; however the initial

plant life will be designed for 25 to 30 years. Upgrades during the life of the plant can increase the design life to 50 years'. As such, there is some uncertainty with regard to the project lifetime and dates of decommissioning. Considering this uncertainty, ERM assumed a 'best estimate' of 30 years' operating time for Phase 1 and 2 operations in order to provide a high level estimate of total, cumulative emissions over the project's lifetime (reported as being 'in the range of' 138 Mt CO_2e) and does not feel that there is sufficient information at this stage to increase the accuracy of this estimate. Furthermore, small deviations from this number are unlikely to change the findings and conclusions from the GHG assessment in relation to the magnitude of GHG emissions from the project, and the associated climate change impacts.

PROPOSED SALDANHA STEEL GAS-FIRED POWER PLANT
SALDANHA, WESTERN CAPE:
FAUNAL ECOLOGY SPECIALIST STUDY

Produced for ERM South Africa

BY

SIMON TODD CONSULTING

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July 2016

EXECUTIVE SUMMARY

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the anchor off-taker, proposes to develop a 1400MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha Bay, West Coast District Municipality and the Western Cape Province. The infrastructure that forms the Project and will be included in the EIA includes a Combined Cycle Gas Turbine (CCGT) power plant, onshore natural gas pipeline and power transmission line to connect to an existing nearby substation.

A desktop review of the available ecological information in conjunction with a site visit and field assessment was conducted in order to characterise the site. The study suggests that although there are a variety of red-data listed fauna known from the area, it is not highly likely that they occur at the site, given their habitat requirements and the nature of the available habitats at the site and the fragmented nature of the surrounding landscape. The natural habitat along the powerline route has however been identified as a Critical Biodiversity Area within the Saldanha district, as well as a listed ecosystem at the national level, under the National List of Threatened Ecosystems. The current level of faunal activity at the site is fairly low given the degraded nature of the power plant site but the site still retains some degree of ecological function. The presence of larger mammals such as Steenbok and Porcupine suggest that the power plant site forms part of a larger habitat network in the area and still plays a role in the broader scale connectivity of the landscape.

It is unlikely that the development of the Saldanha Gas-Fired Power Plant and associated infrastructure would result in the significant impact on fauna and habitats at the site. The main impacts on fauna are likely to result from noise and physical disturbance during the construction phase and pollution and vehicular disturbance during the operation of the road and provided these impacts are mitigated, the significance of the impacts would be minor to negligible.

1 INTRODUCTION

The International Power Consortium South Africa (Pty) Ltd ("IPCSA") with Saldanha Steel (ArcelorMittal South Africa "AMSA") being the anchor off-taker, proposes to develop a 1400 MW natural gas fired power plant to the east of the existing steel manufacturing facility in Saldanha Bay, Western Cape. The Project will use imported natural gas to generate electricity using advanced gas turbines. The Project will supply the needs of Saldanha Steel and the excess electricity will be made available to support and sustain existing industry and encourage economic growth in Saldanha Bay, West Coast District Municipality and the Western Cape Province.

The infrastructure that forms the Project and will be included in the EIA includes:

- A Combined Cycle Gas Turbine (CCGT) power plant (1400MW with possible expansion to 3000MW)
- Onshore natural gas pipeline from the Port of Saldanha to the site (between 2.5 km and 5 km in length); and
- Power transmission line to connect to an existing nearby substation.

ERM Environmental Consultants (ERM), has been appointed by AMSA to undertake the requisite Environmental Assessment process for the proposed project. Due to the presence of indigenous flora and fauna on the proposed development site, a specialist ecological assessment (including a faunal impact assessment) is required to inform the Environmental Impact Assessment process. To these ends, ERM have appointed Simon Todd Consulting to provide specialist faunal ecological input. This study addresses the likely faunal impacts associated with the development and provides a baseline of the fauna and habitats present at the site and mitigation and avoidance measures that can be implemented in order to reduce the ecological impact of the development. The full details of the development as well as the scope of the current study are detailed below.

1.1 SCOPE OF STUDY

The following scope has been provided for the assessment:

- A description of the broad ecological characteristics of the site and its surrounds.
- Legal review, including local regulatory requirements, IFC Performance Standards and other relevant local and international regulations, including permit requirements.

- Undertake a faunal survey to describe the baseline faunal characteristics of the affected area and place this in a regional context.
- Using primary and secondary data, provide a detailed baseline assessment (including species lists) of faunal species and habitats found and expected at the site.
- Compile a sensitivity map depicting the distribution of faunal species, habitats and sensitive biological areas.
- Comment on faunal sensitivity in terms of Red Data Sensitivity Index Score of species, habitats, ecological corridors and linkages with other ecological systems on and adjacent to the site.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify species of special concern (SSC).
- A faunal sensitivity analysis which describes any risks posed by the project; and outlines possible avoidance and mitigation measures.
- Describe and assesses the impact to the terrestrial fauna present in the area.
- Assess cumulative impact of development with current and planned developments in the area.

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	**Cross-reference in this report (page)**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	CV Attached
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Attached
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 3
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 5
(g) an identification of any areas to be avoided, including buffers;	Section 5
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental	Section 5 and Annex C of EIA Report

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	Cross-reference in this report (page)
sensitivities of the site including areas to be avoided, including buffers;	
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3.4
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 6
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Annex B of EIA
(p) any other information requested by the competent authority.	N/A

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs 2014) as well as within the best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers et al. (2005).

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.
- Demonstrate how the proponent intends complying with the principles contained in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should.

- In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment;
- Avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:
The study will include data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:

- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc*).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.

- Clarify species of special concern (SSC) and that are known to be:
    - endemic to the region;
    - that are considered to be of conservational concern;
    - that are in commercial trade (CITES listed species);
    - or, are of cultural significance.
- Provide monitoring requirements as input into the Environmental Management Programme (EMP) for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified or described:

- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries)
- Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The Project will be located on ArcelorMittal property adjacent to the existing Saldanha Steel plant on a portion of Yzervarkensrug 129/0 and Jackals Kloof 195/2. The Project will involve the construction and operation of a 1400 MW Combined Cycle Gas Turbine (CCGT) power plant with capacity to expand up to 3000 MW base load in future. The Project will support both imported Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel supply. CNG and LNG will be supplied by ship to the Port of Saldanha. The gas will be transported via the onshore landing to site through an underground pipeline. The infrastructure that forms the Project and will be included in the EIA includes:

- A CCGT power plant (1400MW with possible expansion to 3000MW)
- Onshore natural gas pipeline from the Port of Saldanha to the site (between 2.5 km and 5 km in length). The LNG pipeline and servitude will run from the pipeline entry point connecting to the power plant boundary. The gas pipeline will be buried to a depth of 3 to 4 m, cover a servitude width of approximately 15 – 20 m and be approximately 3900 m in length.
- Power transmission line to connect to an existing nearby substation. The feeder power line for the initial 160MW base load from the power plant to the ArcelorMittal Steel Works will be the first priority. This 132KV feeder line will be sized for a capacity of 400MW.The additional 1103MW (1400MVA) of power generated at the plant will be evacuated through the construction of a new 22 km High Voltage (HV) 400 kilo Volt (kV) line from the power plant's own switch yard to the existing Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude.

The associated infrastructure will include:

- Access road to site;
- 132 kV and 400 kV switchyard;
- Control and electrical building;
- Central control room, warehouse and administrative buildings;
- Firefighting systems;
- Fuel/gas/diesel storage facilities;
- Emergency backup generators (diesel or LPG); and
- Chemical storage facilities (Water treatment chemicals, and demineralizing resins, lubricants, grease and turbine cleaning detergents, fire extinguishing foams).

Figure 1. Satellite view of the proposed Saldanha Steel CCGT power plant site (red polygon), the natural gas pipeline corridor from the Port of Saldanha to the site (between 2.5 km and 5 km in length) (black polygon); and the site of the corridor for the proposed transmission line (orange line). The Eskom Blouwater substation is indicated by the blue point, and the Eskom Aurora substation is indicated by the yellow point.

2 REGULATORY AND LEGISLATIVE OVERVIEW

A summary of the relevant portions of the Acts which govern the activities and potential impacts to the environment associated with the development are listed below. Provided that standard mitigation and impact avoidance measures are implemented, not all the activities listed in the Acts below would actually be triggered.

National Environmental Management Act (NEMA) (Act No 107, 1998):

NEMA requires that measures are taken that ”prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.” In addition:

- That the disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimised and remedied:
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

Environment Conservation Act (ECA) (No 73 of 1989 Amendment Notice No. R1183 of 1997)

This Act provides for the effective protection and controlled utilisation of the environment. This Act has been largely repealed by NEMA, but certain provisions remain, in particular provisions relating to environmental impact assessments. The ECA requires that developers must undertake Environmental Impact Assessments (EIA) for all projects listed as a Schedule 1 activity in the EIA regulations.

National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004):

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. However, all of the vegetation types within and surrounding the study site are classified as Least Threatened.

NEM:BA also deals with endangered, threatened and otherwise controlled species, under the TOPS Regulations (Threatened or Protected Species Regulations). The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.

- **Endangered:** any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable:** any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

A TOPS permit is required for any activities involving any TOPS listed species.

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorization. Those relevant to the current study are listed below.

Under **Environmental Impact Assessment Regulations Listing Notice 3** of 2010 (*R.546):*

Activity 13. The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. Within:

(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.

It is important to note that the above thresholds and activities also apply to phased developments "*where any phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold."*

National Forests Act (No. 84 of 1998):

The National Forests Act provides for the protection of forests as well as specific tree species, quoting directly from the Act: "*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived*

from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated".

No listed tree species were observed in the area and given the limited extent of the site, it can be said with certainty that no protected tree species occur at the site.

Conservation of Agricultural Resources Act (Act 43 of 1983):

The Conservation of Agricultural Resources Act provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants and those listed under Category 1 are prohibited and must be controlled while those listed under Category 2 must be grown within a demarcated area under permit. Category 3 plants includes ornamental plants that may no longer be planted but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the floodline of water courses and wetlands.

National Veld and Forest Fire Act (Act No. 101 of 1998)

The purpose of this Act is to prevent and combat veld, forest and mountain fires. The Act provides for a variety of institutions, methods and practices for achieving the purpose such as the formation of fire protection associations. It also places responsibility on landowners to develop and maintain firebreaks as well be sufficiently prepared to combat veld fires.

3 METHODOLOGY

3.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

- Threatened Ecosystems and their remaining extent were extracted from the National List of Threatened Ecosystems (2011), where relevant.
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and various spatial databases (ADU, SANBI's SIBIS and BGIS databases).
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.
- The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 2014.3 (See Figure 1) and where species have not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals and amphibians, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming, the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

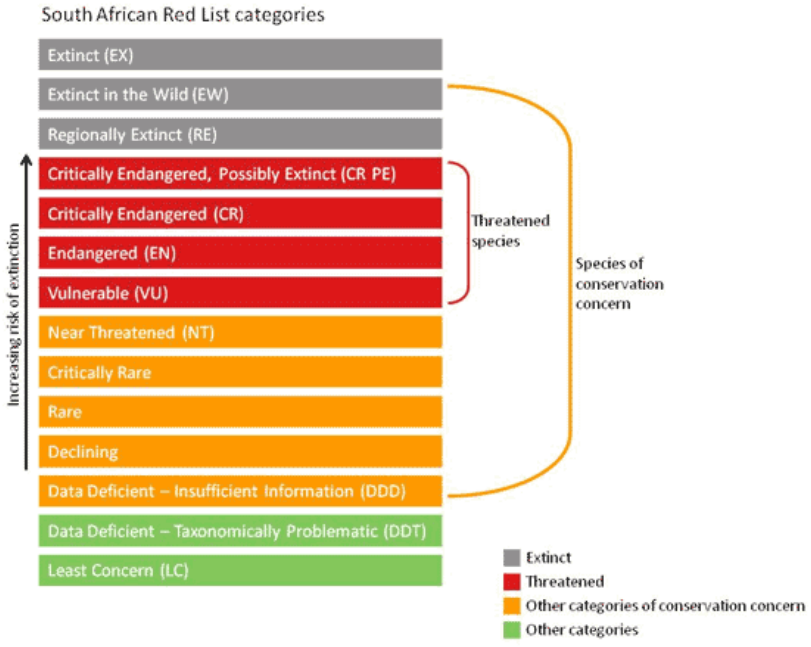

Figure 2. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

3.2 SITE VISIT

The site visit took place on the 25th and 26th of June 2016. During the site visit, the route to be followed by the pipeline was walked and observations and searches for fauna were made at various points within intact vegetation along the route. Sensitive areas were mapped using a GPS and marked on satellite imagery of the site where appropriate and specific sensitive features or listed species were also recorded with waypoints as they occurred. Active searches for reptiles and amphibians were conducted within habitats likely to harbour or be important for such species within the power plant site as well as along the power line route. Small mammal live trapping was undertaken on the power plant site to provide an indication of the use of the site by small mammals. It was however fairly cold during the site visit and some faunal groups such as reptiles are likely to have been less apparent than they would be during the warmer times of the year. The power line route was investgated at various points along the route, with particular attention to intact areas and the potential presence of features and faunal habitats of concern or of limited extent.

3.3 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases. This includes delineating the different habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area.

These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

3.4 SAMPLING LIMITATIONS AND ASSUMPTIONS

The major potential limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during different seasons to ensure that the full complement of animal species present are captured. However, this is rarely possible due to time and cost constraints and therefore, the representivity of the species sampled at the time of the site visit should be critically evaluated.

The lists of amphibians, reptiles and mammals for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. Several site visits have also been conducted in the wider area on adjacent properties at different times of the year and information on fauna observed in these areas is included where relevant. This represents a sufficiently conservative and cautious approach which takes the study limitations into account.

4 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 BROAD-SCALE VEGETATION PATTERNS

The vegetation of the site is specifically deal with in another report and the vegetation is described here only in broad terms in order to characterise and place the habitat at the site in context.

According to the national vegetation map (Mucina & Rutherford 2006), two vegetation types fall within the site, namely Saldanha Flats Strandveld and Saldanha Limestone Strandveld

(Figure 3). At the fine scale of the site the delineation of vegetation types is not highly accurate and the majority of the site appears to correspond to Saldanha Limestone Strandveld. However, in general, both vegetation types consist of a fairly dense shrubland of low to moderate height with graminoids. Of significance is the fact that Saldanha Flats Strandveld is listed in the National List of Threatened Ecosystems as Vulnerable on account of a large extent of transformation due to urbanisation, industrial development and agriculture. However most of the site area is previously transformed, and was previously ploughed.

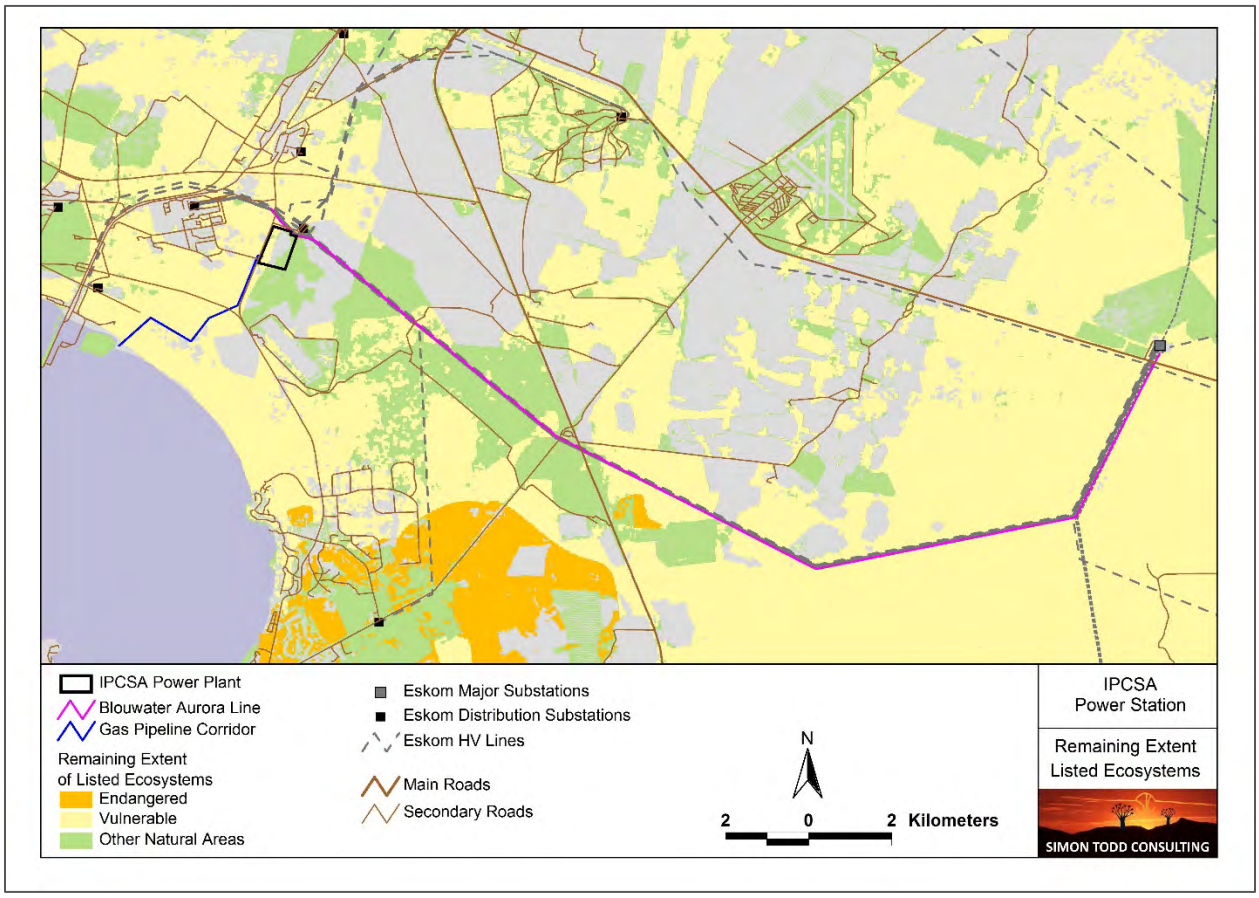

Figure 3. The conservation status of vegetation in and around the proposed Saldanha Steel gas-fired power plant, pipeline and powerline corridors based on the National List of Threatened Ecosystems.

Figure 4. The vegetation at the proposed Saldanha Steel gas-fired power plant site looking south-east.

4.2 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

The site lies within the planning domain of the Saldanha Bay Municipality Critical Biodiversity Areas map produced by the C.A.P.E. Fine-scale Biodiversity Planning Project. Such conservation planning identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. Such maps can also be used for proactive conservation management such as to prioritise management actions such as alien clearing or identify priority areas for stewardship.

The Critical Biodiversity Areas map for the study area is depicted below in Figure 4. There is a large intact area mapped as CBA within the power plant site, but this area has been previously transformed and there are only a few scattered shrubs present and it is not considered sensitive from a faunal perspective as it contains little intact habitat and is not

considered functional from the ecological perspective. The pipeline route is however largely within a CBA and it is confirmed that most of this area is within intact vegetation. The impact of the pipeline can be reduced by ensuring that the pipeline is located along existing lines of disturbance such as roads and existing cleared areas which are prevalent along most of the route. A large proportion of the power line is also within a CBA, especially towards the Aurora substation. However, the alignment is adjacent to existing lines and the total footprint can be kept to a sufficiently low level to generate low impact.

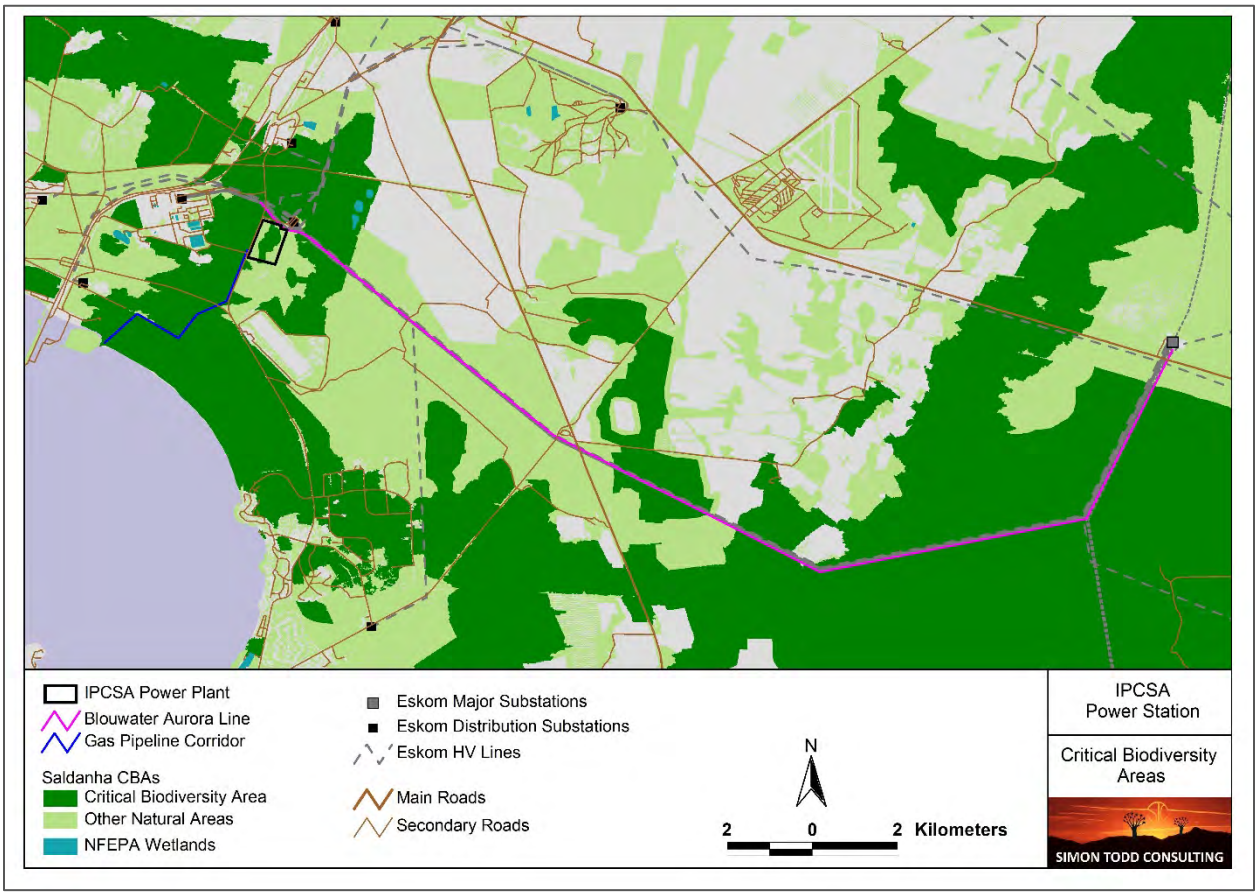

Figure 4. The Critical Biodiversity Areas map for the study area, illustrating that the majority of the site lies within a CBA.

Figure 5. Coastal dune shrubland habitat towards Langebaan along the pipeline route. This area is mapped as a CBA and is considered relatively high sensitivity.

4.3 FAUNAL COMMUNITIES

Mammals

Although as many as 52 different terrestrial mammals are known from the broad area surrounding the study site, the activity and transformation in the vicinity of the site, will have had a significant influence on this and a considerably lower number are likely to actually be present. Furthermore, the variety of habitats at the site is limited and there are no wetlands or rocky outcrops present and as a result, species associated with these habitats are not likely to occur at the site. Faunal activity at the site was however fairly high and a variety of mammals were observed during the site visit including Cape Golden Mole, Cape Dune Mole Rat, Cape Porcupine, Bush Vlei Rat, Cape Gerbil, Cape Grey Mongoose, Bat-Eared Fox, Four-striped Grass Mouse and Steenbok. The majority of species present at the site are smaller mammals which are fairly tolerant of habitat fragmentation

and are able to persist within relatively small habitat fragments or are opportunistic species which take advantage of the open space created by the past agricultural disturbance.

Two listed species potentially occur at the site, namely the White-tailed Mouse *Mystromys albicaudatus* (EN) and Honey Badger *Mellivora capensis* (EN). Given the power station site is previously transformed, there is a lack of cover and adequate food resources for the Honey Badger. The White-tailed Mouse is potentially present with a low likelihood, given the low vegetation cover. The small footprint of the pipeline and powerline is not likely to have a high impact on mammal fauna.

Figure 6. The middle section of the power plant site. This area is previously disturbed and does not retain a large proportion of its former biodiversity, but is still likely to represent habitat for some fauna species.

Reptiles

According to the SARCA database, 45 reptiles have been recorded in the area, which corresponds well with distribution records from the literature (Appendix 3). The potential composition of the reptile fauna at the site comprises 1 tortoise, 1 terrapin, 18 snakes, 19 lizards and skinks and 5 geckos. As with mammals, a large proportion of these are not

likely to occur at the site on account of a lack of suitable habitat and in particular the lack of any rocky outcrops.

Although reptile searches were conducted at the site, few reptiles were encountered, which can be ascribed largely to the site visit being in the winter when many reptiles are not active. Species observed include Cape Skink *Mabuya capensis* and Angulate Tortoise *Chersina angulata*, which was observed to be abundant at the site. The Cape Girdled Lizard *Cordylus cordylus* (Figure 7) and the Brown House Snake were also observed at the site (title page of report).

Figure 7. The Cape Girdled Lizard was observed to be resident at the proposed Saldanha Steel gas-fired power plant site.

Of concern is the fact that five listed species are known from the area including the Large-scaled Girdled Lizard *Cordylus macropholis*, Black Girdled Lizard *Cordylus niger*, Gronovi's Dwarf Burrowing Skink *Scelotes gronovii*, Kasner's Dwarf Burrowing Skink *Scelotes kasneri* and Bloubergstrand Dwarf Burrowing Skink *Scelotes montispectus*, all of which are listed as Near Threatened. The majority of these are however not likely to occur at the site as they are associated with coastal dunes and in the case of the Large-scaled Girdled Lizard the strand line. This habitat at the power plant site has already been transformed and impacted

by development and there is little suitable habitat remaining. Although there are still some dunes remaining within the proposed pipeline corridor (Figure 5), the extent of the impact of the pipeline on this habitat is likely to be low, especially if the alignment can be placed within existing disturbance footprints. The Black Girdled Lizard is restricted to two isolated populations, one on the Cape Peninsula and the other on coastal rocks around Saldanha. Given the localised distribution of this species impact on it would be undesirable, but as there were no rocky outcrops within the site, it is not likely that this species occurs at the site or would be impacted by the development.

In general, as there do not appear to be any specific habitats at the site which are of particular significance for reptiles, the major threat to reptiles would be habitat loss as well as impact resulting from the large amount of traffic using the upgraded road. Tortoises and snakes are particularly vulnerable to being run over by motor vehicles and given the high density of vulnerable species such as the Angulate Tortoise at the site, some impact on these species is highly likely.

Amphibians

The site lies within or near the range of 8 amphibian species, which along with the general lack of water or wetlands at the site suggests that frog diversity is likely to be fairly low. The only listed species which may occur at the site is the Cape Caco *Cacosternum capense*, which is restricted to low lying flat or gently undulating areas with poorly drained clay or loamy soils. Given the sandy soils at the site and the lack of suitable pans for breeding, it is not likely that this species occurs at the site. Species which are likely to occur at the site are likely to those less dependent on perennial water including the Cape Sand Toad *Vandijkophrynus angusticeps*, Sand Rain Frog *Breviceps rosei rosei* and Cape Sand Frog *Tomopterna delalandii*. As with reptiles the major threats from the development would be habitat loss, vehicle impact during periods of movement as well as pollution from dirty runoff off the road or oil and fuel spillages along the road.

5 SITE SENSITIVITY ASSESSMENT

Figure 8. Faunal Sensitivity map of the proposed Saldanha Steel CCGT power plant site, the natural gas pipeline corridor from the Port of Saldanha to the site; and the site of the corridor for the proposed transmission line.

The sensitivity map for the proposed Saldanha Steel CCGT power plant site, pipeline corridor and transmission line corridor is depicted above in Figure 8. The gas pipeline follows an existing road for the large part, which means its impact is fairly low. The area towards the coast is deemed to have the highest sensitivity on account of the better condition of the vegetation and sensitivity of the habitat within this area, but the extent of sensitive dune area on the existing proposed route is low, and the remaining habitat is historically overgrazed and fairly degraded in places. The natural but highly disturbed and transformed vegetation of the power plant is considered low sensitivity, given the low cover and low diversity. The powerline crosses several areas of intact natural vegetation, many of

which are considered sensitive but cannot easily be avoided and the development footprint in these areas should be kept to a minimum.

6 IMPACT ASSESSMENT

6.1 IDENTIFICATION & NATURE OF IMPACTS

The Saldanha Steel Gas-fired Power Plant and associated infrastructure is likely to result in a number of different impacts on fauna during the construction, operation and decommissioning phases, which are summarized below. Potential faunal ecological impacts resulting from the development would stem from a variety of different activities and risk factors associated with the construction and operational phases of the project including the following:

Construction Phase

- Vegetation clearing & site preparation
- Operation of heavy machinery at the site
- Human presence

Operational Phase

- Site maintenance activities
- Human presence

Decommissioning Phase

- Operation of heavy machinery at the site
- Human presence

The above activities are likely to manifest themselves as the following impacts:

1. Loss of habitat for fauna
2. Direct faunal mortality due to vehicle collisions or human presence
3. Habitat degradation for fauna due to pollution & noise
4. Loss of habitat connectivity / isolation of habitat with impacts on broad-scale ecological processes such as dispersal ability or disruption of migration pathways.

Loss of habitat for fauna

Some loss of vegetation is an inevitable consequence of the development. Some habitat is no longer available for use as a result of transformation or the presence of permanent infrastructure. This potentially includes the habitat for 5 red-listed reptiles, two red data-listed mammals and one listed amphibian. Further loss of sensitive indigenous vegetation supporting habitat within the powerline corridor specifically could significantly reduce its ecological function and ability to support viable populations of the resident fauna.

Direct Faunal Impacts

Smaller fauna such as many reptiles would either seek shelter or not be able to move away from construction activity sufficiently quickly during construction and would be killed by vehicles and earth-moving machinery. In addition, the presence of a work force on the site during construction would pose a risk to species such as snakes, tortoises and mammals which would be vulnerable to poaching for food, trade or killed out of fear and superstition. During the operational phase, the activity would be much lower.

Habitat Degradation for Fauna

The noise and activity during the construction and operation of the pipeline and powerline would generate a lot of noise which will deter many animals from the area, or will curb the activity of those less able to move away, but in the long-term the operation of the pipeline and powerline would be of minimal disturbance to fauna. There is also the risk that construction would result in accidental spills of oil or chemicals and generate pollution. Amphibians in particular are very sensitive to such pollutants and should such pollution enter the breeding habitat the local amphibian population is highly likely to decline.

Cumulative Impacts: Loss of Landscape Connectivity and Impacts on Broad-Scale Ecological Processes

The increased level of transformation at the site and the presence of the linear infrastructure would potentially increase the level of habitat and population fragmentation in the area. This would reduce the connectivity of the landscape and impact on broad scale ecological processes such as dispersal and migration. Although the CBAs of natural vegetation remnants within the powerline sites are probably too small to support viable populations of many larger species, it may still play an important role as a refuge or habitat linkage between other larger intact vegetation fragments.

Transformation of intact habitat with CBAs could compromise the ecological functioning of the CBAs and would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

6.2 ASSESSMENT OF IMPACTS

Impacts associated with the different components of the development are assessed below for the construction, operational and decommissioning phases of the project, for each of the Power Line, Gas Pipeline and Power Plant.

6.2.1 TRANSMISSION LINE

Construction Phase Impacts

Construction Impact 1: Loss of habitat for fauna

Impact 1. Loss of habitat for fauna during construction

Nature: The construction phase will require the clearing of vegetation for the pylons, and possibly some access roads as well. The loss of some vegetation from the development footprint is an unavoidable consequence of the development. The construction of the overhead transmission line will result in some habitat loss for resident fauna. During the operational phase, interactions between the transmission line operation and fauna is likely to be very low and therefore this impact is assessed only for the construction phase.

Impact Magnitude – Low

- Extent: **On-site**, the extent of the impact will be limited to the development footprint. The footprint of the development in terms of direct habitat transformation is small in extent.
- Duration: The duration of the impact will be **medium to long-term** as the disturbed areas will take some time recover and the pylons will remain until the project is decommissioned.
- Intensity: Since this results in the total loss of habitat, particularly highly sensitive vegetation types (CBAs) and associated habitat in the powerline corridors, the intensity is seen to be **Moderate to High.**

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity high.

Likelihood: As this infrastructure is required for the operation and construction of the powerplant, this impact will **likely** (**definitely)** occur.

Impact Significance:

Pre-Mitigation: **Moderate (-ve)**
Post-Mitigation**: Minor (-ve)**

Degree of Confidence: High. Based on the project description, this impact will **definitely** occur.

Mitigation:

- Preconstruction walk-through of the power line route to ensure that the sensitive habitat features are avoided.
- Demarcate all areas to be cleared with construction tape or similar material.
- ECO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially in the vicinity of sensitive features.
- All vehicles to remain on demarcated roads and no driving in the veld should be allowed except where necessary along the power line route during construction when all vehicles should follow the same track.
- No fuelwood collection on site.
- No fires should be allowed on-site.

Construction Impact 2. Direct faunal impacts during construction

Impact 2. Direct Faunal Impacts Due To Construction Disturbance

Nature: Some slow-moving species (such as mole rats or blind snakes) may not be able to avoid the construction activities and might be killed. Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of increased human presence at the site.

Impact Magnitude - Small

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as long as construction is underway.
- Intensity: Activity and disturbance along the power line route and the associated clearing and construction will constitute a **Low to Moderate** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity medium.

Likelihood: There is a very high likelihood (**likely**) that this impact will occur in and around construction areas.

Impact Significance:

Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Definite. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- No activity should be allowed in the veld between sunset and sunrise.
- Any dangerous fauna (snakes, scorpions etc) that are encountered during construction should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- Holes and trenches should not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.
- If there is any part of the site that needs to be lit at night for security reasons, then this should be with low-UV emitting types which do not attract insects.

Construction Impact 3. Habitat Degradation for Fauna

Impact 3. Habitat Degradation for Fauna During Construction

Nature: During construction, increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present.

Impact Magnitude – Small/Low

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.

- Intensity: Activity and disturbance along the power line route and the associated clearing and construction will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity medium.

Likelihood: There is a very high likelihood that this impact will occur in and around construction areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Definite. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld.
- No activity should be allowed in the veld between sunset and sunrise.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Decommissioning Phase Impacts

Decommissioning Impact 1. Direct faunal impacts during decommissioning

Impact 1. Direct Faunal Impacts Due To Decommissioning Disturbance

Nature: Some slow-moving species may not be able to avoid the decommissioning activities and might be killed.

Impact Magnitude - Low

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.
- Intensity: Activity and disturbance associated with decommissioning will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity Low.

Likelihood: There is a low likelihood that this impact will occur in and around decommissioning areas.

Impact Significance:
Pre-Mitigation: **Negigible (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable/likely. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Any individuals of protected species observed within the development footprint should be translocated under the supervision of the ECO.
- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- No activity should be allowed in the veld between sunset and sunrise.
- Any dangerous fauna (snakes, scorpions etc) that are encountered should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- Holes and trenches should not be left open for extended periods of time and should only be dug when needed. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.

Decommissioning Impact 2. Habitat Degradation for Fauna

Impact 2. Habitat Degradation for Fauna During Decommissioning

Nature: Increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat temporarily during decommissioning. Sensitive and shy fauna are likely to move away.

Impact Magnitude - Moderate

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as decommissioning is underway.
- Intensity: Activity and disturbance associated with clearing and decommissioning will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be medium and the sensitivity low.

Likelihood: There is a high likelihood **(likely)** that this impact will occur in and around decommissioning areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld.
- No activity should be allowed in the veld between sunset and sunrise.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- All hazardous materials and waste should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

6.2.2 GAS PIPELINE

The major impacts identified above are assessed below for the linear infrastructure of the proposed development, specifically the gas pipeline, during the construction, operational and decommissioning phases of the project.

Construction Phase Impacts

Construction Impact 1: Loss of habitat for fauna

Impact 1. Loss of habitat for fauna during construction

Nature: The construction phase will require the clearing of vegetation for the pipeline. The loss of some vegetation from the development footprint is an unavoidable consequence of the development. The construction of the gas pipeline will result in some habitat loss for resident fauna. During the operational phase, however, interactions between the pipeline infrastructure considered here and fauna is likely to be very low and therefore this impact is assessed only for the construction phase.

Impact Magnitude – Low

- Extent: **On-site**, the extent of the impact will be limited to the development footprint. The footprint of the development in terms of direct habitat transformation is small in extent. The pipeline follows an existing disturbed route for the most part.
- Duration: The duration of the impact will be **medium to long-term** as the disturbed areas will take some time recover and the gas pipeline will remain until the project is decommissioned.
- Intensity: Since this results in the loss of habitat, the intensity is seen to be **Moderate.**

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity medium.

Likelihood: As this infrastructure is required for the operation and construction of the powerplant, this impact will **likely** (**definitely)** occur.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation**: Negligible (-ve)**

Degree of Confidence: High. Based on the project description, this impact will **definitely** occur.

Mitigation:

- Preconstruction walk-through of the pipeline route to ensure that the sensitive habitat features are avoided.
- Demarcate all areas to be cleared with construction tape or similar material.
- ECO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially in the vicinity of sensitive features.
- All vehicles to remain on demarcated roads and no driving in the veld should be allowed except where necessary along the pipeline route during construction when all vehicles should follow the same track.
- No fuelwood collection on site.
- No fires should be allowed on-site.

Construction Impact 2. Direct faunal impacts during construction

Impact 2. Direct Faunal Impacts Due To Construction Disturbance

Nature: Some slow-moving species (such as mole rats or blind snakes) may not be able to avoid the construction activities and might be killed. Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of increased human presence at the site.

Impact Magnitude - Small

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as long as construction is underway.
- Intensity: Activity and disturbance along the pipe line route and the associated clearing and construction will constitute a **Low to Moderate** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity medium.

Likelihood: There is a very high likelihood (**likely**) that this impact will occur in and around construction areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Definite. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- No activity should be allowed in the veld between sunset and sunrise.
- Any dangerous fauna (snakes, scorpions etc) that are encountered during construction should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.

- Holes and trenches should not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.
- If there is any part of the site that needs to be lit at night for security reasons, then this should be with low-UV emitting types which do not attract insects.

Construction Impact 3. Habitat Degradation for Fauna

Impact 3. Habitat Degradation for Fauna During Construction

Nature: During construction, increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present.

Impact Magnitude – Small/Low

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.
- Intensity: Activity and disturbance along the pipe line route and the associated clearing and construction will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity medium.

Likelihood: There is a very high likelihood that this impact will occur in and around construction areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Definite. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld.
- No activity should be allowed in the veld between sunset and sunrise.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.

- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Decommissioning Phase Impacts

Decommissioning Impact 1. Direct faunal impacts during decommissioning

Impact 1. Direct Faunal Impacts Due To Decommissioning Disturbance

Nature: Some slow-moving species may not be able to avoid the decommissioning activities and might be killed.

Impact Magnitude - Low

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.
- Intensity: Activity and disturbance associated with the decommissioning will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity Low.

Likelihood: There is a low likelihood that this impact will occur in and around decommissioning areas.

Impact Significance:
Pre-Mitigation: **Negigible (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable/likely. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Any individuals of protected species observed within the development footprint should be translocated under the supervision of the ECO.
- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.

- No activity should be allowed in the veld between sunset and sunrise.
- Any dangerous fauna (snakes, scorpions etc) that are encountered should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- Holes and trenches should not be left open for extended periods of time and should only be dug when needed. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.

Decommissioning Impact 2. Habitat Degradation for Fauna

Impact 2. Habitat Degradation for Fauna During Decommissioning

Nature: Increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat temporarily during decommissioning. Sensitive and shy fauna are likely to move away.

Impact Magnitude - Moderate

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as decommissioning is underway.
- Intensity: Activity and disturbance along the pipe line route and the associated clearing and decommissioning will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be medium and the sensitivity low.

Likelihood: There is a high likelihood **(likely)** that this impact will occur in and around construction areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld.
- No activity should be allowed in the veld between sunset and sunrise.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- All hazardous materials and waste should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

6.2.3 GAS-FIRED POWER PLANT

The major impacts identified above are assessed below for the proposed gas-fired power plant during the construction, operational and decommissioning phases of the project.

Construction Phase Impacts

Construction Impact 1: Loss of habitat for fauna

Impact 1. Loss of habitat for fauna during construction

Nature: The construction phase will require the clearing of vegetation for the power plant. The loss of some vegetation from the development footprint is an unavoidable consequence of the development. The construction of the power plant will result in some habitat loss for resident fauna.

Impact Magnitude – Moderate

- Extent: **Local**, the extent of the impact will be limited to the development footprint and near surroundings. The footprint of the development in terms of direct habitat transformation is fairly local in extent.
- Duration: The duration of the impact will be **medium to long-term** as the disturbed areas will take some time recover and the plant will remain until the project is decommissioned.
- Intensity: Since this results in the total loss of habitat, the intensity is seen to be **Moderate.**

The magnitude of the pre-mitigation impact is assessed to be moderate/medium and the sensitivity medium.

Likelihood: As this infrastructure is required for the operation and construction of the powerplant, this impact will **definitely** occur.

Impact Significance:

Pre-Mitigation: **Moderate (-ve)**

Post-Mitigation**: Minor (-ve)**

Degree of Confidence: High. Based on the project description, this impact will **definitely** occur.

Mitigation:

- Sensitive habitat features should be avoided.
- Demarcate all areas to be cleared with construction tape or similar material.
- ECO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially in the vicinity of sensitive features.
- All vehicles to remain on demarcated roads and no driving in the veld should be allowed except where necessary during construction when all vehicles should follow the same track.
- No fires should be allowed on-site.

Construction Impact 2. Direct faunal impacts during construction

Impact 2. Direct Faunal Impacts Due To Construction Disturbance

Nature: Some slow-moving species (such as mole rats or blind snakes) may not be able to avoid the construction activities and might be killed. Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of increased human presence at the site.

Impact Magnitude – Minor/Medium

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.
- Intensity: Activity and disturbance at the power plant site and the associated clearing and construction will constitute a **Low to Moderate** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be medium and the sensitivity medium.
Likelihood: There is a very high likelihood that this impact will occur in and around construction areas.

Impact Significance:
Pre-Mitigation: **Moderate (-ve)**
Post-Mitigation: **Minor (-ve)**

Degree of Confidence: Definite. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- Any dangerous fauna (snakes, scorpions etc) that are encountered during construction should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- Holes and trenches should not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.
- If there is any part of the site that needs to be lit at night for security reasons, then this should be with low-UV emitting types which do not attract insects.

Construction Impact 3. Habitat Degradation for Fauna

Impact 3. Habitat Degradation for Fauna During Construction

Nature: During construction, increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present.

Impact Magnitude - Low

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.
- Intensity: Activity and disturbance and the associated clearing and construction will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be Low and the sensitivity low.

Likelihood: There is a high likelihood that this impact will occur in and around construction areas.

Impact Significance:

Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Definite. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Operational Phase Impacts

Operational Impact 1. Direct faunal impacts during operation

Impact 1. Direct Faunal Impacts During Operation

Nature: Some slow-moving species may not be able to avoid the operational activities and might be killed. However most fauna will have migrated away from the site during the construction phase.

Impact Magnitude – Low

- Extent: **On-site**, the extent of the impact will be limited to the site.
- Duration: The duration of the impact will be **medium term** as long as the facility is operating.
- Intensity: Activity and disturbance during operation of the plant will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be Low and the sensitivity Low.

Likelihood: There are likely to be a few impacts on fauna during operation.

Impact Significance:
Pre-Mitigation: **Negligible (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Definite/likely. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld around the site.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- Any dangerous fauna (snakes, scorpions etc) that are encountered should not be handled or molested by the operation staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.

Operation Impact 2. Habitat Degradation for Fauna

Impact 2. Habitat Degradation for Fauna During Operation

Nature: Increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat on an ongoing basis during operation.

Impact Magnitude - Low

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **medium term**
- Intensity: Activity and disturbance at the power plant site will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be small/low and the sensitivity low.

Likelihood: There is a likelihood that this impact will occur in and around the facility's vicinity.

Impact Significance:
Pre-Mitigation: **Negligible (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld around the site.
- All hazardous materials and waste should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

Decommissioning Phase Impacts

Decommissioning Impact 1. Direct faunal impacts during decommissioning

Impact 1. Direct Faunal Impacts Due To Decommissioning Disturbance

Nature: Some slow-moving species may not be able to avoid the decommissioning activities and might be killed.

Impact Magnitude – Medium

- Extent: **On-site**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as decommissioning is underway.
- Intensity: Activity and disturbance at the power plant and the associated clearing and decommissioning will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be medium and the sensitivity low.

Likelihood: There is a high likelihood that this impact will occur in and around decommissioning areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Any individuals of protected species observed within the development footprint should be translocated under the supervision of the ECO.
- All vehicles at the site should adhere to a low speed limit to avoid collisions with fauna such as tortoises.
- Personnel should not be allowed to roam into the veld.

- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- Any dangerous fauna (snakes, scorpions etc) that are encountered should not be handled or molested by the construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- Holes and trenches should not be left open for extended periods of time and should only be dug when needed. Trenches that may stand open for some days, should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape.

Decommissioning Impact 2. Habitat Degradation for Fauna

Impact 2. Habitat Degradation for Fauna During Decommissioning

Nature: Increased levels of noise, pollution, disturbance and human presence will degrade faunal habitat temporarily during decommissioning. Sensitive and shy fauna are likely to move away.

Impact Magnitude - Medium

- Extent: **Local**, the extent of the impact will be limited to the site and near surroundings.
- Duration: The duration of the impact will be **short term** or as along as construction is underway.
- Intensity: Activity and disturbance associated with the decommissioning activity will constitute a **Low** disturbance intensity.

The magnitude of the pre-mitigation impact is assessed to be Medium and the sensitivity low.

Likelihood: There is a very high likelihood that this impact will occur in and around construction areas.

Impact Significance:
Pre-Mitigation: **Minor (-ve)**
Post-Mitigation: **Negligible (-ve)**

Degree of Confidence: Probable. Based on the project description, this impact will occur to a greater or lesser extent.

Mitigation:

- Personnel should not be allowed to roam into the veld.
- No litter, food or other foreign material should be thrown or left around the site and should be placed in demarcated and fenced rubbish and litter areas.
- All hazardous materials and waste should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.

6.2.4 Cumulative Impact

Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. The Project will be located on ArcelorMittal property adjacent to the existing Saldanha Steel plant, and is located within an area identified for industrial development according to the Saldanha Bay Municipal Spatial Development Framework and as such, the area has already experienced high levels of disturbance and degradation due to industry as well as past and present agricultural practises in the surrounding areas. Future proposed developments are detailed below and will contribute to the cumulative impacts on fauna in the study area and broader impact zone of the development. These developments include:

- The IDZ development;
- Afrisam Cement Plant;
- LPG storage facilities – Sunrise and Avidia;
- Vredenburg Industrial Development
  - Frontier Separation Plant
  - Chlor-Alkali Facility
- Desalination plant; and
- One additional 1 000 MW gas-fired power plant.

Impact Nature

The cumulative impact of all development in the study area and surrounds is likely to impact on fauna through increased habitat loss and fragmentation. Habitat fragmentation can result in the disruption of ecological corridors which aid in faunal dispersal, ensure ecosystem resilience, maintain population connectivity and provide refuge areas.

	Pre-Mitigation							
Impact	**Nature**	**Extent**	**Duration**	**Intensity**	**Pro-bability**	**Reversi-bility**	**Irreplace-ability**	**Significance**
Cumulative Impacts	Negative	Regional	Long term	Medium-High	Probable	Low	Low	Moderate
	Post Mitigation							
Impact	**Nature**	**Extent**	**Duration**	**Intensity**	**Pro-bability**	**Reversi-bility**	**Irreplace-ability**	**Significance**
Cumulative Impacts	Negative	Regional	Long term	Medium-Low	Probable	Medium	Low	Minor

Mitigation

Each present and future development will impact on fauna in a different way and in order to ensure the cumulative impacts of the various developments do not exponentially impact on fauna, each development in isolation should abide by the prescribed mitigation measures set by the specialist working on the impact assessment. Therefore future developments in the area should incorporate existing landscape-scale mitigation measures into their cumulative impact assessments.

In the long-term the vegetation remnants and habitats in the area are likely to come under increasing pressure and the area of Saldanha Bay Municipal Spatial Development Framework would benefit from an integrated biodiversity and development management plan which manages cumulative impacts. Strategically, the Saldanha Bay authorities should maintain corridors of remnant natural vegetation in the landscape which new developments must avoid and which would provide for increased ecosystem resilience.

The main impacts on fauna from the project are likely to result from noise and physical disturbance during the construction phase, but will be predominantly be local in nature and would thus not be of broader significance. The major impact from a cumulative perspective is the ongoing loss of landscape corridors, which provide connectivity to fragmented faunal habitat and also allow for movement of wildlife when dispersing or under times of stress, such as droughts. Disturbance and vegetation clearing should therefore be kept to a minimum at all developments and, in order to prevent future loss of habitat, the invasion of alien plant species should be controlled on a regular basis.

The proposed development would, however, contribute to a relatively small disruption of habitat loss of fauna across the greater landscape, as the footprint is relatively low. Provided the mitigation measures in the report are implemented, there would not be high impacts on a cumulative scale. As such, the cumulative impact of this development is considered to have a moderate significance without mitigation, and a minor significance if all proposed developments abide by the various mitigation measures prescribed by the respective specialists.

Key mitigation measures which must be impletmented by Project are:

- Ensure that sensitive habitats are avoided and that species of conservation concern can be translocated where they cannot be avoided.
- Minimise the development footprint as far as possible.
- Stringent construction-phase monitoring of activities at the site to ensure that mitigation measures are adhered to and that the overall ecological impact of the development is maintained at a low level.
- The use of structures which may inhibit movement of fauna, such as mesh and electric fencing should be avoided.

CONCLUSIONS

The proposed ArcelorMittal CCGT power plant, power line and 4.6 km underground pipeline to the Port of Saldanha has been assessed to have little long-term impact on the fauna of the wider area, especially after mitigation, and as such, is considered to have acceptable levels of impact overall.

Summary Assessment

The summary assessment for the Saldanha Steel Gas-fire plant and associated infrastructure is provided below. All of the impacts assessed can be reduced to a low level through mitigation and there are no impacts present which are likely to represent a red-flag for the development. The main contributing factors to the low post-mitigation impact assessment is the relatively small extent of the development, its main footprint being on degraded vegetation/habitat and the low number of sensitive faunal species in the vicinity.

Table 1. Summary assessment of the pre- and post-mitigation impacts associated with the construction, operation and decommissioning phases of the project.

Phase & Impact	Before Mitigation	Post Mitigation
Powerline		
Construction		
Loss of habitat for fauna during construction	Moderate (-ve)	Minor (-ve)
Direct Faunal Impacts Due To Construction Disturbance	Minor (-ve)	Negligible (-ve)
Habitat Degradation for Fauna During Construction.	Minor (-ve)	Negligible (-ve)

Decommissioning		
Direct faunal impacts during decommissioning	Negligible (-ve)	Negligible (-ve)
Habitat Degradation for Fauna During Decommissioning	Minor (-ve)	Negligible (-ve)
Gas Pipeline		
Construction		
Loss of habitat for fauna during construction	Minor (-ve)	Negligible (-ve)
Direct Faunal Impacts Due To Construction Disturbance	Minor (-ve)	Negligible (-ve)
Habitat Degradation for Fauna During Construction.	Minor (-ve)	Negligible (-ve)
Decommissioning		
Direct faunal impacts during decommissioning	Negligible (-ve)	Negligible (-ve)
Habitat Degradation for Fauna During Decommissioning	Minor (-ve)	Negligible (-ve)
Power Plant		
Construction		
Loss of habitat for fauna during construction	Moderate (-ve)	Minor (-ve)
Direct Faunal Impacts Due To Construction Disturbance	Moderate (-ve)	Minor (-ve)
Habitat Degradation for Fauna During Construction.	Minor (-ve)	Negligible (-ve)
Operation		
Direct Faunal Impacts During Operation	Negligible (-ve)	Negligible (-ve)
Habitat Degradation for Fauna During Operation	Negligible (-ve)	Negligible (-ve)
Decommissioning		
Direct Faunal Impacts Due To Decommissioning	Minor (-ve)	Negligible (-ve)
Cumulative Impact		
Impact on critical biodiversity areas and broad-scale ecological processes	Negligible (-ve)	Negligible (-ve)

7 CONCLUSION & RECOMMENDATIONS

The development would have a significant but local negative impact on the local environment if not constructed in a sensitive manner. In particular the further loss of intact vegetation within the CBAs associated with the powerline to the east should be avoided as much as possible. This area is ecologically sensitive and represents habitat that considered important enough to qualify as a Critical Biodiversity Area and is also an example of an

ecosystem listed under the National List of Threatened Ecosystems (2011). There were however no specific areas or habitats within the site that were identified as being of particular importance for fauna. The current level of faunal activity at the site is fairly low given the degraded nature of the power plant site but the site still retains some degree of ecological function. In addition, the presence of larger mammals such as Steenbok and Porcupine suggest that the power plant site forms part of a larger habitat network in the area and still plays a role in the broader scale connectivity of the landscape. Although a number of listed fauna are known to occur in the area, the probability that any of them occur within the site is relatively low and it is even less likely that the site represents an important habitat location for any of them.

It is unlikely that the development of the Saldanha Gas-Fired Power Plant and associated infrastructure would result in the significant impact on fauna and habitats at the site. The extent of the development is low and the area is already degraded and overgrazed in context of the surrounding landscape. The primary goal of mitigation at the site should focus first on avoidance of the sensitive receptors at the site, and then minimising the footprint and impact of the construction process and long-term operation. The main impacts on fauna are likely to result from noise and physical disturbance during the construction phase and pollution and vehicular disturbance during the operation of the road, but are likely to be local in nature and would not be of broader significance.

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9 ANNEX 1. LIST OF MAMMALS

List of mammals which are likely to occur in the broad vicinity of the Saldanha Steel Gas-Fired Plant. Habitat notes and distribution records are based on Skinner & Chimimba (2005), while conservation status is from the IUCN Red Lists 2013.

Scientific Name	Common Name	Status	Habitat	Saldahna
Afrosoricida (Golden Moles):				
Chrysochloris asiatica	Cape Golden Mole	LC	Coastal parts of the Northern and Western Cape	Confirmed
Macroscledidea (Elephant Shrews):				
Macroscelides proboscideus	Round-eared Elephant Shrew	LC	Species of open country, with preference for shrub bush and sparse grass cover, also occur on hard gravel plains with sparse boulders for shelter, and on loose sandy soil provided there is some bush cover	High
Elephantulus myurus	Eastern Rock Elephant Shrew	LC	Confined to rocky koppies and piles of boulders	Low
Tubulentata:				
Orycteropus afer	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	Low
Hyracoidea (Hyraxes)				
Procavia capensis	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	Low
Lagomorpha (Hares and Rabbits):				
Pronolagus rupestris	Smith's Red Rock Rabbit	LC	Confined to areas of krantzes, rocky hillsides, boulder-strewn koppies and rocky ravines	Low
Lepus capensis	Cape Hare	LC	Dry, open regions, with palatable bush and grass	High
Lepus saxatilis	Scrub Hare	LC	Common in agriculturally developed areas, especially in crop-growing areas or in fallow	High

			lands where there is some bush development.	
Rodentia (Rodents):				
Bathyergus suillus	Cape Dune Mole Rat	LC	Restricted to sandy habitats along the coast or alluvial sand	Confirmed
Cryptomys hottentotus	African Mole Rat	LC	Wide diversity of substrates, from sandy soils to heavier compact substrates such as decomposed schists and stony soils	High
Georychus capensis	Cape Mole Rat	LC	Sandy soils, in coastal dunes, in sandy alluvium along river systems and montane regions of the Western Cape	High
Hystrix africaeaustralis	Cape Porcupine	LC	Catholic in habitat requirements.	Confirmed
Graphiurus ocularis	Spectacled Dormouse	LC	Associated with sandstones of Cape Fold mountains, which have many vertical and horizontal crevices.	Low
Acomys subspinosus	Cape Spiny Mouse	LC	Assocaited with rocky areas on mountain slopes in Fynbos	Low
Rhabdomys pumilio	Four-striped Grass Mouse	LC	Essentially a grassland species, occurs in wide variety of habitats where there is good grass cover.	Confirmed
Mus minutoides	Pygmy Mouse	LC	Wide habitat tolerance	High
Myomyscus verreauxii	Verreaux's Mouse	LC	Scrub on grassy hillsides and riverine forest	High
Aethomys namaquensis	Namaqua Rock Mouse	LC	Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	Low
Otomys irroratus	Vlei Rat	LC	Abundant in habitats associated with damp soil in vleis or along streams and rivers.	High
Otomys unisulcatus	Bush Vlei Rat	LC	Shrub and fynbos associations in areas with rocky outcrops Tend to avoid damp situations but exploit the semi-arid Karoo through behavioural adaptation.	Confirmed
Gerbillurus paeba	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium	High

			with a grass, scrub or light woodland cover	
Gerbilliscus afra	Cape Gerbil	LC	Confined to areas of loose, sandy soils of sandy alluvium. Common on cultivated lands.	Confirmed
Mystromys albicaudatus	White-tailed Mouse	EN	Variable vegetation, but live in cracks or burrows in the soil	Low
Malacothrix typica	Gerbil Mouse	LC	Found predominantly in Nama and Succulent Karoo biomes, in areas with a mean annual rainfall of 150-500 mm.	Low
Dendromus melanotis	Grey Climbing Mouse	LC	Often associated with stands of tall grass especially if thickened with bushes and other vegetation	High
Steatomys krebsii	Krebs's Fat Mouse	LC	Prefer a sandy substrate.	High
Primates:				
Papio ursinus	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	Low
Eulipotyphla (Shrews):				
Myosorex varius	Forest Shrew	LC	Prefers moist, densely vegetated habitat	Low
Suncus varilla	Lesser Dwarf Shrew	LC	Often associated with termitaria, little else known	High
Crocidura cyanea	Reddish-Grey Musk Shrew	LC	Occurs in relatively dry terrain, with a mean annual rainfall of less than 500 mm. Occur in karroid scrub and in fynbos often in association with rocks.	Low
Crocidura flavescens	Greater Red Musk Shrew	LC	Wide habitat tolerance	Low
Carnivora:				
Proteles cristata	Aardwolf	LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	Low
Caracal caracal	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	Low
Felis silvestris	African Wild Cat	LC	Wide habitat tolerance.	High

Genetta genetta	Small-spotted genet	LC	Occur in open arid associations	High
Genetta tigrina	Large-spotted genet	LC	Fynbos and savanna particularly along riverine areas	High
Suricata suricatta	Meerkat	LC	Open arid country where substrate is hard and stony. Occur in Nama and Succulent Karoo but also fynbos	Low
Cynictis penicillata	Yellow Mongoose	LC	Semi-arid country on a sandy substrate	High
Herpestes pulverulentus	Cape Grey Mongoose	LC	Wide habitat tolerance	Confirmed
Atilax paludinosus	Marsh Mongoose	LC	Associated with well-watered terrain, living in close association with rivers, streams, marshes, etc.	High
Vulpes chama	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	Low
Canis mesomelas	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	Low
Otocyon megalotis	Bat-eared Fox	LC	Open country with mean annual rainfall of 100-600 mm	High
Aonyx capensis	African Clawless Otter	LC	Predominantly aquatic and do not occur far from permanenet water	Low
Ictonyx striatus	Striped Polecat	LC	Widely distributed throughout the sub-region	High
Mellivora capensis	Ratel/Honey Badger	IUCN LC/SA RDB EN	Catholic habitat requirements	Low
Rumanantia (Antelope):				
Sylvicapra grimmia	Common Duiker	LC	Presence of bushes is essential	High
Pelea capreolus	Grey Rhebok	LC	Associated with rocky hills, rocky mountainsides, mountain plateaux with good grass cover.	Low
Raphicerus	Steenbok	LC	Inhabits open country,	Confirmed

campestris				
Raphicerus melanotis	Cape Grysbok	LC	Thick scrub bush, particularly along the lower levels of hills	Low
Oreotragus oreotragus	Klipspringer	LC	Closely confined to rocky habitat.	Low

10 ANNEX 2. LIST OF REPTILES

List of reptiles which are likely to occur in the vicinity of the Sadanha Steel Gas-fired plant, according to the SARCA database.

Family	Genus	Species	Subspecies	Common name	Red list category
Chamaeleonidae	*Bradypodion*	*occidentale*		Western Dwarf Chameleon	Least Concern
Gekkonidae	*Afrogecko*	*porphyreus*		Marbled Leaf-toed Gecko	Least Concern
Gekkonidae	*Chondrodactylus*	*bibronii*		Bibron's Gecko	Least Concern
Gekkonidae	*Goggia*	*lineata*		Striped Pygmy Gecko	Least Concern
Gekkonidae	*Pachydactylus*	*austeni*		Austen's Gecko	Least Concern
Gekkonidae	*Pachydactylus*	*geitje*		Ocellated Gecko	Least Concern
Agamidae	*Agama*	*hispida*		Spiny Ground Agama	Least Concern
Cordylidae	*Chamaesaura*	*anguina*	*anguina*	Cape Grass Lizard	Least Concern
Cordylidae	*Cordylus*	*cordylus*		Cape Girdled Lizard	Least Concern
Cordylidae	*Cordylus*	*macropholis*		Large-scaled Girdled Lizard	Near Threatened
Cordylidae	*Cordylus*	*niger*		Black Girdled Lizard	Near Threatened
Cordylidae	*Karusasaurus*	*polyzonus*		Karoo Girdled Lizard	Least Concern
Gerrhosauridae	*Tetradactylus*	*seps*		Short-legged Seps	Least Concern
Lacertidae	*Meroles*	*knoxii*		Knox's Desert Lizard	Least Concern
Scincidae	*Acontias*	*grayi*		Gray's Dwarf Legless Skink	Least Concern

Scincidae	*Acontias*	*meleagris*		Cape Legless Skink	Least Concern
Scincidae	*Microacontias*	*lineatus*		Striped Dwarf Legless Skink	Not listed
Scincidae	*Scelotes*	*bipes*		Silvery Dwarf Burrowing Skink	Least Concern
Scincidae	*Scelotes*	*gronovii*		Gronovi's Dwarf Burrowing Skink	Near Threatened
Scincidae	*Scelotes*	*kasneri*		Kasner's Dwarf Burrowing Skink	Near Threatened
Scincidae	*Scelotes*	*montispectus*		Bloubergstrand Dwarf Burrowing Skink	Near Threatened
Scincidae	*Trachylepis*	*capensis*		Cape Skink	Least Concern
Scincidae	*Trachylepis*	*homalocephala*		Red-sided Skink	Least Concern
Scincidae	*Trachylepis*	*variegata*		Variegated Skink	Least Concern
Scincidae	*Typhlosaurus*	*caecus*		Southern Blind Legless Skink	Least Concern
Atractaspididae	*Homoroselaps*	*lacteus*		Spotted Harlequin Snake	Least Concern
Colubridae	*Crotaphopeltis*	*hotamboeia*		Red-lipped Snake	Least Concern
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Least Concern
Colubridae	*Dispholidus*	*typus*	*typus*	Boomslang	Least Concern
Colubridae	*Duberria*	*lutrix*	*lutrix*	South African Slug-eater	Least Concern

Colubridae	*Lamprophis*	*aurora*		Aurora House Snake	Least Concern
Colubridae	*Lamprophis*	*guttatus*		Spotted House Snake	Least Concern
Colubridae	*Lycodonomorphus*	*inornatus*		Olive House Snake	Least Concern
Colubridae	*Lycodonomorphus*	*rufulus*		Brown Water Snake	Least Concern
Colubridae	*Psammophis*	*crucifer*		Cross-marked Grass Snake	Least Concern
Colubridae	*Psammophis*	*leightoni*		Cape Sand Snake	Least Concern
Colubridae	*Psammophis*	*notostictus*		Karoo Sand Snake	Least Concern
Colubridae	*Psammophylax*	*rhombeatus*	*rhombeatus*	Spotted Grass Snake	Least Concern
Colubridae	*Pseudaspis*	*cana*		Mole Snake	Least Concern
Elapidae	*Naja*	*nivea*		Cape Cobra	Least Concern
Leptotyphlopidae	*Leptotyphlops*	*nigricans*		Black Thread Snake	Least Concern
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Least Concern
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Least Concern
Pelomedusidae	*Pelomedusa*	*subrufa*		Marsh Terrapin	Least Concern
Testudinidae	*Chersina*	*angulata*		Angulate Tortoise	Least Concern

11 ANNEX 3. LIST OF AMPHIBIANS

List of amphibians which are likely to occur at the proposed Saldanha Steel Gas-fired plant site. Habitat notes and distribution records are based on Du Preez and Carruthers (2009), while conservation status is from the IUCN Red Lists 2013.

Scientific Name	Common Name	Status	Habitat	Distribution	Saldahna
Breviceps rosei rosei	Sand Rain Frog	Not Threatened	Well vegetated low-lying sandy areas in coastal lowlands	Endemic	High
Breviceps namaquensis	Namaqua Rain Frog	Not Threatened	Arid sandy habitats from the coast to inland mountains	Endemic	Low
Vandijkophrynus angusticeps	Cape Sand Toad	Not Threatened	Temporary rain-filled depressions in sandy soils	Endemic	High
Xenopus laevis	Common Platanna	Not Threatened	Any more or less permanent water	Widespread	High
Cacosternum capense	Cape Caco	Vulnerable	Restricted to low lying flat or gently undulating areas with poorly drained clay or loamy soils	Endemic	Low
Amietia fuscigula	Cape River Frog	Not Threatened	Large still bodies of water or permanent streams and rivers.	Widespread	High
Strongylopus grayii	Clicking Stream Frog	Not Threatened	Winter and summer rainfall areas in the fynbos, Succulent and Nama Karoo	Widespread	High
Tomopterna delalandii	Cape Sand Frog	Not Threatened	Lowlands in fynbos and Succulent Karoo	Endemic	High

Short CV/Summary of Expertise – Simon Todd

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Ecological Solutions for People & the Environment

- Profession: Independent Ecological Consultant - Pr.Sci.Nat 400425/11
- Specialisation: Plant & Animal Ecology
- Years of Experience: 18 Years

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute
- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town
- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.

General Experience & Expertise

- Conducted a large number of fauna and flora specialist assessments distributed widely across South Africa. Projects have ranged in extent from <50 ha to more than 50 000 ha.

- Widely-recognized ecology specialist. Published numerous peer-reviewed scientific publications based on various ecological studies across the country. Past chairman of the Arid Zone Ecology Forum and current executive committee member.
- Extensive experience in the field and exceptional level of technical expertise, particularly with regards to GIS capabilities which is essential with regards to producing high-quality sensitivity maps for use in the design of final project layouts.
- Strong research background which has proved invaluable when working on several ecologically sensitive and potentially controversial sites containing some of the most threatened fauna in South Africa.
- Published numerous research reports as well as two book chapters and a large number of papers in leading scientific journals dealing primarily with human impacts on the vegetation and ecology of the arid and semi-arid parts of South Africa.
- Maintain several long-term vegetation monitoring projects distributed across Namaqualand and the karoo.
- Guest lecturer at two universities and have also served as an external examiner.
- Reviewed papers for more than 10 international ecological journals.
- Past chairman and current committee member of the Arid Zone Ecological Forum.
- SACNASP registered as a Professional Natural Scientist, (Ecology) No. 400425/11.

A selection of recent work is as follows:

Specialist Assessments:

Solar Energy Developments:

Environmental Impact Assessment for the Proposed Wolmarransstad Solar Energy Facility North West Province. Fauna & Flora Specialist Report for EIA. Savannah Environmental 2015

Environmental Impact Assessment for the proposed Humansrus Solar PV Energy Facility 1 Near Copperton, Northern Cape: Fauna & Flora Specialist Report for EIA. CapeEAPrac 2015.

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environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for environmental authorisation National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Specialist:	Simon Todd Consulting		
Contact person:	Simon Todd		
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Project Consultant:	Environmental Resources Management		
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4.2 The specialist appointed in terms of the Regulations_

I, Simon Todd , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Simon Todd Consulting

Name of company (if applicable):

20 July 2016

Date:

NICK HELME BOTANICAL SURVEYS
PO Box 22652 Scarborough 7975
Ph: 021 780 1420 cell: 082 82 38350 email: botaneek@iafrica.com
Pri.Sci.Nat # 400045/08

BOTANICAL IMPACT ASSESSMENT OF PROPOSED ARCELOR MITTAL GAS FIRED POWER PLANT, PIPELINE AND POWER TRANSMISSION ROUTES, SALDANHA, WESTERN CAPE.

Compiled for: ERM Southern Africa (Pty) Ltd, Cape Town

Client: Arcelor Mittal (Pty) Ltd

2 September 2016

Draft: 28 June 2016

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own, notwithstanding the fact that I have received fair remuneration from the client for preparation of this report.

NA Helme

Abridged CV:

Contact details as per letterhead.
Surname : HELME
First names : NICHOLAS ALEXANDER
Date of birth : 29 January 1969
University of Cape Town, South Africa. BSc (Honours) – Botany (Ecology & Systematics). 1990.
SACNASP Registration No: 400045/08 (Pri.Sci.Nat)
BEE Level Four Contributor BE # 1915.

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-western Cape. Since the end of 2001 I have been working on my own and trade as Nick Helme Botanical Surveys, and have undertaken at least 900 site assessments during this period.

A selection of relevant work undertaken over the last few years is as follows:

- Botanical site screening for proposed Sasol power station, Saldanha (ERM 2015)
- Botanical site screening for proposed Globeleq power station, Saldanha (ERM 2015)
- Botanical site screening for proposed Arcelor Mittal power station, Saldanha (ERM 2015)
- Botanical assessment of Langebaan transfer station and landfill area (AECOM 2015)

- Botanical assessment of proposed overnight facilities at Klein Mooimaak, West Coast National Park (SANParks 2015)
- Ecological Assessment for proposed Frontier Minerals Separation Plant, Saldanha (Sedex 2014)
- Botanical assessment of proposed Elandsfontein phosphate mine east of Langebaan (Braaf Environmental 2014)
- Botanical assessment for proposed LNG terminal, Saldanha (PetroSA 2014)
- Botanical Scoping study for proposed Saldanha Municipality Desalination Project (CSIR 2012)
- Botanical inputs into proposed Saldanha IDZ (MEGA 2011)
- Botanical Assessment of site on SAS Saldanha (Footprint Environmental 2011)
- Fatal Flaw Analysis of Ptn of Ptn 16 of Pienaarspoort 197, Saldanha (MOGS 2011)
- Scoping study of proposed Wind Energy Facility near Britannia Bay (Savannah Environmental 2010)
- Scoping and Impact Assessment study of proposed Wind Energy Facility at Rheboksfontein, Darling (Savannah Environmental 2010)
- Scoping and Impact Assessment study of proposed Wind Energy Facility near Vredenburg (Savannah Environmental 2010)
- Scoping and Impact Assessment of proposed Wind Energy Facility near Hopefield (Savannah Environmental 2008 & 2009)
- Botanical Scoping and Impact Assessment of proposed St Helena Hills development (DJ Environmental 2009)
- Botanical Impact Assessment of Portion 4 of Farm 560, Yzerfontein (EnviroLogic 2009)
- Botanical Impact Assessment of Portion 9 of Farm 957, Saldanha (EnviroLogic 2008)
- Botanical Sensitivity study of Portion 4 of Farm Yzerfontein 560 (De Villiers family 2008)
- Botanical Scoping and Impact Assessment of proposed overnight sites in the West Coast National Park (SANParks 2008 & 2010)
- Botanical Impact Assessment of proposed development on Portion 87 of the Farm Witteklip 123, Vredenburg (CCA Environmental 2008)
- Fine Scale Vegetation Mapping and Conservation Planning for Saldanha Municipality (CapeNature & SANBI, 2006 - 2007)

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	Cross-reference in this report (page)
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	ii
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	ii
(c) an indication of the scope of, and the purpose for which, the report was prepared;	3
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	3
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	11
(g) an identification of any areas to be avoided, including buffers;	11-13
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	13
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	11-18
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	17
(p) any other information requested by the competent authority.	17

TABLE OF CONTENTS

1. INTRODUCTION

This botanical impact assessment was commissioned in order to help inform the planning and environmental authorisation process being undertaken for a proposed gas fired power station in the Saldanha area, in the Western Cape. A botanical screening study was undertaken by Helme in 2015, and examined two alternative sites, along with three possible pipeline routes for landing the gas from the port area (see Figure 1). The Scoping Study narrowed this down to a single power plant site, a single pipeline route and a single transmission line route, each to be assessed at the Impact Assessment stage, and these are shown in Figures 2 and 3. A portion of Site 2 (Figure 1) was selected as the preferred power plant site for the Impact Assessment.

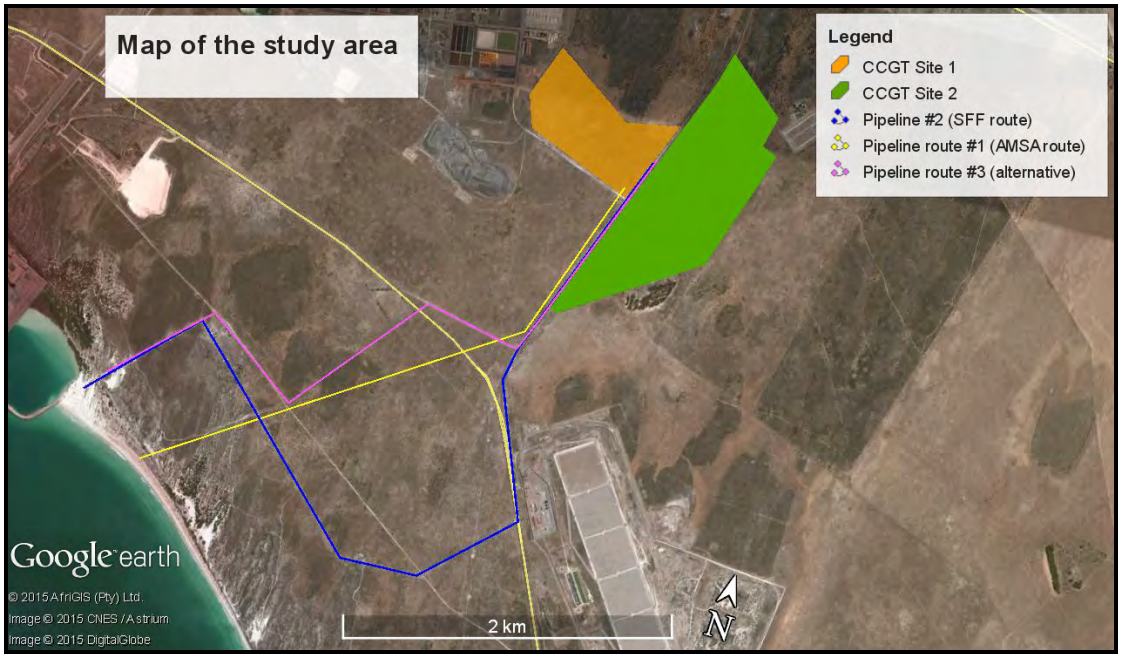

Figure 1: Map showing the two power station sites and the three pipeline routes looked at in the screening study undertaken in 2015 (Helme 2015). It should be noted that the actual study area was taken to be broader than just these tightly defined areas, especially for the pipelines, and encompassed essentially all the Arcelor Mittal owned land surrounding the areas shown.

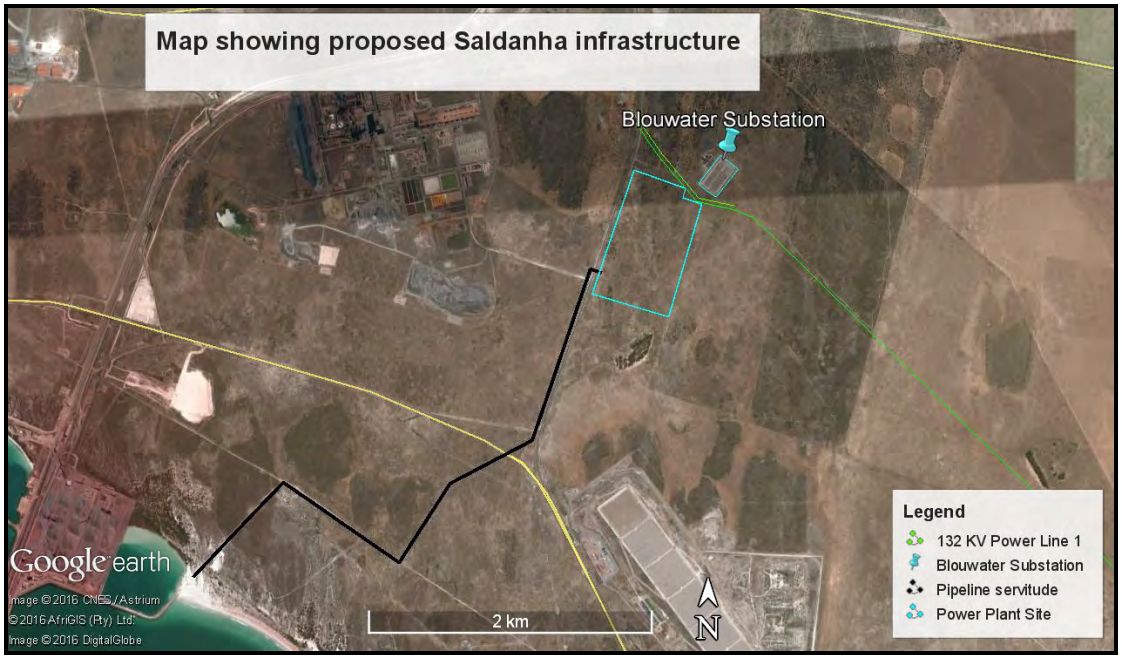

Figure 2: Simplified map of proposed infrastructure footprint in the Saldanha area, as assessed for the Impact Assessment. Note that the Blouwater substation is already in position.

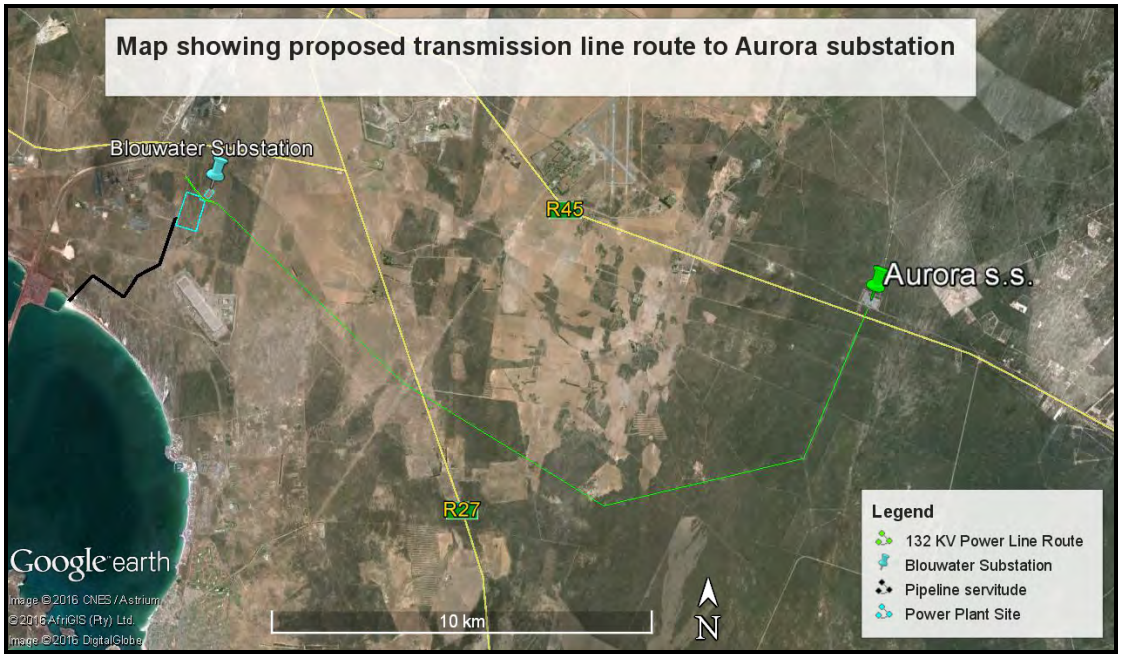

Figure 3: Satellite image showing all proposed infrastructure, as assessed for the Impact Assessment. Note that the Blouwater and Aurora substations are already in position.

2. TERMS OF REFERENCE

The terms of reference for this study were as follows:

- Describe the vegetation in the study area, and note the presence or likelihood of any plant Species of Conservation Concern (SCC; previously known as Red Data Book species).
- Provide a botanical constraints map for the area.
- Assess the local (Saldanha) and regional (West Coast) conservation value of the study area, referring to specialist knowledge and to the National Spatial Biodiversity Assessment (NSBA, Rouget *et al* 2004) and to CapeNature's Fine Scale Conservation Plan for the Saldanha Municipality (Pence 2008).
- Identify the likely botanical impacts associated with each aspect of the proposed development (power plant, pipeline, transmission line).
- Recommend any feasible mitigation that can be used to reduce or avoid the identified impacts, including recommendations for the operational phase of the project.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

Fieldwork for the baseline study was undertaken on 27 August 2015, which is within the peak spring flowering period in this winter rainfall region. Virtually all the geophytes and annuals were evident and in identifiable condition, and the timing of the site visit was thus optimal, and the seasonal constraints on the comprehensiveness of the botanical findings were minimised (although they are never entirely absent, as some species flower outside of spring). In addition, the available Google Earth imagery (the most recent being January 2015) is of a high resolution and is easily interpreted.

Conservation worthy habitats are those with high species diversity; those that support rare, threatened or localised plant species (plant Species of Conservation Concern); those that are rare in a regional context, and those areas where ecological processes are deemed to be important and vulnerable to disturbance. Sufficient detail was evident in the aerial images and on site to be able to assess the overall conservation value and botanical sensitivity of the area, and confidence in the accuracy of the botanical findings is high.

The development footprints are assumed to be the areas shown in Figures 2 and 3, and no additional associated infrastructure is assessed as part of this study. It is assumed that the actual development footprint will be largely (>98%) within

the areas shown. The 132kV transmission line has been assumed to have an 18m wide servitude, with pylons approximately every 250m. The pipeline infrastructure is understood to be likely to consist of:

- A gas and sea-water forwarding station at the start of the land-based pipeline system
- A dual, parallel gas pipeline for security of gas supply
- A sea water pipeline to provide the power plant with sea water for desalination
- A power cable to provide motive power for a projected air compressor and actuated isolation valves and instrumentation along the pipeline route
- A gas and sea-water receiving station at the Power plant.

Total pipeline length on land is likely to be 4603m, and the pipeline servitude during construction is understood to be 30 – 36m wide, with the trench depth of typically 1-2m.

It should be noted that the actual study area for the baseline work was taken to be broader than just the tightly defined target areas, especially for the pipelines, and encompassed essentially all the Arcelor Mittal owned land surrounding the areas shown. This study does not include an assessment of faunal impacts as a separate faunal study is being undertaken.

Reference was made to the GIS based database of rare plant localities maintained by CREW (Custodians of Rare and Endangered Wildflowers, based at Kirstenbosch, updated to March 2015), to the Red List of South African plants (Raimondo *et al* 2009), to the Fine Scale Vegetation map of the Saldanha Municipality (Helme & Koopman 2007), and to CapeNature's Fine Scale Conservation Plan for the Saldanha Municipality (Pence 2008).

4. STUDY AREA AND REGIONAL CONTEXT

The study area is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The study area is part of the greater West Coast region, and lies within what has been termed the West Strandveld bioregion (Mucina & Rutherford 2006). This bioregion has a fairly distinct flora, and the Saldanha Peninsula is particularly rich in locally and regionally endemic plant species, as well as plant Species of Conservation Concern (Helme & Koopman 2007).

The study area is within the planning domain of the Saldanha Fine Scale Conservation Plan (Pence 2008). This important reference indicates that the majority of the project area is a terrestrial Critical Biodiversity Area (CBA), as shown in Figure 4. Critical Biodiversity Areas are regarded as essential areas for the achievement of regional conservation targets, and are designed to ensure minimum land take for maximum result (Maree & Vromans 2010). It should be noted that the CBA mapping process in this area unfortunately suffered from a lack of groundtruthing and misinterpretation of the satellite imagery, and is therefore not considered particularly accurate or useful for planning purposes, and was in fact redone by Helme (2011) for the IDZ feasibility project. All ecological assessments in this area should thus be based on detailed groundtruthing, as has been the case for the current study.

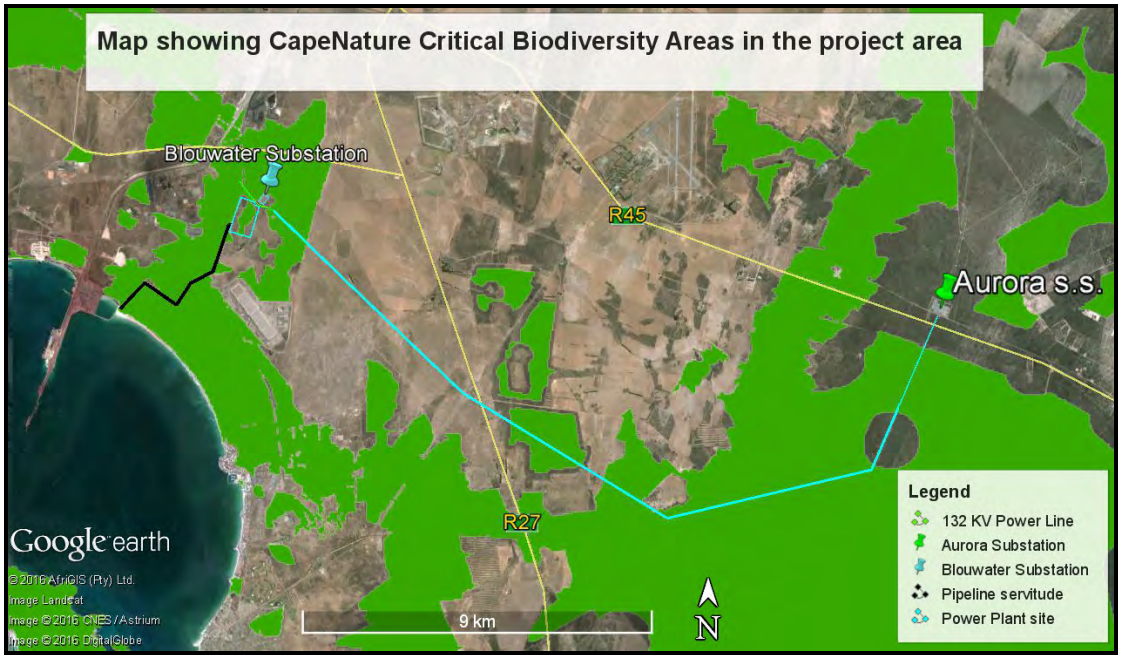

Figure 4: Extract of the Saldanha Municipality Fine Scale Conservation Plan (Pence 2008), showing the project area in relation to the identified Critical Biodiversity Areas (CBAs; green shading).

5. OVERVIEW OF THE VEGETATION

Power Plant Footprint

The underlying vegetation type in the proposed power plant development area is best classified as **Saldanha Flats Strandveld**, which is supported by Helme & Koopman (2007). This vegetation type is officially listed as **Vulnerable** on a national basis (DEA 2011). It should however be noted that Pence (2014) has recently re-assessed this and many other lowland ecosystems in the Western Cape, and the best available data suggest that in fact only 35% of the total original extent of this vegetation type remains, meaning that it should be classified as **Endangered** on a national basis. The unit has a 24% conservation target, but only about half this was conserved in 2004 (Mucina & Rutherford 2006). The percentage conserved has in fact probably increased in the last few years with the inclusion of some fairly large additional areas in the West Coast National Park (WCNP), and the unit can be considered moderately conserved.

The site is largely flat, with shallow to moderately deep neutral sands overlying calcrete, which are seldom exposed at the surface, but which have been piled up into heaps in places. There are no wetlands. Virtually all of the site has been subject to disturbance, probably originally in the form of ripping, but has also been significantly heavily grazed and trampled by cattle on an ongoing basis,

which has reduced the rehabilitation success. The heavy grazing has meant that there were virtually no flowering annuals on the site at the time of the survey, in contrast to many other similar areas.

Plate 1: Spring view of the proposed power plant footprint area, looking northeast towards Blouwaterbaai substation. Note the lack of flowering spring annuals, due to heavy grazing by livestock.

The baseline study (Helme 2015) identified an area north of the existing Blouwaterbaai substation access road that supports intact **Saldanha Limestone Strandveld**, which has not been ripped or heavily disturbed, and is thus more structurally diverse and of higher conservation value than the chosen development area (which is part of this Impact Assessment). Saldanha Limestone Strandveld was previously listed as an Endangered vegetation type (Rouget et al 2004), and then was unfortunately downgraded to Least Threatened (DEA 2011), due to an oversight by SANBI, and this error will apparently only be remedied only in about 2017. The unit has the highest number of threatened and localised plant species of all vegetation types in the Saldanha region (Helme & Koopman 2007). The unit is also poorly conserved (represented) in the West Coast National Park. Typical species in this intact limestone area include *Thamnochortus spicigerus, Zygophyllum morgsana, Limonium capense, Senecio alooides, Pteronia divaricata, Euphorbia burmanii, Othonna cylindrica* and *Searsia glauca*. Two plant **Species of Conservation Concern** (SCC) were recorded in this limestone area, and the likelihood that any others occur here in viable numbers is low. The recorded SSC include *Limonium capense* (Near Threatened), *Aloe*

distans (a large population of this regional endemic, but now regarded as a subspecies of *A. perfoliata*), and *Nenax hirta ssp calciphila* (Near Threatened).

Within the power plant development area indigenous plant species diversity is relatively low (about 25% of what it would be in an undisturbed area), and includes *Galenia fruticosa, Exomis microphylla* (brakbos), *Oncosiphon suffruticosum* (stinkkruid), *Arctotheca calendula* (Cape weed), *Osteospermum incanum* (dune bietou), *O. chrysanthemoides* (bietou), *Muraltia spinosa* (tortoise berry), *Helichrysum niveum, Phyllobolus canaliculatus*, *Tetragonia fruticosa* (kinkelbos), *Stachys ballota, Mesembryanthemum crystallinum* (slaai), *Lycium ferocissimum, Oxalis pes-caprae* (geel suuring), *O. obtusa, Limeum aethiopicum* (koggelmandervoet), *Trachyandra divaricata* (duinekool), *Carpobrotus edulis* (suurvy), *Torilis arvensis, Senecio burchellii* (hongerblom), *Gladiolus cunonius*, *Calobota sericea* (fluitjiesbos), *Felicia hyssopifolia, Ehrharta calycina* (polgras), *Cynodon dactylon* (fynkweek), *Conicosia pugioniformis, Hermannia prismatocarpa, Ehrharta villosa* (pypgras), *Pelargonium myrrhifolium, Thamnochortus spicigerus* (duinriet), *Aspalathus acuminata, Searsia glauca* (kunibush), *Searsia laevigata* (dune taaibos), *Melolobium adenodes, Cissampelos capensis, Asparagus africanus, A. capensis, Amellus* sp., *Gymnosporia buxifolia* (pendoring), *Oxalis luteola, Crassula expansa, C. vaillantii, Ornithogalum sp., Zygophyllum morgsana, Viscum capense* (voelent), *Haemanthus pubescens* (poierkwas), *Trachyandra falcata* (veldkool) and *T. ciliata.*

Various annual alien grasses are also present, including *Bromus pectinatus, Bromus diandrus* (ripgut brome), *Lolium sp.* (ryegrass), *Avena* sp. (wild oats) and *Vulpia myuros* (ratstail fescue), plus the alien herbs *Erodium moschatum* (cranesbill), *Echium plantagineum* (Pattersons's curse), *Raphanus rapistrum* (wildemostert) and *Brassica tournefortii*. No woody alien species are present, and none of the alien herbs or grasses is dominant.

No plant **Species of Conservation Concern** were recorded within the proposed development footprint, and the likelihood that any occur here in viable numbers is low.

The Pipeline Route

There are no areas of particular botanical sensitivity north of the Langebaan - Saldanha road, but there are notable areas of sensitivity between the road and the coast.

The stable part of the coastal dunes support largely pristine Langebaan Dune Strandveld, which is not listed as threatened ecosystem (DEA 2011), and is well conserved within the nearby West Coast National Park. However, the portions outside the Park are under severe threat from coastal and industrial development, and species and structural diversity is high, accounting for the Medium to High botanical sensitivity.

The initial, coastal part of the pipeline would cross partly stabilised coastal dunes such as those shown in Plate 2, which are typical of such habitats on the west coast, and are of Low botanical sensitivity, being high energy environments adapted to change and movement. Species diversity is fairly low and there are no threatened plant species.

Plate 5: View of Low sensitivity partly stable coastal dunes close to where the pipeline would originate.

The Medium sensitivity areas tend to be previously partly disturbed patches of what would have been at the ecotone (transition) of Saldanha Limestone Strandveld and Saldanha Flats Strandveld. Various plant SCC may be present, usually in fairly low numbers, and these include *Limonium capense* (Near Threatened), *Indigofera latiopetiolata* (local endemic; STBA), and *Nenax hirta ssp calciphila* (Near Threatened).

The primary areas of High sensitivity close to the pipeline route are patches of Saldanha Limestone Strandveld, but the final route does not pass through any of the key patches, although the 36m servitude width means that construction is likely to impact on some of the less diverse examples of this habitat in the

southern section of the route. Typical indigenous plant species in the undisturbed, High sensitivity habitats (Saldanha Limestone Strandveld) include *Limonium capense*, *L. peregrinum*, *Pteronia divaricata, P. uncinata, Clutia daphnoides, Othonna cylindrica, Pelargonium gibbosum* (dikbeenmalva), *Felicia elongata, Ruschia macowanii, Putterlickia pyracantha, Eriocephalus racemosus (kapok), Senecio alooides, ordaaniella dubia, Euclea racemosa* (sea guarrie), *Ruschia langebaanensis, Thamnochortus spicigerus* (duinriet), *Searsia glauca* (blue kunibush), *Thesidium fragile, Muraltia spinosa* (tortoise berry), *Zygophyllum flexuosum* and *Pterocelastrus tricuspidatus* (kershout).

At least nine plant Species of Conservation Concern were confirmed from the High sensitivity areas during the site visits, and a few others are confidently expected to occur in this area. The SCC recorded were *Limonium capense* (NT), *Lampranthus vernalis* (NT), *Ruschia langebaanensis* (Threatened), *Felicia elongata* (VU), *Muraltia harveyana* (VU), *Cheiridopsis rostrata* (VU), *Nenax hirta ssp. calciphila* (NT), *Cephallophyllum rostellum* (EN) and *Argyrolobium velutinum* (VU). Photographs of all these species can be viewed on the website www.ispot.org.za.

The Powerline Route

The powerline route west of the R27 crosses mostly cultivated lands with no significant natural vegetation, except one patch which supports Saldanha Flats Strandveld of High sensitivity.

East of the R27 about 75% of the route crosses natural vegetation, with elements of Saldanha Flats Strandveld, but dominated by Hopefield Sand Fynbos in the centre and east. This vegetation type is currently listed as Vulnerable on a national basis (DEA 2011, Pence 2014), although it will be uplisted to Endangered in the next few years, due to the high number of threatened plant species that it supports (>60; SANBI – pers. comm.).

Dominant species in most of this Sandveld area are *Willdenowia incurvata* (zonkwasriet), *Cannomois arenicola, Passerina corymbosa* (gonna), *Leucadendron salignum* (geelbos) and *Phylica cephalantha*. Alien invasive vegetation is rare within most of the actual proposed route, covering less than 1% of the total area. However, there are small patches of invasive alien rooikrans (*Acacia cyclops*) and Port Jackson (*Acacia saligna*).

At least 18 plant Species of Conservation Concern have been recorded within or close to the Hopefield Sand Fynbos portion of the servitude area, including *Leucospermum tomentosum* (Vulnerable), *L. hypophyllocarpodendron* ssp. *canaliculatum* (Vulnerable), *Serruria decipiens* (Vulnerable), *Aspalathus ternata* (Near Threatened), *Metalasia adunca* (Near Threatened), *Protea scolymocephala* (Vulnerable), *Thamnochortus punctatus* (Declining) *Cannomois arenicola* (Endangered), *Caesia sabulosa* (Vulnerable), *Chrysocoma esterhuyseniae* (Endangered), *Macrostylis crassifolia* (Vulnerable), *Diosma aspalathoides* (Near Threatened), *Lachnaea grandiflora* (Vulnerable), *Lachnaea capitata* (Vulnerable), *Capnophyllum africanum* (Near Threatened), *Echiostachys spicatus* (Endangered), *Helichrysum cochleariforme* (Near Threatened) and *Agathosma thymifolia* (Vulnerable). Various other plant SCC can be expected to occur.

5.1 Botanical Conservation Value

The terms conservation value and sensitivity are often used interchangeably, but this is not strictly correct. The term “conservation value” refers to the value of the habitat in local and regional conservation terms (*i.e.* answering the question how important is it?), whilst “sensitivity” strictly means how resilient is the habitat to disturbance. In the case of urban or industrial development (although not buried pipelines) any natural or partly natural habitat would effectively be permanently lost in the development footprint, and thus technically sensitivity would be high, irrespective of the conservation value of the underlying habitat.

The conservation value of a habitat is a product of species diversity, rarity of habitat, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats (ease of rehabilitation). Extensive previous work in the region has allowed the author to make conclusions regarding the overall and relative sensitivity of the vegetation in the study area (see Figure 5). Note that the groundtruthed botanical sensitivity map (Figure 5) is significantly different from the Critical Biodiversity Areas (Figure 4) in the Saldanha Steel area, which is largely due to an unfortunate lack of groundtruthing of the latter product prior to publication, and Figure 5 is regarded as a much more accurate representation of the true situation on the ground.

Areas that have been cultivated or ripped and have relatively low botanical diversity and no significant populations of plant Species of Conservation Concern (SCC) are considered to be of Low botanical conservation value at a regional scale.

The Medium sensitivity areas are generally Saldanha Limestone Strandveld that has been partly disturbed, but which has rehabilitated naturally to some degree, Populations of plant SCC may be present, although in limited numbers.

The Spreeuwal dune area has been mapped as being of Medium to High sensitivity, even though it does not support many known populations of plant Species of Conservation Concern. This area is largely pristine, apart from some alien plant invasion, and has high plant diversity, and a high level of structural (growth form) diversity.

High conservation value areas south of the coast road to Saldanha support relatively intact examples of the locally restricted vegetation type Saldanha Limestone Strandveld, with regionally significant populations of various plant Species of Conservation Concern. These areas may or may not be designated CBAs (Critical Biodiversity Area). These areas are considered ecologically irreplaceable, on account of the presence of relatively intact examples (with both high species diversity and high structural heterogeneity) of a regionally restricted vegetation type (in this case Saldanha Limestone Strandveld), and due to the presence of regionally endemic plant Species of Conservation Concern. Conservation of such areas would contribute significantly to species and/or ecological process targets for the region, and should be considered No Go areas for development.

Along the powerline route there is a patch of High sensitivity Saldanha Flats Strandveld just east of Blouwater substation, and a large High sensitivity section of mostly Hopefield Sand Fynbos east of the R27. This section is about 14km long, and supports at least 18 plant Species of Conservation Concern.

The power plant footprint presents no significant constraints to the proposed development.

The section between the Spreeuwal dunes and the Saldanha – Langebaan road has important areas of High sensitivity vegetation that should not be disturbed, and thus presents significant constraints that need to be taken into account (and which have been taken into account as far as possible in determining the pipeline route).

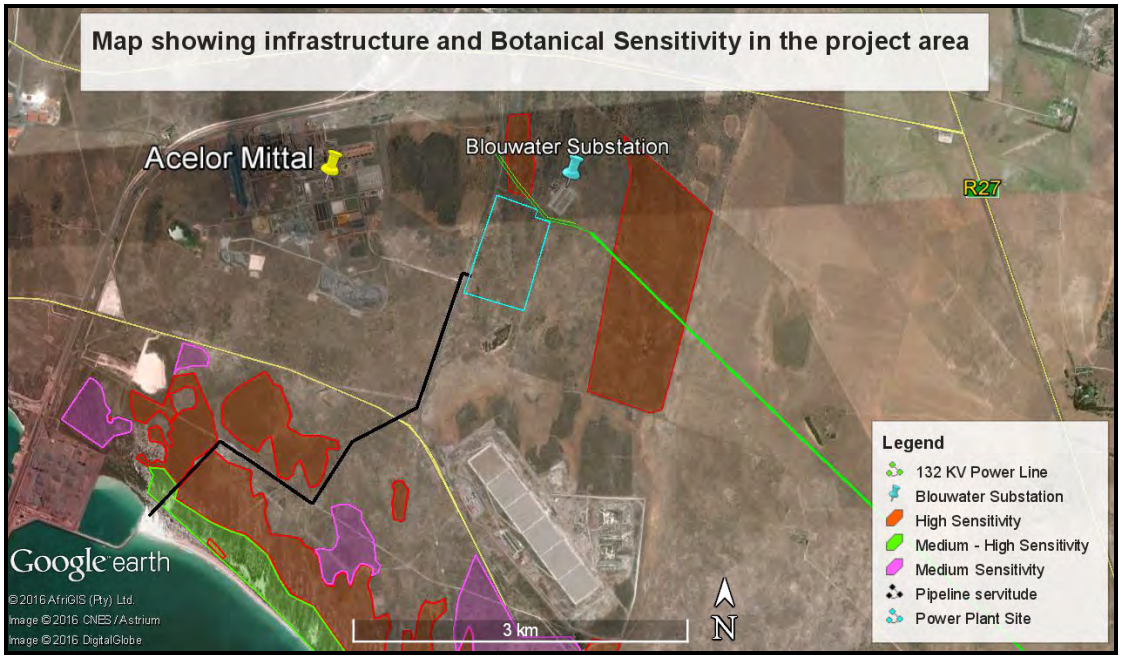

Figure 5: Map of the botanical conservation value (sensitivity) in the vicinity of the project area west of the R27. Note that unshaded areas within the project area are of Low conservation value.

For the powerline route the only sensitive area west of the R27 is shown in Figure 5. East of the R27 essentially all natural vegetation can be considered to be of High sensitivity, and this is generally reflected in the CBA map (Figure 4; apart from an anomalous circle which should be considered as a CBA).

6. ISSUES IDENTIFIED

In terms of the construction of the proposed infrastructure the following ecological issues have been identified:

- Direct, permanent loss of previously ripped and degraded but partly natural vegetation (up to 50ha) of an Endangered vegetation type (Saldanha Flats Strandveld) within the power plant footprint during the construction and operational phases.
- No loss of site populations of plant Species of Conservation Concern within the power plant site.
- Loss of portions of site populations of plant Species of Conservation Concern within the pipeline route and the powerline route is possible, but relatively few such species are likely to be impacted, and only in low numbers.
- Direct loss and damage of small areas of Medium – High and High sensitivity habitat during pipeline and powerline construction. This is likely

to be of a long term duration (5-19yrs), but some form of natural rehabilitation is likely to mitigate the impacts.

- Indirect, permanent botanical impacts at the operational phase. The main impact in this regard would be the fragmentation of the current partial ecological connectivity across the power plant site. This is not likely to be a significant impact for either the pipeline or the powerline routes.

No potentially positive ecological impacts associated with this project have been identified, unless at least some of the adjacent High conservation value areas can be permanently secured for conservation (which seems unlikely).

7. IMPACT ASSESSMENT

7.1 Construction Phase Impacts

Up to 50ha of degraded but partly natural vegetation will be permanently lost within the power plant site, all of it during the construction phase. No plant Species of Conservation Concern are known to occur in this area, and the vegetation in the area is deemed to be of Low sensitivity, and because of this the magnitude of the impact is likely to be Low - Moderate. Loss of this area cannot easily be mitigated and the impact is likely to be Low negative at a regional scale, before and after mitigation.

Although only 4km long the pipeline will have a greater impact than one might imagine, as the disturbance corridor will be up to 36m wide. In about 80% of the route this passes through Low sensitivity habitat where this will have only a Low negative impact, but in about 800m (20%) of the route the corridor passes through High or Medium – High sensitivity habitat, where a number of plant Species of Conservation concern may be present. The magnitude of the impact in this area is Moderate, and most of the impact should be of a long term nature (5-19yrs) rather than a permanent impact, as the corridor should rehabilitate naturally over this period. Disturbance favours certain species, and the more sensitive ones are unlikely to return to the disturbed habitat. Search and Rescue from the Medium – High and High sensitivity area prior to construction, and use of these plants in the active rehabilitation of the disturbed corridor will help speed up habitat recovery.

The transmission line, although fairly long, is not likely to have a significant negative botanical impact, as the pylon footprints (permanent impacts) are relatively small (typically each less than $30m^2$) and the access track impacts are

likely to fade over time, as natural rehabilitation takes place. Half the transmission line route crosses cultivated lands of Low sensitivity, and botanical impacts here will be negligible. The remaining section crosses High sensitivity habitat with at least 18 plant Species of Conservation Concern recorded, although of course not all of these will occur within the exact footprint of the pylons or access track. On balance the transmission line construction is likely to have a Low negative botanical impact.

Potential impacts	Power Plant	Pipeline	Powerline
Nature of impact:	Loss of up to 50ha of degraded but partly natural vegetation (Low sensitivity) with no known plant Species of Conservation Concern	Loss and degradation of up to 1.6ha of High sensitivity vegetation, 0.8ha of Med- High sensitivity vegetation, and up to 13.3ha of Low sensitivity vegetation	Loss and degradation of small portion of Low sensitivity vegetation along 14km of route; Loss and degradation of small portion of High sensitivity vegetation along 14km of route, including impacts on various plant Species of Conservation Concern.
Extent and duration of impact:	Site; permanent	Site; mostly long term (partial natural rehabilitation of disturbed areas)	Site; mostly long term (access tracks), with small permanent impacts in pylon positions
Magnitude of impact:	Low - Moderate	Moderate	Low
Probability of occurrence:	Certain	Certain	Very likely
Degree to which the impact can be reversed:	Not reversible	Partly reversible	Largely reversible
Degree to which the impact may cause irreplaceable loss of resources:	50ha of habitat is technically irreplaceable, but in poor condition	Likely to cause very minor irreplaceable loss of only certain species; habitat itself will rehabilitate to some extent	Unlikely to cause irreplaceable loss as very small footprint in context of available habitat
Cumulative impact prior to mitigation:	Low negative	Low – Medium negative	Low negative
Significance rating of impact prior to mitigation:	Low negative	Low – Medium negative	Low negative
Degree to which the impact can be mitigated:	Cannot be significantly mitigated any further	Minor mitigation possible	Cannot be significantly mitigated
Proposed mitigation:	None	Search and Rescue in High and Med- High sensitivity areas and use of these species for rehabilitation; minimising pipeline disturbance corridor width in these areas	None
Cumulative impact post mitigation:	Low Negative	Low Negative	Low Negative
Significance rating of impact after mitigation:	Low Negative	Low Negative	Low negative

Table 1: Construction phase botanical impacts of the proposed project.

7.2 Operational Phase Impacts

Operational phase botanical impacts of this project are likely to be of very minor significance. The primary operational phase impact is loss of ecological connectivity, related mainly to the 50ha power plant site. A secondary operational phase impact could be proliferation of invasive alien plants in the pipeline route and around the power plant, facilitated by the soil disturbance during construction.

The loss of ecological connectivity in the power plant area is likely to be of **Low** negative botanical significance, as the site does not break a key ecological corridor, with adequate natural or partly natural areas still surrounding the site. The powerline and pipeline will not have any significant negative impacts on botanical connectivity.

The alien invasive plant issue is one that is easily mitigated, by means of ongoing alien invasive plant management around the power plant, and in the servitudes. After mitigation this could be reduced to a Very Low negative level in al three areas assessed.

Potential impacts	Power Plant	Pipeline	Powerline
Nature of impact:	Loss of current levels of ecological connectivity across 50ha site; alien plant invasion in surrounding disturbed areas	Reduction of current levels of ecological connectivity across route; alien plant invasion in disturbed areas	Reduction of current levels of ecological connectivity across route
Extent and duration of impact:	Site and local surrounds; permanent in case of connectivity; temporary in case of alien plants	Site and local surrounds; long term in case of connectivity; temporary in case of alien plants	Site; permanent in case of connectivity; temporary in case of alien plants
Magnitude of impact:	Low	Low	Very Low
Probability of occurrence:	Certain	Very likely	Moderately likely
Degree to which the impact can be reversed:	Not reversible	Partly reversible	Not reversible
Degree to which the impact may cause irreplaceable loss of resources:	Not likely	Not likely	Not likely
Cumulative impact prior to mitigation:	Low negative	Low negative	Very Low negative
Significance rating of impact prior to mitigation:	Low negative	Low negative	Very Low negative
Degree to which the impact can be mitigated:	Loss of connectivity can't be mitigated; alien plant invasion can be fully mitigated	Rehabilitation of corridor will partly mitigate loss of connectivity; alien plant invasion can be fully mitigated	Not possible
Proposed mitigation:	Ongoing alien invasive plant removal around	Rehabilitation of corridor with rescued material and	None

	site	additional species brought in; ongoing alien invasive plant removal within corridor	
Cumulative impact post mitigation:	Low Negative	Low Negative	Very Low Negative
Significance rating of impact after mitigation:	Low Negative	Low Negative	Very Low negative

Table 2: Operational phase botanical impacts of the proposed project.

7.3 Cumulative Botanical Impacts

Assessment of the cumulative impacts of the proposed development was specifically requested by the DEA. There are numerous proposed developments in the Saldanha – Vredenburg region, all of which will contribute to the overall cumulative impact, including:

- The IDZ development itself, covering an area of up to 4000ha (including existing development and conservation areas).
- Afrisam Cement Plant
- LPG storage Facilities – Sunrise and Avidia
- Vredenburg Industrial Development (located between Namaqua Sands and the Fossil Park):
    - Frontier Separation Plant
    - Chlor-Alkali Facility
- Desalination plant
- One additional 1000 MW gas-fired power plant.

The primary construction phase impacts are permanent loss of up to 50ha of currently degraded but technically Endangered Saldanha Flats Strandveld in the power plant footprint, and potential long term loss and degradation of an 800m long strip of Medium – High and High sensitivity vegetation in the coastal section of the pipeline corridor. Additional minor impacts will be associated with other parts of the pipeline route, and with construction of the transmission line through the eastern parts of its route.

As per Table 1 above the construction phase cumulative botanical impact is likely to be Low – Medium negative prior to mitigation, and Low negative after mitigation.

As per Table 2 above the operational phase cumulative botanical impact is likely to be Low negative prior to mitigation, and Very Low negative after mitigation.

All required mitigation is outlined in Section 8. It is strongly recommended that this project, and any others in the greater Saldanha IDZ region, contribute to a regional biodiversity offset, which is an approach supported by CapeNature,

rather than doing it piecemeal, project by project. This will require that all involved parties meet and discuss the quantums of the contributions from each developer.

8. REQUIRED MITIGATION AND EMP REQUIREMENTS

The following mitigation is considered reasonable, feasible and essential, and is factored into the assessment:

- The pipeline construction corridor in the area within and between the High and Medium – High sensitivity areas (as per Figure 5) should be minimised and kept as narrow as possible, and should ideally be less than 25m wide in this area, or 30m at most. The approved development footprint in this area must be surveyed and clearly demarcated with wire or coloured rope, and strung with warning signs, prior to any construction.
- The approved power plant and access road must similarly be surveyed and marked out prior to any development.
- The ECO must ensure that no disturbance occurs outside the approved development footprints of the power plant site or the pipeline route during construction.
- Topsoil removed from the pipeline trench must be kept separate from other fill during the construction process, and must be replaced last, on the soil surface.
- Alien invasive species (such as ryegrass or oats) or straw containing any such species should not be used for temporary soil stabilisation of the pipeline corridor, as these will then rapidly dominate these areas, to the exclusion of indigenous species.
- Plant Search and Rescue must be undertaken from the entire pipeline development corridor south of the Langebaan – Saldanha road, prior to any development. Search and Rescue should also be undertaken for selected species within the power plant footprint prior to development. All translocatable plant species, but notably the succulents and geophytes, must be bagged up and stored in a nursery for later use, once construction of the pipeline has been completed and rehabilitation is required in this area south of the road. Replanting of these rescued specimens should be undertaken in the first autumn – winter (May – June) after construction has been completed, giving the plants maximum time to establish before the next summer dry period.

- Additional rehabilitation of the pipeline servitude south of the coast road should be undertaking using locally indigenous Strandveld species that are additional to those used in the Search and Rescue process. This work should be undertaken by an experienced horticultural contractor who has access to suitable locally grown species. Key elements suggested include shrubs such as *Othonna cylindrica, Limonium peregrinum, Calobota sericea, Thamnochortus spicigerus, Searsia laevigata, Searsia glauca, Lycium ferocissimum, Euclea racemosa* and *Putterlickia pyracantha*.
- Ongoing alien invasive plant management must be undertaken on an annual or biannual basis within any undeveloped portions of the power plant site and within the full pipeline servitude. No spraying of herbicide should be undertaken in these areas as this kills numerous non-target species. The focus should be on removing (using CapeNature approved methodology) all alien invasive shrubs and large herbs (such as *Echium* species), although in some cases it may be possible and necessary to also remove invasive alien grasses such as kikuyu (*Pennisetum clandestinum*) or ryegrass (*Lolium* species).

9. CONCLUSIONS

- The identified site for the proposed power plant presents no significant botanical constraints to the proposed project and can be approved with no significant botanical mitigation.
- All project related botanical impacts are deemed to be of Low or Very Low negative botanical significance after mitigation.
- The primary construction phase impacts are permanent loss of up to 50ha of currently degraded but technically Endangered Saldanha Flats Strandveld in the power plant footprint, and potential long term loss and degradation of an 800m long strip of Medium – High and High sensitivity vegetation in the coastal section of the pipeline corridor. Additional minor impacts will be associated with other parts of the pipeline route, and with construction of the transmission line through the eastern parts of its route.
- Operational phase botanical impacts are likely to be relatively minor and of no regional significance.
- All mitigation outlined in Section 8 is considered feasible, reasonable and essential, and should be included in any Environmental Authorisation.

10. REFERENCES

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Environmental Resources Management Southern Africa (Pty) Ltd

for ArcelorMittal International SA (Pty) Ltd

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

Development of the Gas-Fired Independent Power Plant, Saldanha, Western Cape Province

Study done for:

ERM

Prepared by:

EAR
Enviro Acoustic Research

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EXECUTIVE SUMMARY

INTRODUCTION AND PURPOSE

Enviro-Acoustic Research CC was contracted to conduct an Environmental Noise Impact Assessment (ENIA) to determine the potential noise impact on the surrounding environment due to the development of Independent Gas-Fired Power Plant near Saldanha, Western Cape Province.

This report describes the existing Rating Levels as well as the potential noise impact that the operation may have on the surrounding sound environment, highlighting the methods used, potential issues identified, findings and recommendations. The Terms of Reference (TOR) for this study is in the National/International guidelines and regulations: the latest Environmental Impact Assessment guidelines, the SANS 10103:2008, SANS 10328, SANS 10357, Noise Control Regulation PN 200 of 2013 and the IFC: General EHS Guidelines (Equator Principal).

PROJECT DESCRIPTION

The International Power Consortium South Africa (IPCSA), have developed a solution to Saldanha Steel's requirement for stable, economical electricity over the long term. This solution consists of a 1507 MW Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site.

The project will supply the power needs of ArcelorMittal's Saldanha Steel plant (±160MW of base load energy, peaking up to 250MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province. The project will be developed in two phases.

The project will be developed in two phases, with the development of six Siemens Trent60 50MW nominal gas turbines in open cycle (labelled T1 through to T6 – one turbine will be a redundant unit to ensure uninterrupted power supply) developed in phase one with three Siemens SGT5-4000F 435MW nominal combined cycle plants, labelled Unit 1, Unit 2 and Unit 3 (erected on three self-contained power 'islands') developed during the second phase.

NEED AND DESIRABILITY OF PROJECT

Due to economic and environmental advantages, power generation does provide valuable employment and business opportunities. It must be noted when such projects are close to potential noise-sensitive receptors, consideration must be given to ensuring a compatible co-existence.

This does not suggest that the sound from the facility should not be audible under all circumstances as this is an unrealistic expectation that is not required or expected from any other agricultural, commercial, industrial or transportation related noise source, but rather that the sound due to the power generation activities should be at a reasonable level in relation to the ambient sound levels.

BASELINE ASSESSMENT

Ambient sound levels were measured at one location for a two night-time period during May 2016 using a class-1 Sound Level Meter. The sound level meters would measure "average" sound levels over a 10 minutes period, save the data and start with a new 10 minute measurement till the instrument was stopped. This data was also augmented with additional measurements at three locations during the day and night.

Longer term measurements indicated a location with a complex sound character, where the cumulative combination of natural (ocean and wind) and anthropogenic (sounds from the house, road traffic and Saldanha Steel) sounds resulted in an elevated ambient sound level more typical of an urban area.

Short term measurements indicated ambient sound levels typical of an urban noise district (with main roads, business and workshops) closer to the project site. Daytime ambient sound levels are higher, mainly due to road traffic, although wind-induced noises also contributed to the ambient sound levels. Short term measurements away from roads, business and residential dwellings indicate an area with the potential to be very quiet.

NOISE IMPACT DETERMINATION

A SANS 10103:2008 rating typical of an urban noise district (at the closest receptors) was assigned due to the character of the area. Therefore, the criteria used to evaluate the potential of a noise impact included:

- The projected noise rating levels when compared to the SANS 10103:2008 rating level of 45 dBA (52 dBA for a disturbing noise);
- The potential change in ambient sound levels, with a change less than 3 dB ideal.

The projected noise rating levels were calculated using a sound propagation model. A conceptual scenario was developed for the construction phase with two scenarios considered during the operational phase. The output of the modelling exercise indicated that there is negligible risk of a noise impact for both phases. This would be even less for the decommissioning phase.

FINDINGS

While the maximum projected noise rating level could be as high as 36 dBA (at NSD02) during peak operation once fully commissioned, this is significantly less than the night-time ambient sound level and the potential noise impact is considered insignificant. The change in ambient sound levels is expected to be significantly less than 3 dBA at all the surrounding noise-sensitive receptors.

MITIGATION

Mitigation is not required due to the low significance of a noise impact, neither is a routine noise measurement programme recommended. Measurement locations, frequencies and procedures are provided as a guideline for the developer to consider should there be a noise complaint if people in the future settle closer than 2,000m from the plant (unlikely as the land belongs to ArcellorMittal).

RECOMMENDATIONS

The increases in noise levels are of negligible significance. It is therefore the recommendation that the project should be authorized (from a noise impact perspective) with no additional mitigation conditions.

CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	**Cross-reference in this report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	**Section 14**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**See below**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.1**
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 3.3**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	**Section 1.6**
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	**Sections 3.1**
(g) an identification of any areas to be avoided, including buffers;	Not relevant and required.
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Buffers not required.
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 6**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	**Sections 8** and **13**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	No comments received (**Section 1.5**)
(p) any other information requested by the competent authority.	The DEA had the following comment in the approval of the Scoping Report: *'A compliance and road map on provincial and national regulations on dust and noise'*.

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 3 - Environmental Impact Assessment Process	**Cross-reference in this report**
Describe any policies or legislation relevant to your field that the applicant will need to comply with.	**Sections 2.2.1 and 2.2.2**
Comment on need/desirability of the proposal in terms your field and in terms of the proposal's location.	**Section 9.2**
Determine the-- (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and (ii) degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated;	**Sections 8**
Determine what the most ideal location within the site for the activity is in terms of your field.	Entire site suitable from a noise perspective
Identify suitable measures to avoid, manage or mitigate identified impacts.	Negligible significance of noise impact, no mitigation required
Identify residual risks that need to be managed and monitored.	There will be no residual risks after closure.
Include a concluding statement indicating a preferred alternative in terms of your field.	In terms of acoustics there is no preference for alternatives in terms of site or technology as discussed in the Scoping Report for this Project.

This report should be cited as:

De Jager, M. (2016): "*Environmental Noise Impact Assessment: Development of a Gas-Fired Independent Power Plant near Saldanha, Western Cape Province*". Enviro-Acoustic Research CC, Pretoria

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Report no:

ERM-AM/ENIA-S/201605-Rev 2

Author:

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Review:

Shaun Weinberg *(B.Sc. Applied Mathematics in Physics Stream – in process)*

Date:

September 2016

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/
NEAS Reference Number:	DEAT/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

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Th e specialist appointed in terms of the Regulations

I, **Morné de Jager**, declare that –

General declaration

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Enviro-Acoustic Research cc
Name of company (if applicable):

8 September 2016
Date:

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GLOSSARY OF ABBREVIATIONS

AADT	Annual Average Daily Traffic
AZSL	Acceptable Zone Sound Level (Rating Level)
DoE	Department of Energy
EARES	Enviro Acoustic Research cc
ECA	Environment Conservation Act (Act 78 of 1989)
EMP	Environmental Management Plan
FEL	Front End Loader
HRSG	Heat recovery steam generation
i.e.	that is
IFC	International Finance Corporation
IPP	Independent Power Producer
km	kilometres
m	Meters (measurement of distance)
m^2	Square meter
m^3	Cubic meter
mamsl	Meters above mean sea level
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NCR	Noise Control Regulations (under Section 25 of the ECA)
SABS	South African Bureau of Standards
SANS	South African National Standards
TLB	Tip Load Bucket
WHO	World Health Organisation

1 INTRODUCTION

1.1 INTRODUCTION AND PURPOSE

Enviro-Acoustic Research (EARES) cc was appointed to undertake a specialist study to determine the potential noise impact on the surrounding environment due to the proposed development of a Gas-Fired Independent Power Plant by ArcelorMittal International SA near Saldanha, Western Cape Province (see **Figure 1-1**).

This report describes the existing Rating Levels as well as the potential noise impact that the operation may have on the surrounding sound environment, highlighting the methods used, potential issues identified, findings and recommendations. The Terms of Reference (TOR) for this study is in the National/International guidelines and regulations: the latest Environmental Impact Assessment guidelines, the SANS 10103:2008, SANS 10328, SANS 10357, Noise Control Regulation PN 200 of 2013 and the IFC: General EHS Guidelines (Equator Principal).

1.2 BRIEF PROJECT DESCRIPTION

The International Power Consortium South Africa (IPCSA), have developed a solution to Saldanha Steel's requirement for stable, economical electricity over the long term. This solution consists of a 1507 MW Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site.

The project will supply the power needs of ArcelorMittal's Saldanha Steel plant (±160MW of base load energy, peaking up to 250MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province. The project will be developed in two phases.

Phase 1 will include six Siemens Trent60 50 MW nominal gas turbines in open cycle (labelled T1 through to T6 – with one turbine as backup) with phase 2 including three Siemens SGT5-4000F 435 MW nominal combined cycle plants, labelled Unit 1, Unit 2 and Unit 3 respectively that will be erected on three self-contained power 'islands' each approximately 150m long x 60m wide.

Phase 1 of the project will be constructed over approximately 15 – 18 months and constitute the following components:

- Site entrance with truck staging areas, hard standing areas;
- Offices and control room;
- Warehouse areas and workshops;
- Installation of six open cycle Siemens Industrial Trent 60 gas turbines (T1, T2, T3, T4, T5 and T6), one of which will be a redundant unit to ensure uninterrupted supply;
- Associated step-up transformers for every generating unit;
- 132KV and 400 kV switchyard;
- Site drainage;
- Gas receiving, conditioning and forwarding;
- Waste-Water treatment and water reclamation plant; and
- Storm water collection reservoir (25,000 m^3) and water treatment plant.

Phase 2 of the project will take 18 – 20 months and will include the following additional components:

- Installation of complete UNIT 1, UNIT 2 and UNIT 3 open cycle Siemens SCC5-4000F gas turbine (total approx. 1,305 MW nominal (Installed Gross capacity) combined cycle plants);
- Associated step-up transformers, and station switchyard.

1.3 STUDY AREA

The study area is described in terms of environmental components that may contribute or change the sound character in the area.

1.3.1 Location

The proposed facility is situated in the West Coast District municipal area (Saldanha Bay Local Municipality) in the Western Cape Province. The town of Saldanha is around 10km west with Vredenburg located 10km north-west from the proposed project.

1.3.2 Climatic Conditions

Saldanha falls within the Mediterranean climate zone which is characterised by warm, dry summers and cold, wet winters. The rainfall in the project area occurs most primarily between the months of April and September, with precipitation intensity highest in the months of June and July. The area generally receives little rainfall (between 250 and 350mm per year) with most of this rainfall during the winter months, giving it a Mediterranean climate. The prevailing winds in the area are predominantly from the south.

1.3.3 Topography

The landscape can be described at moderately undulating plains. There are no topographical features that can break the line of sight to the project and will assist in minimizing the propagation of noise from the project.

1.3.4 Surrounding Land Use

The power plant will be developed around 5km from the Saldanha Industrial Development Zone (IDZ), but ArcelorMittal's Saldanha plant is located just west of the proposed project. There is a large railway siding to the north and Saldanha Bay Oil Storage Centre to the south. The land use to the east is mainly wilderness (dryland grazing).

Figure 1-1: Locality map indicating proposed project location

1.3.5 Roads and Rail lines

The S3253 is located south of the project site, the S3240 to the north with the Saldanha Export Terminal rail line passing the site to the west.

1.3.6 Residential areas

Excluding farmsteads (generally comprising of one main dwelling with a number of houses in the vicinity used by the farm workers), there are no formal residential areas within 5,000m.

1.3.7 Other Industrial Activities

ArcelorMittal's Saldanha Plant is located directly to the west with the Salkor railway siding to the north. Both operations are active 24 hours per day.

1.3.8 Ground conditions and vegetation

The surrounding area falls within the "Fynbos" biome, with the vegetation type being typical of the Cape Floristic Region. The site and surrounding area has been largely disturbed, heavily grazed and trampled. While disturbed, the surface area is generally well covered by vegetation.

Taking into consideration available information it is the opinion of the author that the ground conditions (when considering acoustic propagation on a ground surface) can be classified as medium, which implies that it will have a moderately acoustical absorbency. It should be noted that this factor is only relevant for air-borne waves being reflected from the ground surface, with certain frequencies slightly absorbed by the vegetation.

1.3.9 Residential Areas

There are no formal residential areas within 5,000m from the proposed project.

1.3.10 Other Potential Interested and Affected Parties in terms of Acoustics

The area is sparsely populated in the vicinity of the industrial zone. The closest noise-sensitive receptors are further than 2,000m from the proposed project. Also refer to **Figure 1-2**.

1.3.11 Ambient sound levels and available information

Existing ambient sound levels are discussed in **Section 3.2**. Generally, as typical with coastal areas, ambient sound levels are impacted by surf action.

1.4 POTENTIAL NOISE-SENSITIVE RECEPTORS (DEVELOPMENTS) AND NO-GO AREAS

An assessment of the area was done using available topographical maps to identify potential Noise-sensitive developments (NSD) in the area. The data was imported into GoogleEarth® to allow a more visual view of the areas where Noise-sensitive developments were identified. Noise-sensitive developments and other potential Interested and Affected Parties identified are highlighted in **Figure 1-2**. It should be noted that NSD01 is an unused building, confirmed by NSD02 that it will not to be used in the future for residential purposes.

1.5 COMMENTS REGARDS TO NOISE RECEIVED DURING THIS PROJECT

No specific comments are registered at the time this report was compiled, noise was mentioned in passing in a comment by DEA on the original scoping report for the project.

1.6 TERMS OF REFERENCE

A noise impact assessment must be completed for the following reasons:

- It is a controlled activity in terms of the NEMA regulations and a ENIA is required, because:
    - It may cause a disturbing noise that is prohibited in terms of section 18(1) of the Government Notice 579 of 2010
- It is generally required by the local or district authority as part of the environmental authorization or planning approval in terms of Regulation 2(d) of GN R154 of 1992 (Regulation 4(1) in terms of PN.200 of 2013 – Western Cape).

In addition, Appendix 6 of GN 982 of December 2014 (Gov. Gaz. 38282), issued in terms of the National Environmental Management Act, No. 107 of 1998 also defines minimum information requirements for specialist reports.

The document (in South Africa) that addresses the issues specifically concerning environmental noise is SANS 10103:2008. It has recently been thoroughly revised and brought in line with the guidelines of the World Health Organisation (WHO). It provides the maximum average ambient noise levels during the day and night to which different types of developments indoors may be exposed.

In addition, SANS 10328:2008 does specify the methodology to assess the potential noise impacts on the environment due to a proposed activity that might impact on the environment.

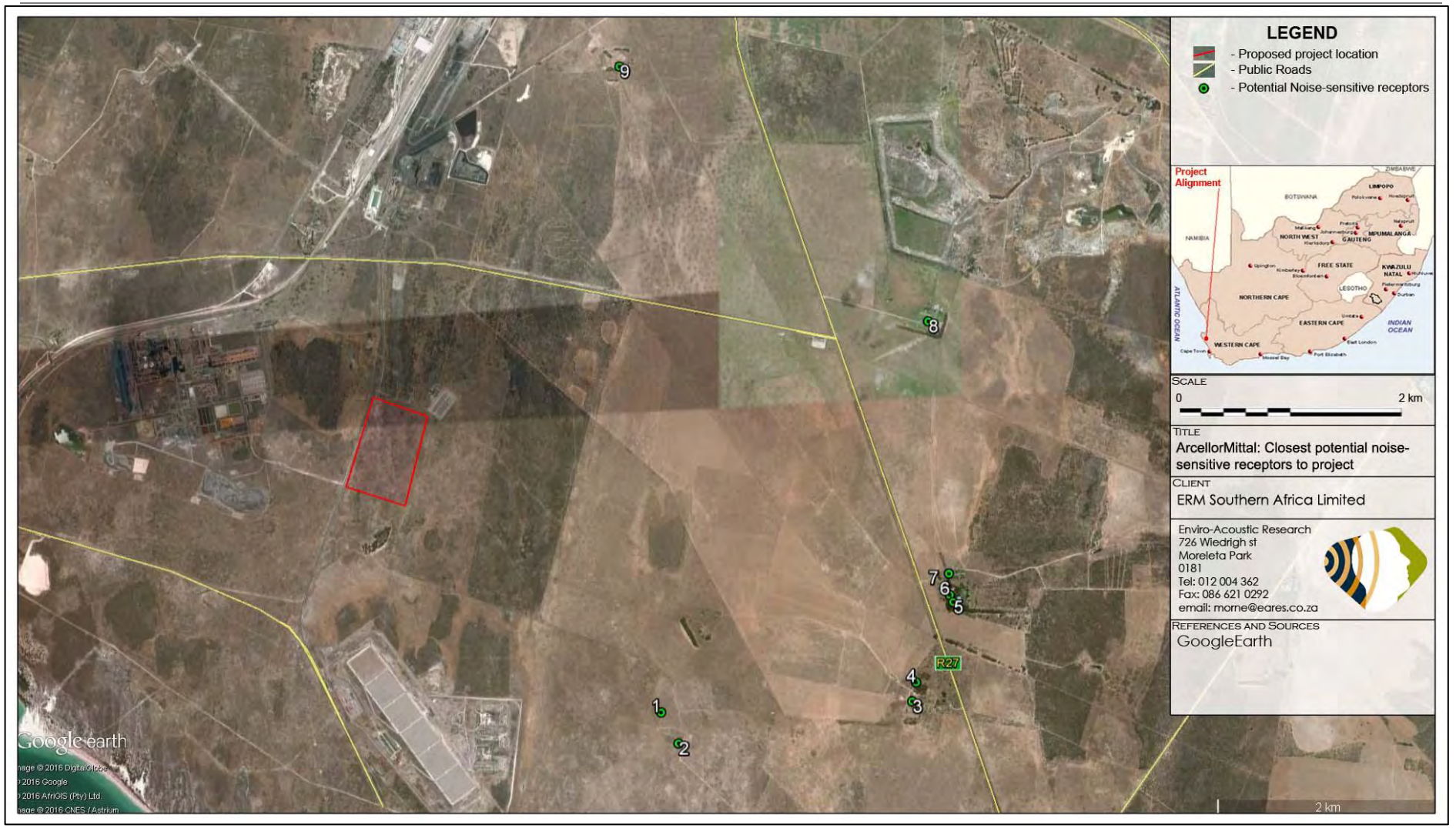

Figure 1-2: Aerial image indicating potentially noise-sensitive receptors close to proposed development

This standard also stipulates the minimum requirements to be investigated for Scoping purposes. These minimum requirements are:

a) The purpose of the investigation;
b) A brief description of the planned development or the changes that are being considered;
c) A brief description of the existing environment;
d) The identification of the noise sources that may affect the particular development, together with their respective estimated sound pressure levels or sound power levels (or both);
e) The identified noise sources that were not taken into account and the reasons why they were not investigated;
f) The identified noise-sensitive developments and the estimated impact on them;
g) Any assumptions made with regard to the estimated values used;
h) An explanation, either by a brief description or by reference, of the methods that were used to estimate the existing and predicted rating levels;
i) The location of the measurement or calculation points, i.e. a description, sketch or map;
j) Estimation of the environmental noise impact;
k) Alternatives that were considered and the results of those that were investigated;
l) A list of all the interested or affected parties that offered any comments with respect to the environmental noise impact investigation;
m) A detailed summary of all the comments received from interested or affected parties as well as the procedures and discussions followed to deal with them;
n) Conclusions that were reached;
o) Recommendations, i.e. if there could be a significant impact, or if more information is needed, a recommendation that an environmental noise impact assessment be conducted; and
p) If remedial measures will provide an acceptable solution, which would prevent a significant impact, these remedial measures should be outlined in detail and included in the final record of decision if the approval is obtained from the relevant authority. If the remedial measures deteriorate after a certain time and a follow-up auditing or maintenance programme (or both) is instituted, this programme should be included in the final recommendations and accepted in the record of decision if the approval is obtained from the relevant authority.

2 LEGAL CONTEXT, POLICIES AND GUIDELINES

2.1 THE REPUBLIC OF SOUTH AFRICA CONSTITUTION ACT ("THE CONSTITUTION")

The environmental rights contained in section 24 of the Constitution provide that everyone is entitled to an environment that is not harmful to his or her well-being. In the context of noise, this requires a determination of what level of noise is harmful to well-being. The general approach of the common law is to define an acceptable level of noise as that which the reasonable person can be expected to tolerate under the particular circumstances. The subjectivity of this approach can be problematic, which has led to the development of noise standards (see **Section 2.5**).

"Noise pollution" is specifically included in Part B of Schedule 5 of the Constitution, which means that noise pollution control is a local authority competence, provided that the local authority concerned has the capacity to carry out this function.

2.2 THE ENVIRONMENT CONSERVATION ACT (ACT 73 OF 1989)

The Environment Conservation Act ("ECA") allows the Minister of Environmental Affairs and Tourism ("now the Ministry of Water and Environmental Affairs") to make regulations regarding noise, among other concerns. See also **section 2.2.1**.

2.2.1 Noise Control Regulations (GN R154 of 1992)

In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996 legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in the Free State, Gauteng and Western Cape provinces.

The National Noise Control Regulations (GN R154 1992) defines:

"**disturbing noise**" as:
noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.

In addition:

In terms of Regulation 2 -

"A local authority may –

(c): if a noise emanating from a building, premises, vehicle, recreational vehicle or street is a disturbing noise or noise nuisance, or may in the opinion of the local authority concerned be a disturbing noise or noise nuisance, instruct in writing the person causing such noise or who is responsible therefor, or the owner or occupant of such building or premises from which or from where such noise emanates or may emanate, or all such persons, to discontinue or cause to be discontinued such noise, or to take steps to lower the lever of the noise to a level conforming to the requirements of these Regulations within the period stipulated in the instruction: Provided that the provisions of this paragraph shall not apply in respect of a disturbing noise or noise nuisance caused by rail vehicles or aircraft which are not used as recreational vehicles;

(d): before changes are made to existing facilities or existing uses of land or buildings, or before new buildings are erected, in writing require that noise impact assessments or tests are conducted to the satisfaction of that local authority by the owner, developer, tenant or occupant of the facilities, land or buildings or that, for the purposes of regulation 3(b) or (c), reports or certificates in relation to the noise impact to the satisfaction of that local authority are submitted by the owner, developer, tenant or occupant to the local authority on written demand";

In terms of Regulation 4 of the Noise Control Regulations:

"No person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof".

2.2.2 Western Cape Provincial Noise Control Regulations: PN 200 of 2013

The control of noise in the Western Cape is legislated in the form of the Noise Control Regulations in terms of Section 25 the Environment Conservation Act No. 73 of 1989, applicable to the Province of the Western Cape as Provincial Notice 200 of 20 June 2013.

The regulations define:

"**ambient noise**" means the all-encompassing sound in a given situation at a given time, measured as the reading on an integrated impulse sound level meter for a total period of at least 10 minutes".

"**disturbing noise**" means a noise, excluding the unamplified human voice, which—

(a) exceeds the rating level by 7 dBA;
(b) exceeds the residual noise level where the residual noise level is higher than the rating level;
(c) exceeds the residual noise level by 3 dBA where the residual noise level is lower than the rating level; or
(d) in the case of a low-frequency noise, exceeds the level specified in Annex B of SANS 10103;

''noise sensitive activity'' means any activity that could be negatively impacted by noise, including residential, healthcare, educational or religious activities;

''low-frequency noise'' means sound which contains sound energy at frequencies predominantly below 100 Hz;

''rating level'' means the applicable outdoor equivalent continuous rating level indicated in Table 2 of SANS 10103;

''residual noise'' means the all-encompassing sound in a given situation at a given time, measured as the reading on an integrated impulse sound level meter for a total period of at least 10 minutes, excluding noise alleged to be causing a noise nuisance or disturbing noise;

''sound level'' means the equivalent continuous rating level as defined in SANS 10103, taking into account impulse, tone and night-time corrections;

These Regulations prohibits anyone for causing a disturbing noise (Clause 2) and uses the $L_{Aeq,impulse}$ descriptor to define ambient sound and noise levels.

Also, in terms of regulation 4:
(1) The local authority, or any other authority responsible for considering an application for a building plan approval, business licence approval, planning approval or environmental authorisation, may instruct the applicant to conduct and submit, as part of the application—

(a) a noise impact assessment in accordance with SANS 10328:2008 to establish whether the noise impact rating of the proposed land use or activity exceeds the appropriate rating level for a particular district as indicated in SANS 10103; or

(b) where the noise level measurements cannot be determined, an assessment, to the satisfaction of the local authority, of the noise level of the proposed land use or activity.

(2) *(a)* A person may not construct, erect, upgrade, change the use of or expand any building that will house a noise-sensitive activity in a predominantly commercial or industrial area, unless he or she insulates the building sufficiently against external noise so that the sound levels inside the building will not exceed the appropriate maximum rating levels for indoor ambient noise specified in SANS 10103.

(b) The owner of a building referred to in paragraph *(a)* must inform prospective tenants or buyers in writing of the extent to which the insulation measures contemplated in that paragraph will mitigate noise impact during the normal use of the building.

(c) Paragraph *(a)* does not apply when the use of the building is not changed.

(3) Where the results of an assessment undertaken in terms of subregulation (1) indicate that the applicable noise rating levels referred to in that subregulation will likely be exceeded, or will not be exceeded but will likely exceed the existing residual noise levels by 5 dBA or more—

(a) the applicant must provide a noise management plan, clearly specifying appropriate mitigation measures to the satisfaction of the local authority, before the application is decided; and

(b) implementation of those mitigation measures may be imposed as a condition of approval of the application.

(4) Where an applicant has not implemented the noise management plan as contemplated in sub-regulation (3), the local authority may instruct the applicant in writing to—

(a) cease any activity that does not comply with that plan; or

(b) reduce the noise levels to an acceptable level to the satisfaction of the local authority.

2.3 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act ("NEMA") defines "pollution" to include any change in the environment, including noise. A duty therefore arises under section 28 of NEMA to take reasonable measures while establishing and operating any facility to prevent noise pollution occurring. NEMA sets out measures which may be regarded as reasonable. They include the following measures:

1. to investigate, assess and evaluate the impact on the environment;

2. to inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
3. to cease, modify or control any act, activity or process causing the pollution or degradation;
4. to contain or prevent the movement of the pollution or degradation;
5. to eliminate any source of the pollution or degradation; and
6. to remedy the effects of the pollution or degradation.

In addition, Appendix 6 of GN 982 of December 2014 (Gov. Gaz. 38282), issued in terms of this Act, have general requirements for EAPs and specialists. It also defines minimum information requirements for specialist reports.

2.3.1 Appendix 6 of GN 982 of December 2014 (Gov. Gaz. 38282)

These regulations define the required information to compile a specialist report. Chapter 4, Part 2 highlights this in section (8) *"A specialist report must contain all information set out in Appendix 6 to these Regulations".* These requirements are further defined as:

Appendix 6

"Specialist reports

1. (1) A specialist report prepared in terms of these Regulations must contain-

(a) details of-

(i) the specialist who prepared the report; and

(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;

(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;

(c) an indication of the scope of, and the purpose for which, the report was prepared;

(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;

(e) a description of the methodology adopted in preparing the report or carrying out them specialised process;

(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;

(g) an identification of any areas to be avoided, including buffers;

(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;

(i) a description of any assumptions made and any uncertainties or gaps in knowledge;

(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;

(k) any mitigation measures for inclusion in the EMPr;

(l) any conditions for inclusion in the environmental authorisation;

(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;

(n) a reasoned opinion-

(i) as to whether the proposed activity or portions thereof should be authorised; and

(ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;

(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;

(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and

(q) any other information requested by the competent authority.

2.4 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT (ACT 39 OF 2004)

Section 34 of the National Environmental Management: Air Quality Act (Act 39 of2004) makes provision for:

(1) the Minister to prescribe essential national noise standards -

(a) for the control of noise, either in general or by specified machinery or activities or in specified places or areas; or

(b) for determining –

(i) a definition of noise

(ii) the maximum levels of noise

(2) When controlling noise the provincial and local spheres of government are bound by any prescribed national standards.

This section of the Act has been promulgated, but no such standards have yet been issued. Draft regulations have however, been promulgated for adoption by Local Authorities.

An atmospheric emission licence issued in terms of Section 22 may contain conditions in terms of noise.

2.4.1 Model Air Quality Management By-law for adoption and adaptation by Municipalities (GN 579 of 2010)

Model Air Quality Management By-Laws for adoption and adaptation by municipalities was published by the Department of Water and Environmental Affairs in the Government Gazette of 2 July 2010 as Government Notice 579 of 2010.

The main aim of the model air quality management by-law is to assist municipalities in the development of their air quality management by-law within their jurisdictions. It is also the aim of the model by-law to ensure uniformity across the country when dealing with air quality management challenges. Therefore, the model by-law is developed to be generic in order to deal with most of the air quality management challenges. With Noise Control being covered under the Air Quality Act (Act 39 of 2004), noise is also managed in a separate section under this Government Notice.

- **IT IS NOT** the aim of the model by-law to have legal force and effect on municipalities when published in the Gazette; and
- **IT IS NOT** the aim of the model by-law to impose the by-law on municipalities.

Therefore, a municipality will have to follow the legal process as set out in the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000) when adopting and adapting the model by-law to its local jurisdictions.

2.5 NOISE STANDARDS

There are a few South African scientific standards (SABS) relevant to noise from mines, industry and roads. They are:

- SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';
- SANS 10210:2004. 'Calculating and predicting road traffic noise';
- SANS 10328:2008. 'Methods for environmental noise impact assessments'.

- SANS 10357:2004. 'The calculation of sound propagation by the Concave method'.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful *per se.*

2.6 NATIONAL TRANSPORT POLICY (SEPTEMBER 1996)

The White Paper sets the vision for transport in South Africa that provides for *safe, reliable, effective, efficient and fully integrated transport operations and infrastructure which….. are environmentally and economically sustainable*. The White Paper further states that "*the provision of transportation infrastructure and the operation of the transportation system have the potential for causing damage to the physical and social environment, inter alia, through atmospheric and noise pollution, ecological damage and severance. … The Department of Transport is committed to an integrated environmental management approach in the provision of transport*". It is also stated that "*As part of the overall long-term vision for the South African transport system, transport infrastructure will, inter alia, be structured to ensure environmental sustainability and internationally accepted standards*". One of the strategic objectives for transport infrastructure to achieve this vision is to promote environmental protection and resource conservation.

2.7 INTERNATIONAL GUIDELINES

While a number of international guidelines and standards exist, those selected below are used by numerous countries for environmental noise management.

2.7.1 Guidelines for Community Noise (WHO, 1999)

The World Health Organization's (WHO) document on the *Guidelines for Community Noise* is the outcome of the WHO- expert task force meeting held in London, United Kingdom, in April 1999. It is based on the document entitled "Community Noise" that was prepared for the World Health Organization and published in 1995 by the Stockholm University and Karolinska Institute.

The scope of WHO's effort to derive guidelines for community noise is to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments.

Guidance on the health effects of noise exposure of the population has already been given in an early publication of the series of Environmental Health Criteria. The health risk to humans from exposure to environmental noise was evaluated and guidelines values derived. The issue of noise control and health protection was briefly addressed.

The document uses the L_{Aeq} and $L_{A,max}$ noise descriptors to define noise levels. It should be noted that a follow-up document focusing on Night-time Noise Guidelines for Europe (WHO, 2009).

2.7.2 Night Noise Guidelines for Europe (WHO, 2009)

Refining previous Community Noise Guidelines issued in 1999, and incorporating more recent research, the World Health Organization has released a comprehensive report on the health effects of night time noise, along with new (non-mandatory) guidelines for use in Europe. Rather than a maximum of 30 dB inside at night (which equals 45-50 dB max outside), the WHO now recommends a maximum year-round outside night-time noise average of 40 db to avoid sleep disturbance and its related health effects. The report notes that only below 30 dB (outside annual average) are "*no significant biological effects observed*," and that between 30 and 40 dB, several effects are observed, with the chronically ill and children being more susceptible; however, "*even in the worst cases the effects seem modest*." Elsewhere, the report states more definitively, "*There is no sufficient evidence that the biological effects observed at the level below 40 dB (night, outside) are harmful to health*." At levels over 40 dB, "*Adverse health effects are observed*" and "*many people have to adapt their lives to cope with the noise at night. Vulnerable groups are more severely affected*."

The 184-page report offers a comprehensive overview of research into the various effects of noise on sleep quality and health (including the health effects of non-waking sleep arousal), and is recommended reading for anyone working with noise issues. The use of an outdoor noise standard is in part designed to acknowledge that people do prefer to leave windows open when sleeping, though the year-long average may be difficult to obtain (it would require longer-term sound monitoring than is usually budgeted for by either industry or neighbourhood groups).

While recommending the use of the average level, the report notes that some instantaneous effects occur in relation to specific maximum noise levels, but that the health effects of these "cannot be easily established."

2.7.3 Equator Principles

The **Equator Principles** (EPs) are a voluntary set of standards for determining, assessing and managing social and environmental risk in project financing. Equator Principles Financial Institutions (EPFIs) commit to not providing loans to projects where the borrower will not or is unable to comply with their respective social and environmental policies and procedures that implement the EPs.

The Equator Principles were developed by private sector banks and were launched in June 2003. Revision III of the EPs has been in place since June 2013. The participating banks chose to model the Equator Principles on the environmental standards of the World Bank (1999) and the social policies of the International Finance Corporation (IFC). Eighty-three financial institutions (2016) have adopted the Equator Principles, which have become the de facto standard for banks and investors on how to assess major development projects around the world.

The environmental standards of the World Bank have been integrated into the social policies of the IFC since April 2007 as the International Finance Corporation Environmental, Health and Safety (EHS) Guidelines.

2.7.4 IFC: General EHS Guidelines – Environmental Noise Management

These guidelines are applicable to noise created beyond the property boundaries of a development that conforms to the Equator Principle.

It states that noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception. The preferred method for controlling noise from stationary sources is to implement noise control measures at source.

It goes as far as to proposed methods for the prevention and control of noise emissions, including:

- Selecting equipment with lower sound power levels;
- Installing silencers for fans;
- Installing suitable mufflers on engine exhausts and compressor components;

- Installing acoustic enclosures for equipment casing radiating noise;
- Improving the acoustic performance of constructed buildings, apply sound insulation;
- Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m^2 in order to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or to the receptor location to be effective;
- Installing vibration isolation for mechanical equipment;
- Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas ;
- Re-locating noise sources to less sensitive areas to take advantage of distance and shielding;
- Placement of permanent facilities away from community areas if possible;
- Taking advantage of the natural topography as a noise buffer during facility design;
- Reducing project traffic routing through community areas wherever possible;
- Planning flight routes, timing and altitude for aircraft (airplane and helicopter) flying over community areas; and
- Developing a mechanism to record and respond to complaints.

It sets noise level guidelines (see **Table 2-1**) as well as highlighting the certain monitoring requirements pre- and post-development. It adds another criterion in that the existing background ambient noise level should not rise by more than 3 dBA. This criterion will effectively sterilize large areas of any development. It is, therefore, the considered opinion that this criterion was introduced to address cases where the existing ambient noise level is already at, or in excess of the recommended limits.

Table 2-1: IFC Table .7.1-Noise Level Guidelines

Receptor type	One hour L_{Aeq} (dBA)	
	Daytime 07:00 - 22:00	Night-time 22:00 – 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

The document uses the $L_{Aeq,1\ hr}$ noise descriptors to define noise levels. It does not determine the detection period, but refers to the IEC standards, which requires the fast detector setting on the Sound Level Meter during measurements for Europe.

3 CURRENT ENVIRONMENTAL SOUND CHARACTER

3.1 LIMITATIONS: ACOUSTICAL MEASUREMENTS

The following are limitations associated with the measurement of ambient sound levels:

- Ambient sound levels are the cumulative effects of innumerable sounds generated at various instances both far and near. High measurements may not necessarily mean that noise levels in the area are high. Similarly, a low sound level measurement will not necessarily mean that the area is always quiet, as sound levels will vary over seasons, time of the day, faunal characteristics, vegetation in the area and meteorological conditions (especially wind). This is excluding the potential effect of sounds from anthropogenic origin. It is impossible to quantify and identify the numerous sources that influenced one 10-minute measurement using the reading result at the end of the measurement;
- Because a sound level measured is the combination of sounds both near and far, sound measurements can only indicate likely sound levels. These measurements cannot define the origin of potential noise sources, neither easily differentiate between a loud far-off noise nor a softer, but closer sound;
- Determination of road traffic and other noise sources of significance are important (traffic counts). In areas where roads are busy road traffic generally contributes to a significant portion of the ambient noise;
- Measurements over wind speeds of 3 m/s will provide data potentially influenced by wind-induced noises. Therefore sound data will have to be read in conjunction with meteorological (wind) data. SANS methodologies specifically recommend that data collected during windy conditions be discarded. If this data is to be used special precautions should be taken, including the use of all-weather wind shields specifically designed for use in higher wind conditions;
- Ambient sounds will vary with seasons as faunal activity increase and decrease, similarly as vegetation (in particular foliage) changes;
- Accurately defining ambient sound/noise levels at a community or house requires that measurements must be collected at that location for a long period of time;
- Exact location of a sound level meter in a small area (such as a single dwelling) in relation to structures, vegetation and external noise sources will impact on the measurements;
- While not audible while an instrument is erected at a measurement location, there could be a noise source in the area that can only be detected during the quieter periods or when the data is analysed at a future period (such as a water pump that only operates for a short period of time periodically during the day);

- Measurements recorded near oceans are naturally high most of the time due to surf noises;
- Measurements recorded near rivers, streams, wetlands, trees and bushy areas can be high. This is due to faunal activity which can dominate the sound levels around the measurement point. It is technically very difficult to "mask" fauna activity during a measurement period or find an area where there is no faunal activity that will not contribute unwanted sounds to measurements;
- Considering one variable/weighted/time is not sufficient for and acoustical assessment. L_{AMin}, L_{AIeq}, L_{Aeq}, L_{Ceq}, L_{AMax}, L_{A10}, L_{A90} and spectral analysis forms part of the many variables to be considered; and,
- As a residential area develops the presence of people will result in increased sounds. These are generally a combination of traffic noise, voices, animals and equipment (incl. TV's and Radios). The result is that ambient sound levels will increase as an area matures.

3.2 MEASUREMENT PROCEDURE

The measurement of ambient sound levels is defined by the South African National Standard SANS 10103:2008 as: "***The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication***". The standard specifies the acceptable techniques for sound measurements including:

- type of equipment;
- minimum duration of measurement;
- microphone positions;
- calibration procedures and instrument checks; and
- weather conditions.

Ambient sound levels were measured over a period of two nights during May 2016 with the locations used to measure ambient (background) sound levels presented in **Figure 3-1**. Photos taken during the measurement date is presented in **Appendix B**.

3.3 MEASUREMENT RESULTS

3.3.1 Measurement Point AMSGLTASL01 (NSD02)

This measurement location was just in front of a residential house, close to the fence of this dwelling. The microphone was approximately 5m from a large tree.

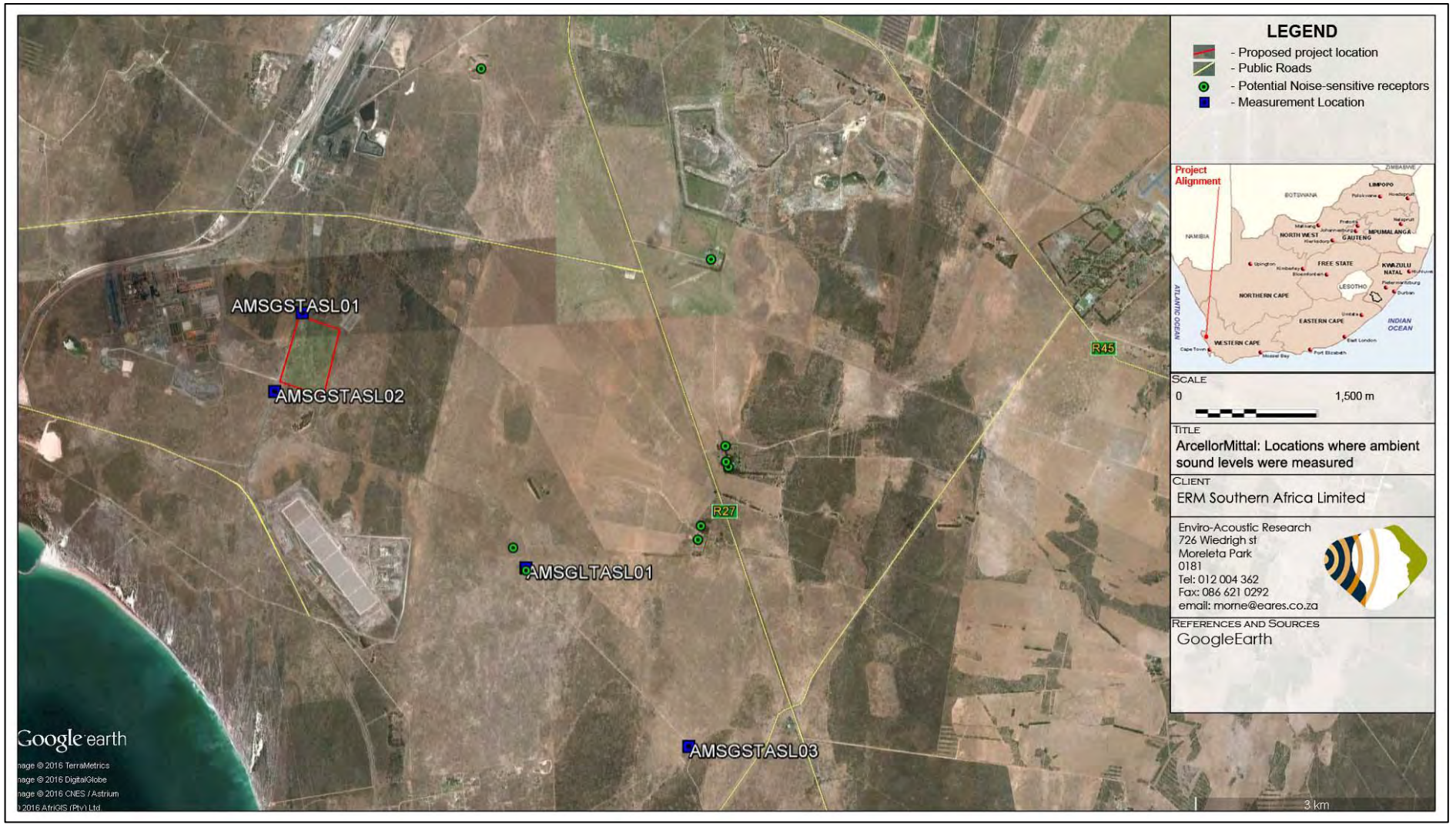

Figure 3-1: Locations where ambient sound levels were measured

Table 3-1 highlights sounds heard during equipment deployment and collection, with the eequipment used to gather data presented in **Table 3-2**.

Table 3-1: Noises/sounds observed

		During Deployment	During Collection
Magnitude Scale Code: • **Barely Audible** • **Audible** • **Dominating**	**Faunal and natural**	Cows and Jackal communication. Bird calls. Cricket communication. Wind-induced noises at times.	Bird calls. Ocean.
	Residential	Water Pump (at times). Voices. Dogs barking (at times).	Dogs barking (occasional, dominating during event).
	Industrial & transportation	Road traffic sounds (during passing in distance). Saldanha Steel operations.	Road traffic sounds (during passing in distance).

Table 3-2: Equipment used to gather data at NSD02

Equipment	Model	Serial no	Calibration
SLM	SVAN 977	34160	May 2015
Microphone	ACO Pacific 7052E	54645	May 2015
Calibrator	Quest QC-20	QOC 020005	June 2015
Weather Station	WH3081PC	-	-

* Microphone fitted with the appropriate windshield (RION WS-03).

The instrument was setup to do the measurements over a 10-minute period, stop the measurement (and immediately start a new 10-minute measurement) and save the data until the instrument was stopped. Measured data is presented in **Figure 3-2** (equivalent and 10-minute A-weighted measurements, impulse and fast descriptor).

Measured $L_{Aeq,i}$ day/night-time data: This sound descriptor is mainly used in South Africa to define sound and noise levels. During the daytime 10-minute $L_{Aeq,10min}$ values ranged from 37 to 77 dBA. The night-time $L_{Aeq,10min}$ values (night-time reference period 22:00 – 06:00) ranged from 40 to 55 dBA. The daytime arithmetic mean was 49 dBA while the night-time average was 47 dBA. The equivalent daytime sound level ("average" value over 16 hours for the second day) was 61 dBA. The equivalent value for the first night was 49 dBA and 47 dBA for the second night. Measured data indicated an area with increased ambient sound levels due to natural sounds as well as various sounds of anthropogenic origin. Ambient sound levels are illustrated in **Figure 3-2**.

Measured $L_{Aeq,f}$ day/night-time data: Fast-weighted equivalent sound levels are included in this report as this is the sound descriptor used in most international countries to define the Ambient Sound Level. During the daytime $L_{Aeq,10min,f}$ values ranged from 35

to 74 dBA. The night-time $L_{Aeq,10min,f}$ values (night-time reference period 22:00 – 06:00) ranged from 38 to 54 dBA. The daytime arithmetic mean was 47 dBA while the night-time average being 46 dBA. The equivalent daytime sound levels were 55 (evening only), 58 and 48 (morning only) dBA. Night-time equivalent sound levels were 48 and 46 dBA. Ambient sound levels are illustrated in **Figure 3-2**.

Measured 10-minute L_{FA90} day/night-time data: L_{A90} is a statistical indicator that describes the noise level that is exceeded 90% of the time and frequently used to define the background sound level internationally. Daytime values ranged from 26 to 54 dBA90 averaging at 37 dBA90. The night-time L_{A90} values ranged from 23 to 50 dBA90 (night-time reference period 22:00 – 06:00) averaging at 35 dBA90. Measured L_{A90} data also confirm an area with increased sound levels. This area was never silent during the measurement (compared to a undeveloped rural area). This is illustrated in **Figure 3-3**.

L_{IAeq} - L_{FAeq} average difference, day/night-time: The average daytime difference between the $L_{Aeq,i}$ and $L_{Aeq,f}$ variables was 2.6 dB while the night-time average difference was 1.3 dBA. While impulsive noises were reported it is not significant.

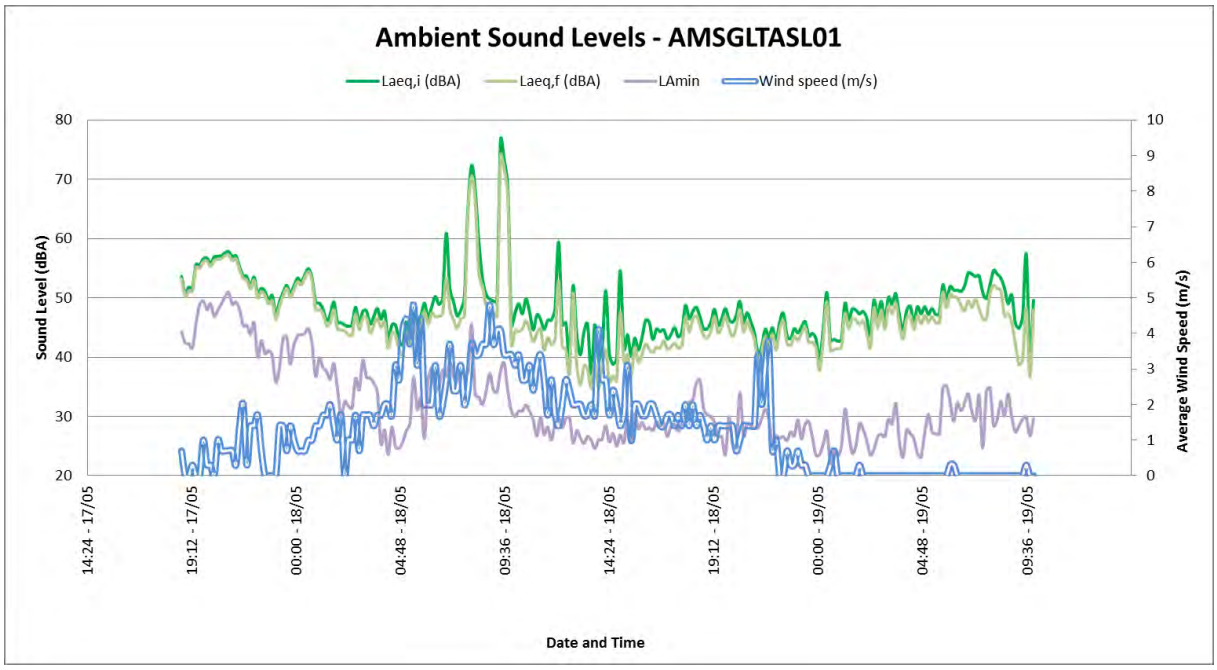

Figure 3-2: Ambient Sound Levels measured at AMSGLTASL01

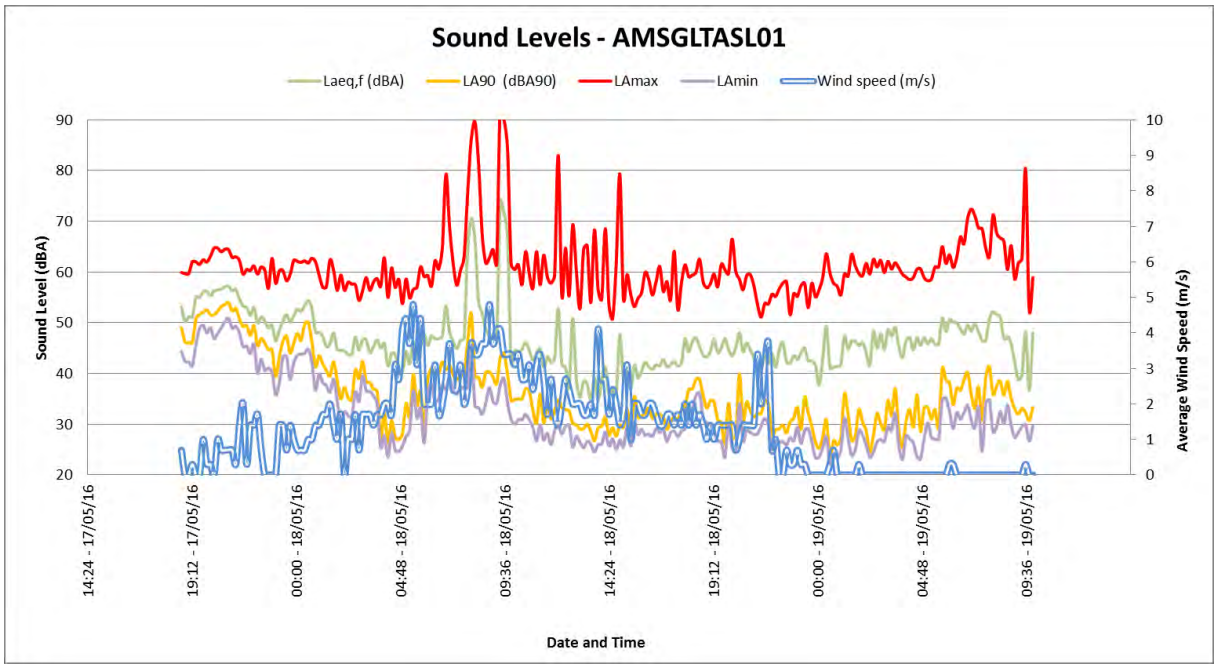

Figure 3-3: 10 minute maximum, 90th percentile, equivalent and minimum sound levels measured at AMSGLTASL01

L_{Amax} night-time occurrences: While there were numerous events where the maximum sound levels exceeded 65 dBA, this was limited to daytime hours. There were no noise events during the two night-time periods where the sound level exceeded 65 dBA. Night-time maximum noise events may affect sleeping patterns in humans (if they occur frequently at night).[1]

Third octave spectral analysis:

Third octaves were measured and are displayed in the following Figures.

Lower frequency (20 – 250 Hz) – Noise sources of significance in this frequency band would include nature (wind and surf especially) and sounds of anthropogenic origin (such as electric motors) and vehicles (engine revolutions). Lower frequencies tend to travel further through the atmosphere than higher frequencies. The presence of significant acoustic energy in this frequency rage indicates the presence of these noises. Smooth curves normally indicate noises of natural origin with wavy curves generally indicating sounds of anthropogenic origin. All measurements indicated significant acoustic energy in these low frequencies. Considering the sounds heard it is likely a combination of sounds

[1] World Health Organization, 2009, '*Night Noise Guidelines for Europe*.

from natural sounds (wind, ocean). Sounds from the road may have contributed to this acoustic energy.

Third octave surrounding the 1000 Hz – This range contains energy mostly associated with human speech (350 Hz – 2,000 Hz; mostly below 1,000 Hz) and dwelling noises (including sounds from larger animals such as chickens, dogs, goats, sheep and cattle). Most measurements indicate that wind-induced sounds (based on the audible sounds heard) created a constant background noise, likely masking most other sounds in the area (although louder transient sounds will still be clearly audible - such as a bird call). The peak in 315 – 400 Hz range likely relates to voices heard the first night when the instrument was deployed.

Higher frequency (2,000 Hz upwards) – Smaller faunal species such as birds, crickets and cicada use this range to communicate and hunt etc. Morning and daytime measurements indicate peaks in the 4,000 – 5,000 Hz range, relating to the bird sounds nesting in the area. Measurements however indicated little sounds in this frequency range during the measurement period with wind-induced and surf noises dominating. Night-time measurements indicate peaks in the 2,000 (first night) and 2,500 (second night) Hz frequencies.

Spectral data analysis indicates an area with elevated ambient sound levels. There is no one particular sound but it is due to the cumulative effect of sounds from various sources, both close and far.

SANS 10103 Rating Level - Though the area indicates sound level typical of an urban noise district, the development character is more typical of a rural district. Considering the night-time sound levels a SANS 10103:2008 rating level typical of an Urban Noise District will be applicable.

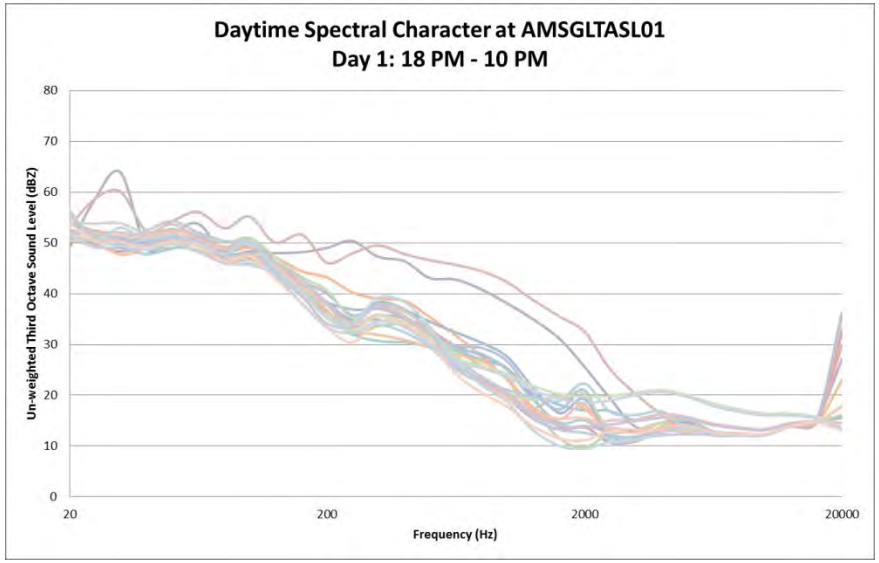

Figure 3-4: Spectral frequencies – AMSGLTASL01, Day 1

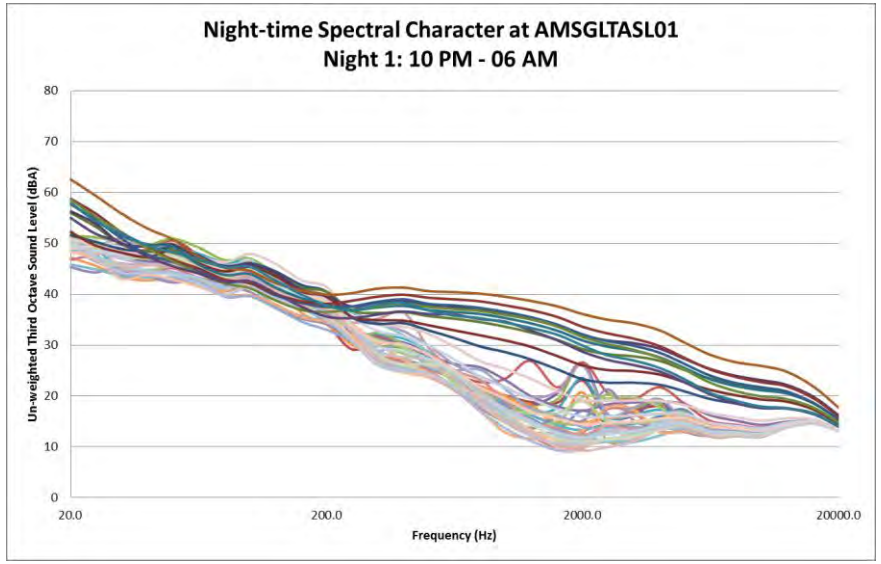

Figure 3-5: Spectral frequencies - AMSGLTASL01, Night 1

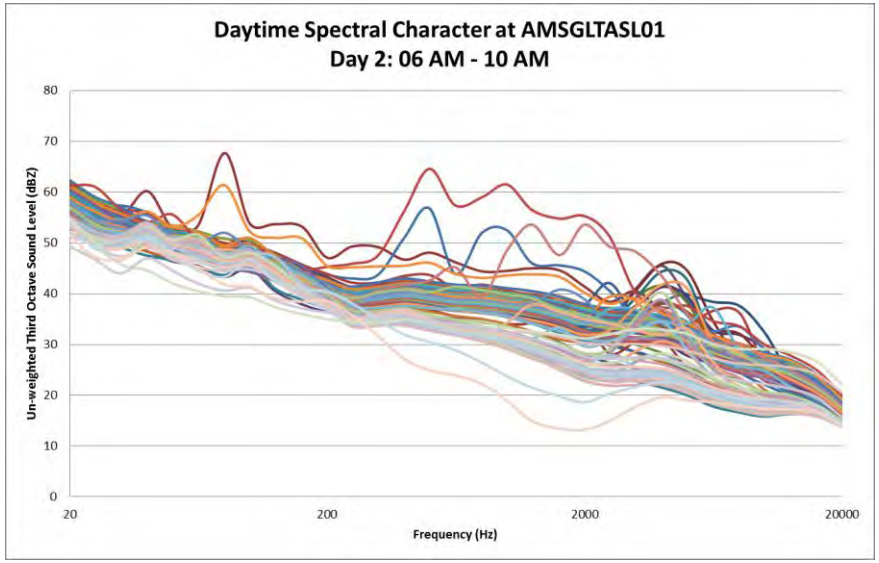

Figure 3-6: Spectral frequencies - AMSGLTASL01, Day 2

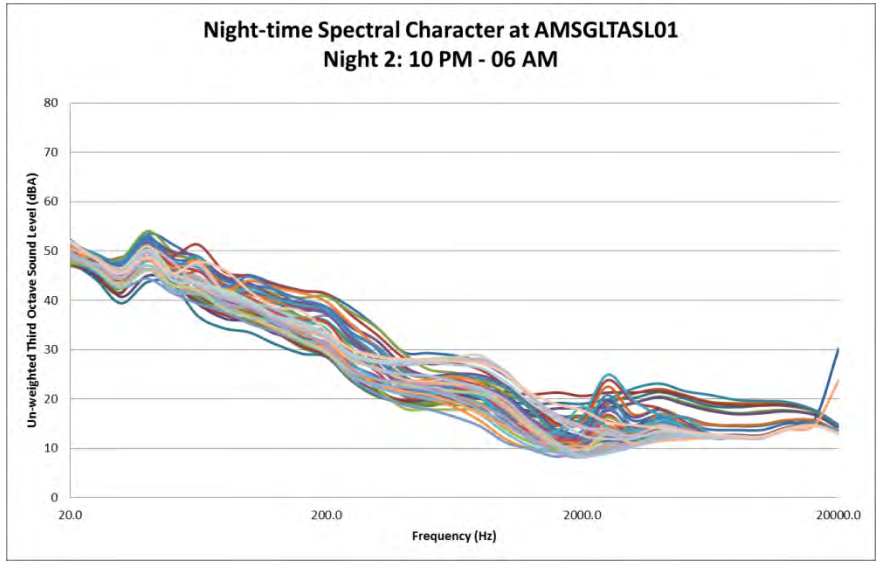

Figure 3-7: Spectral frequencies - AMSGLTASL01, Night 2

3.3.2 Single measurements – In vicinity of development area

A number of single measurements were collected to gauge the ambient sound character and levels in the area. Equipment used at these locations is defined in the following table. Refer to **Appendix B** for photos of the measurement locations.

Table 3-3: Equipment used to do singular measurements

Equipment	Model	Serial no	Calibration
SLM	RION NA-28	00901489	May 2015
Microphone	UC-59	02087	May 2015
Calibrator	Quest QC-20	QOC 020005	June 2015

Note: SLM fitted at all times with appropriate windshield

The data collected and information about the measurement locations are presented in **Table 3-4**.

Note:

$L_{Aeq,i}$ - Equivalent (average) A-weighted impulse-time-weighted noise level

$L_{Aeq,f}$ - Equivalent (average) A-weighted fast-time-weighted noise level

L_{A90} - Noise level that is exceeded 90% or more of the time, A-weighted fast-time-weighted noise level

Short term measurements indicated ambient sound levels typical of an urban noise district (with main roads, business and workshops) closer to the project site. Daytime ambient sound levels are higher, mainly due to road traffic, although wind-induced noises also contributed to the ambient sound levels. Short term measurements away from roads, business and residential dwellings indicate an area with the potential to be very quiet.

Table 3-4: Summary of singular noise measurements

Measurement location	$L_{Aeq,i}$ level (dBA)	$L_{Aeq,f}$ level (dBA)	L_{A90} Level (dBA90)	Spectral character	Comments
AMSGSTASL01 Daytime	76	73	52	**Figure 3-8**	Similar sound level from Saldanha Steel than night-time measurement (during periods of windless conditions and no road traffic). Increased wind induced noises and significantly more traffic. Bird sounds just audible during quiet periods. Gusty northerly wind. Traffic travelling about 80 - 100 km/h. 1. 74 cars, 3 trucks 2. 67 cars, 3 trucks
	76	73	50		
AMSGSTASL01 Night-time	51	47	45	**Figure 3-9**	Hum from Saldanha Steel dominating, possible flare. Sirens audible at times. Lower hum from Namaqua Sands. Reverse alarms at times. Sounds of trucks slamming or similar impulsive noise audible at times from ore loading area, just audible. Wind gusts but industry noises dominating.
	52	48	45		
AMSGSTASL02 Daytime	75	72	51	**Figure 3-10**	Sounds from Saldanha Steel constant background noise. Road traffic noises dominant noise most of times. Wind gusts at times. 1. 55 cars, 4 trucks 2. 59 cars, 2 trucks
	75	72	51		
AMSGSTASL02 Night-time	49	46	45	**Figure 3-11**	Sounds from Saldanha Steel dominating, constant hum. Flare visible. Frogs audible. Other unidentifiable sounds from Saldanha Steel, including sirens at times, locomotive hooter in distance during second measurement.
	51	47	46		
AMSGSTASL03 Daytime	49	47	39	**Figure 3-12**	Wind induced noises likely dominant with significant bird noises, northerly wind. Saldanha Steel audible as low rumble during quiet periods. Traffic noises just audible at times.
	47	45	37		
AMSGSTASL03 Night-time	37	29	24	**Figure 3-13**	Traffic on R27 road significant noise source during traffic passing. With no traffic passing low hum from Saldanha Steel works constant in background. Siren at road works area during first measurement. Faunal sounds at times and just audible. Northerly wind gusts at times but not increasing sound levels as there is little vegetation in area. Road traffic noises rather constant and audible above hum from steel works. Alarms from caracal deterrents active every few minutes (about 6-8 times). Bird call at times in distance.
	32	24	20		

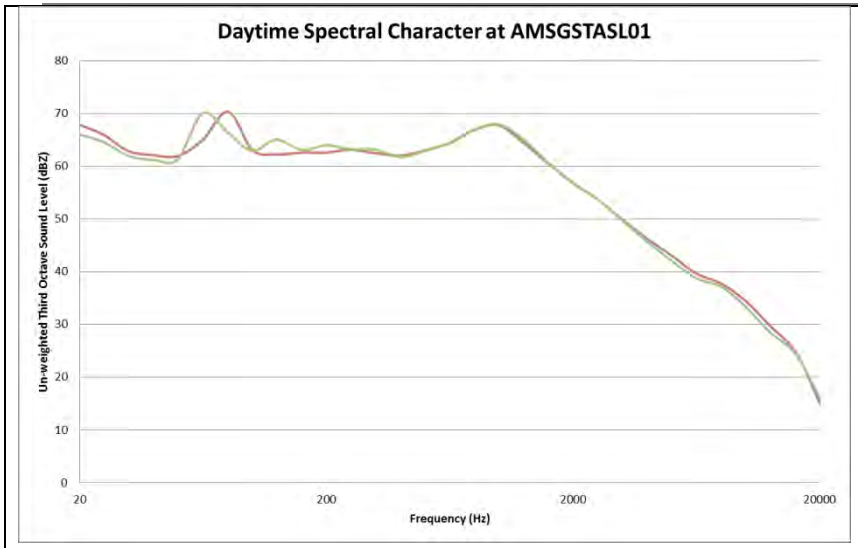

Figure 3-8: Spectral frequencies recorded at AMSGSTASL01

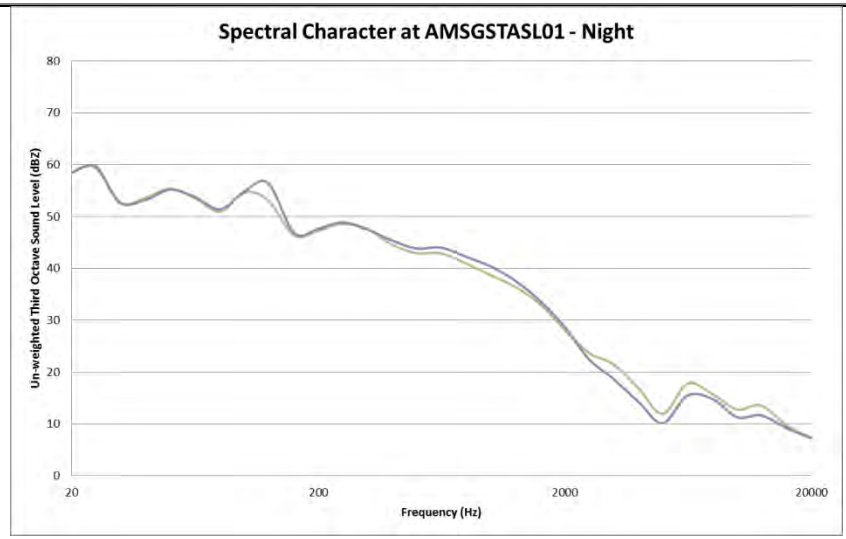

Figure 3-9: Spectral frequencies recorded at AMSGSTASL01

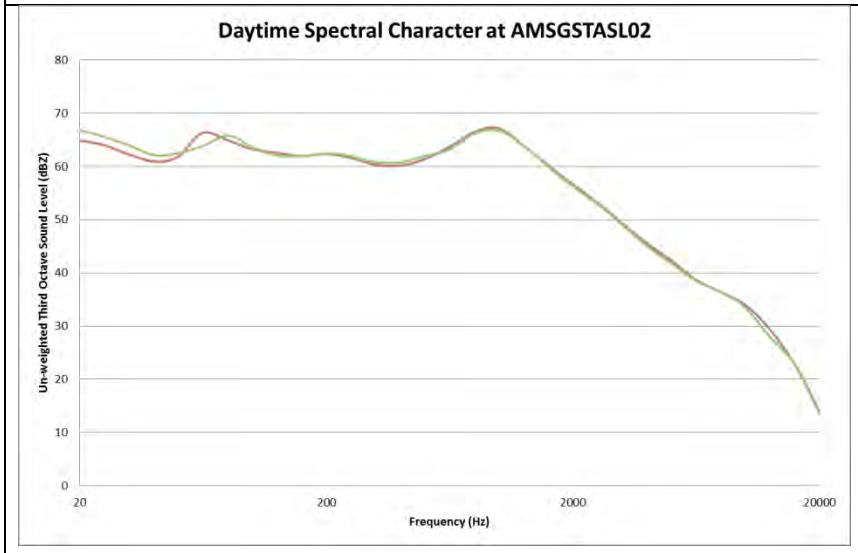

Figure 3-10: Spectral frequencies recorded at AMSGSTASL02

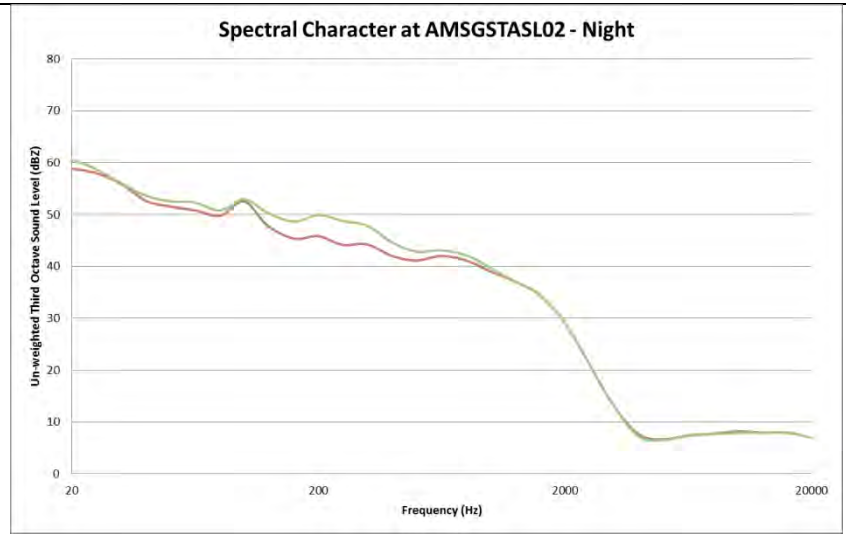

Figure 3-11: Spectral frequencies recorded at AMSGSTASL02

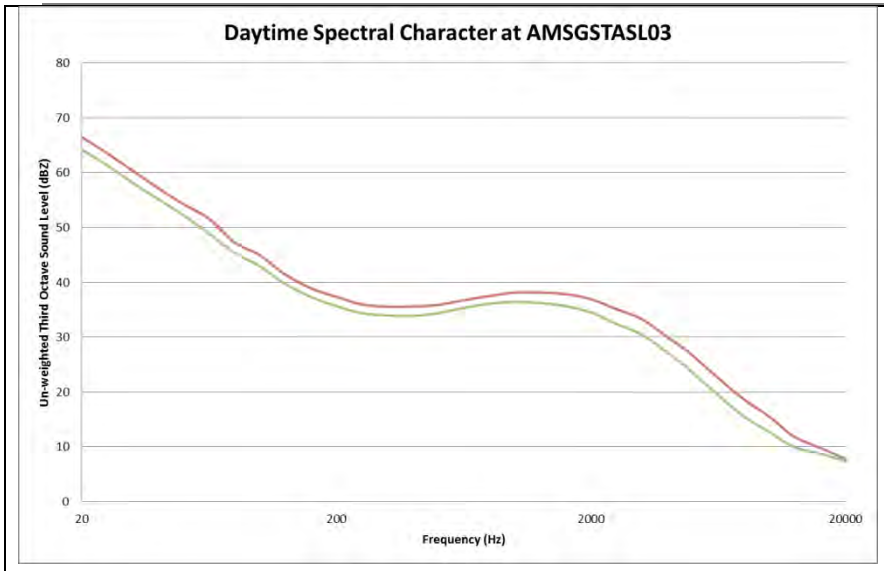

Figure 3-12: Spectral frequencies recorded at AMSGSTASL03

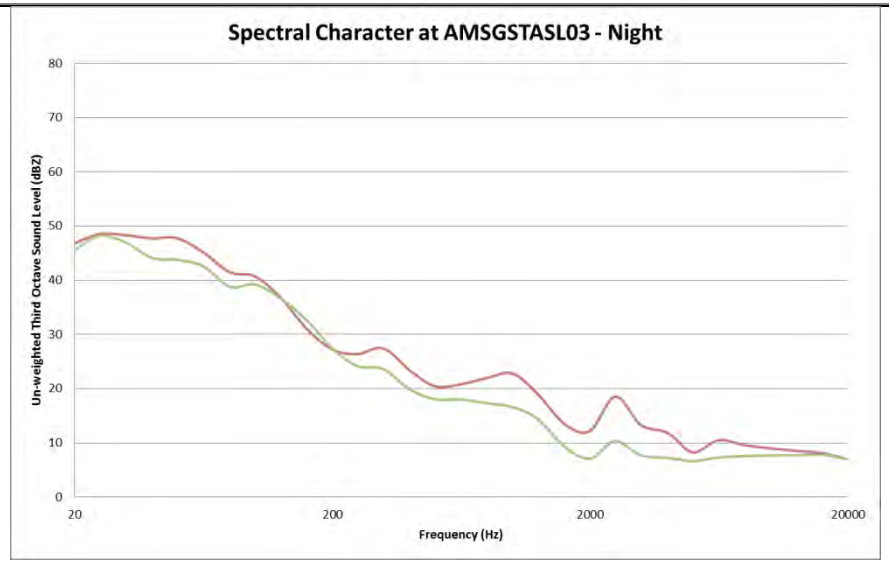

Figure 3-13: Spectral frequencies recorded at AMSGSTASL03

4 POTENTIAL NOISE SOURCES

Increased noise levels are directly linked with the various actions associated with the construction and operation of the project activities.

4.1 POTENTIAL NOISE SOURCES: CONSTRUCTION NOISES

4.1.1 Construction Activities

Construction activities include:

- Additional traffic to and from the site, as well as traffic on the site;
- Site preparation, including the site clearing and levelling, development of internal site roads and security fencing;
- Establishment of contractors camp, storage and laydown areas;
- Earthworks, possible blasting (if hard rock is encountered) and piling activities;
- Development of the foundations;
- Laying of pipelines and establishment of the switchyard, and;
- Construction of infrastructure and facilities.

As the project will be developed in phases, it is likely that the operational phase will be taking place simultaneously with the construction of phase 2. There are a number of factors that determine the audibility as well as the potential of a noise impact on receptors.

Maximum noises generated can be audible over a large distance, however, are generally of very short duration. If maximum noise levels however exceed 65 dBA at a receptor, or if it is clearly audible with a significant number of instances where the noise level exceeds the prevailing ambient sound level with more than 15 dB the noise can increase annoyance levels and may ultimately result in noise complaints. Potential maximum noise levels generated by construction equipment as well as the potential extent are presented in **Table 4-1**. The potential extent depends on a number of factors, including the prevailing ambient sound levels during the instance the maximum noise event occurred, as well as the spectral character of the noise and the ambient soundscape in the surroundings.

Average or equivalent sound levels are another factor that impacts on the ambient sound levels and is the constant sound level that the receptor can experience. Typical sound

power levels associated with various activities that may be found at a construction site is presented in **Table 4-2**.

4.1.2 Blasting

It is unlikely that blasting will be required as part of the civil works to clear obstacles or to prepare foundations and blasting will not be considered in this report for the following reasons:

- Blasting is highly regulated, and control of blasting to protect human health, equipment and infrastructure will ensure that any blasts will use the minimum explosives and will occur in a controlled manner. The breaking of obstacles with explosives is also a specialized field and when correct techniques are used, causes significantly less noise than using a hydraulic rock-breaker.
- People are generally more concerned about ground vibration and air blast levels that might cause building damage than the impact of the noise from the blast. However, these are normally associated with close proximity mining/quarrying.
- Blasts are an infrequent occurrence, with a loud but a relative instantaneous character. Potentially affected parties generally receive sufficient notice (siren) and the knowledge that the duration of the siren noise as well as the blast will be over relative fast results in a higher acceptance of the noise. Note that with the selection of explosives and blasting methods, noise levels from blasting is relatively easy to control.

4.2 POTENTIAL NOISE SOURCES: COMMISSIONING

Noise will be generated during the start-up and commissioning phase of the plant during:

- hot commissioning and clean-out of the heat recovery boiler hot–path exchanger bundles and the super-heater piping using high pressure, high temperature steam in order to clean the pipe internals off all welding debris and mill scale. The high pressure steam would be vented to atmosphere, generating high noise levels for around 2 - 4 hours per day over 2 – 4 days.
- hot commissioning of steam piping running from heat recovery steam generation (HRSG) to steam turbines, during 'blow-out' operations to clean the pipe internals of all debris and mill scale. High pressure steam will be blown through the live steam line and vented to atmosphere. This process could last for 3 – 4 hours per day for up to 2 – 4 days.
- the testing of high pressure steam safety valves during commissioning could generate a sound pressure level of 160 dBA. This state would be sustained intermittently only for a few minutes at a time over a one hour period at most.

These can be considered temporary noises, and excluding the testing of the safety valves, the noise levels are similar to the noises considered for the worse-case operational scenario and will be addressed as part of the operational phase. Noises from the testing of the safety valves will be high, but very temporary and the testing will be taking place during the day, when noises are of lower concern than noises at night.

4.3 POTENTIAL NOISE SOURCES: OPERATIONAL NOISES

While there are numerous sources of noises associated at a gas-fired power plant, the main sources of noise are the:

- The air intake fans;
- Fans located on the air and steam condensers;
- Gas Turbine, steam turbine and generator (normally within building);
- Ventilation fans located on the turbine generator building; and
- Exhaust and flue stacks.

Typical sound power levels associated with various power generation equipment or activities are presented in **Table 4-2**.

While the generator unit will also generate noise (from the diesel/gas engine/turbine, electrical generator, steam condenser and venting), these activities generally takes place within a building and due to attenuation through the building walls the effective noise levels will be significantly less than the noise emitted by the noise from the air intake fans, the extraction fans on the stacks and potentially the condenser cooling fans.

It should be noted that while the noise levels of one intake fan may be less than the noise levels from an extraction fan, there are generally a bank of intake fans that cumulatively generate more noise than the extraction fans on the exit stack.

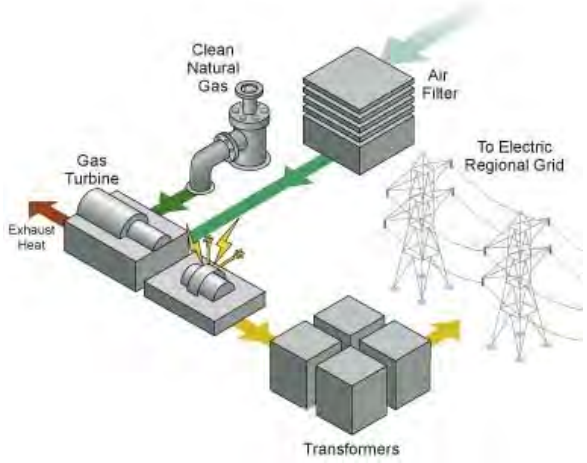

Figure 4-1: Simple gas-fired turbine generators (such as the Trent60)

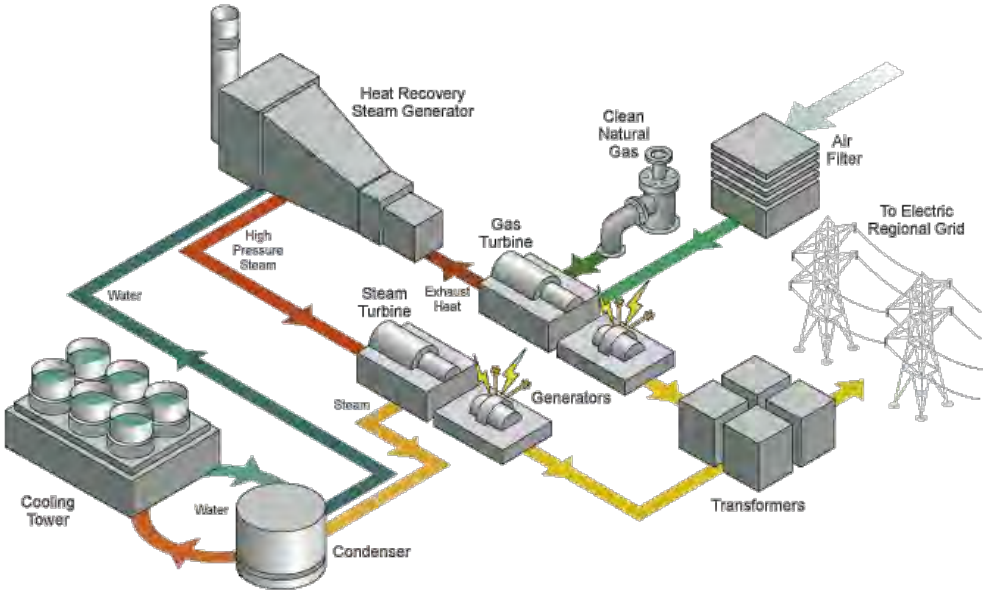

Figure 4-2: Combined Cycle Generation Process

Table 4-1: Potential maximum noise levels generated by construction equipment

Equipment Description[2]	Impact Device?	Maximum Sound Power Levels (dBA)	Operational Noise Level at given distance considering potential **maximum** noise levels (Cumulative as well as the mitigatory effect of potential barriers or other mitigation not included – simple noise propagation modelling only considering distance) (dBA)											
			5 m	10 m	20 m	50 m	100 m	150 m	200 m	300 m	500 m	750 m	1000 m	2000 m
Backhoe	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Compactor (ground)	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Compressor (air)	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Concrete Batch Plant	No	117.7	92.7	86.7	80.6	72.7	66.7	63.1	60.6	57.1	52.7	49.2	46.7	40.6
Concrete Mixer Truck	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Crane	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Dozer	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Drum Mixer	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Dump Truck	No	118.7	93.7	87.7	81.6	73.7	67.7	64.1	61.6	58.1	53.7	50.2	47.7	41.6
Excavator	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Flat Bed Truck	No	118.7	93.7	87.7	81.6	73.7	67.7	64.1	61.6	58.1	53.7	50.2	47.7	41.6
Front End Loader	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Generator (>25KVA)	No	116.7	91.7	85.7	79.6	71.7	65.7	62.1	59.6	56.1	51.7	48.2	45.7	39.6
Generator (<25KVA)	No	104.7	79.7	73.7	67.6	59.7	53.7	50.1	47.6	44.1	39.7	36.2	33.7	27.6
Grader	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Impact Pile Driver	Yes	129.7	104.7	98.7	92.6	84.7	78.7	75.1	72.6	69.1	64.7	61.2	58.7	52.6
Jackhammer	Yes	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Mounted Impact Hammer	Yes	124.7	99.7	93.7	87.6	79.7	73.7	70.1	67.6	64.1	59.7	56.2	53.7	47.6
Slurry Trenching Machine	No	116.7	91.7	85.7	79.6	71.7	65.7	62.1	59.6	56.1	51.7	48.2	45.7	39.6
Vibratory Concrete Mixer	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Vibratory Pile Driver	No	129.7	104.7	98.7	92.6	84.7	78.7	75.1	72.6	69.1	64.7	61.2	58.7	52.6
Welder/Torch	No	107.7	82.7	76.7	70.6	62.7	56.7	53.1	50.6	47.1	42.7	39.2	36.7	30.6

[2] Equipment list and Sound Power Level source: http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

Table 4-2: Potential equivalent noise levels generated by various equipment

Equipment Description	Sound Power Levels (dBA)	Operational Noise Level at given distance considering equivalent (average) sound power emission levels (Cumulative as well as the mitigatory effect of potential barriers or other mitigation not included) (dBA)							
		10 m	20 m	50 m	100 m	200 m	500 m	1000 m	2000 m
Black start facility	102.9	71.9	65.9	57.9	51.9	48.4	45.9	37.9	31.9
Bulldozer CAT D9	111.9	80.9	74.9	66.9	60.9	57.4	54.9	46.9	40.9
Cement truck (with cement)	111.7	80.7	74.7	66.7	60.7	57.2	54.7	46.7	40.7
Crane	107.5	76.5	70.5	62.5	56.5	53.0	50.5	42.5	36.5
Diesel Generator (Large - mobile)	106.1	75.1	69.1	61.2	55.1	51.6	49.1	41.2	35.1
Dumper/Haul truck - Terex 30 ton	112.2	81.2	75.2	67.2	61.2	57.7	55.2	47.2	41.2
Electrical Turbine Generator	116.7	85.7	79.7	71.8	65.7	62.2	59.7	51.8	45.7
Elevated Flare	124.0	93.0	87.0	79.0	73.0	69.5	67.0	59.0	53.0
Excavator - Hitachi EX1200	113.1	82.1	76.1	68.1	62.1	58.6	56.1	48.1	42.1
Exhaust Fans	90.6	59.6	53.5	45.6	39.6	36.0	33.5	25.6	19.6
Extraction fan/blower (flue gas stack)	119.0	88.0	82.0	74.0	68.0	64.5	62.0	54.0	48.0
FEL - Bell L1806C	102.7	71.7	65.7	57.7	51.7	48.2	45.7	37.7	31.7
General noise	108.8	77.8	71.8	63.8	57.8	54.2	51.8	43.8	37.8
General Noise - Construction (commercial)	96.5	65.6	59.5	51.6	45.6	42.0	39.5	31.6	25.6
Generator building	96.0	65.0	59.0	51.0	45.0	41.5	39.0	31.0	25.0
Grader - Operational Hitachi	108.9	77.9	71.9	63.9	57.9	54.4	51.9	43.9	37.9
Intake Fans	97.7	66.8	60.7	52.8	46.8	43.2	40.7	32.8	26.8
JBL TLB	108.8	77.8	71.8	63.8	57.8	54.3	51.8	43.8	37.8
Road Transport Reversing/Idling	108.2	77.2	71.2	63.3	57.2	53.7	51.2	43.3	37.2
Road Truck average	109.6	78.7	72.6	64.7	58.7	55.1	52.6	44.7	38.7
Rock Breaker, CAT	120.7	89.7	83.7	75.7	69.7	66.2	63.7	55.7	49.7
Silenced radiator	98.3	67.3	61.3	53.4	47.3	43.8	41.3	33.4	27.3
Steam Turbine Condenser	105.4	74.4	68.4	60.4	54.4	50.9	48.4	40.4	34.4
Steam venting	101.7	70.7	64.7	56.7	50.7	47.2	44.7	36.7	30.7
Turbine Generator	116.7	85.7	79.7	71.8	65.7	62.2	59.7	51.8	45.7
Ventilation Fan	110.1	79.1	73.1	65.1	59.1	55.6	53.1	45.1	39.1
Vibrating roller	106.3	75.3	69.3	61.3	55.3	51.8	49.3	41.3	35.3
Water Cooling Fans	113.0	82.0	76.0	68.0	62.0	58.5	56.0	48.0	42.0

4.4 POTENTIAL NOISE SOURCES: DECOMMISSIONING

Decommissioning starts when power generation stops, signalling the beginning of the dismantling of the equipment. Activities that can take place include:

- Dismantling of the remaining equipment and infrastructure. This includes the following:
    - Dismantling of all equipment,
    - Removal of all remaining redundant infrastructure (buildings and structures, dams, workshop, access roads, possibly the offices and other buildings, etc.).
    - Removal of any contaminated soil.
    - The rehabilitation of disturbed areas including the necessary ripping of compacted soils and the shaping of rehabilitated areas to ensure free drainage.
    - Seeding of disturbed areas (if necessary to re-establish vegetation).
    - Monitoring and maintenance of the rehabilitated areas.

However, while there are numerous activities that can take place during the decommissioning stage, the potential noise impact will only be discussed in general. This is because the noise impacts associated with the decommissioning phase is normally less than both the construction and operational phases for the following reasons:

- Final decommissioning normally takes place only during the day, a time period when existing ambient sound levels are higher, generally masking most external noises for surrounding receptors;
- There is a lower urgency of completing this phase and less equipment remains onsite (and are used simultaneously) to effect the final decommissioning.

5 METHODS: NOISE IMPACT ASSESSMENT AND SIGNIFICANCE

5.1 NOISE IMPACT ON ANIMALS[3]

A great deal of research was conducted in the 1960's and 1970's on the effects of aircraft noise on animals. While aircraft noise have a specific characteristic that might not be comparable with industrial noise, the findings should be relevant to most noise sources.

Overall, the research suggests that species differ in their response to:

- Various types of noise;
- Durations of noise; and
- Sources of noise.

A general animal behavioural reaction to aircraft noise is the startle response. However, the strength and length of the startle response appears to be dependent on:

- which species is exposed;
- whether there is one animal or a group; and
- whether there have been some previous exposures.

Unfortunately, there are numerous other factors in the environment of animals that also influence the effects of noise. These include predators, weather, changing prey/food base and ground-based disturbance, especially anthropogenic. This hinders the ability to define the real impact of noise on animals.

From these and other studies the following can be concluded:

- Animals respond to impulsive (sudden) noises (higher than 90 dBA) by running away. If the noises continue, animals would try to relocate.
- Animals of most species exhibit adaptation with noise, including aircraft noise and sonic booms.
- More sensitive species would relocate to a more quiet area, especially species that depend on hearing to hunt or evade prey, or species that makes use of sound/hearing to locate a suitable mate.
- Noises associated with helicopters, motor- and quad bikes significantly impact on animals.

[3]Report to Congressional Requesters, 2005; USEPA, 1971; Autumn, 2007; Noise quest, 2010

There are guidelines that very briefly mention how potential noises can impact on wildlife from industrial and commercial industries. Most of these however do not have any set criteria that can be used to define the potential noise impact[4]. Faunal guidelines do exist that requires the protection of an animal's surrounding environment, with "physical" impacts such as water, habitat destruction etc. having a far more critical impact than that of noise.

5.1.1 Effects of Noise on Wildlife

Potential noise impacts on wildlife are very highly species dependent. Studies showed that most animals adapt to noises and would even return to a site after an initial disturbance, even if the noise continues. The more sensitive animals that might be impacted by noise would relocate to a quieter area.

There are a few specific studies discussing the potential impacts of noise on wildlife associated with construction, transportation and industrial facilities. Available information indicates that noises from transportation and industrial may mask the sounds of a predator approaching; similarly predators depending on hearing would not be able to locate their prey.

Many natural based acoustics themselves may be loud or impulsive. Examples include thunder, wind induced noises that could easily exceed 35 dBA ($L_{A90,fast}$) above wind speeds averaging 6 m/s, noise levels during early morning dawn chorus, crickets or loud cicada noises during late evening or early morning.

5.2 WHY NOISE CONCERNS COMMUNITIES[5]

Noise can be defined as "unwanted sound", and an audible acoustic energy that adversely affects the physiological and/or psychological well-being of people, or which disturbs or impairs the convenience or peace of any person. One can generalise by saying that sound becomes unwanted when it:

- Hinders speech communication;
- Impedes the thinking process;
- Interferes with concentration;
- Obstructs activities (work, leisure and sleeping); and
- Presents a health risk due to hearing damage.

[4] E.g. International council of Mining & Metals. "Good Practice Guidance for Mining and Biodiversity". P.g. 63.
[5] World Health Organization, 1999; Noise quest, 2010; Journal of Acoustical Society of America, 2009

However, it is important to remember that whether a given sound is "noise" depends on the listener or hearer. The driver playing loud rock music on their car radio hears only music, but the person in the traffic behind them hears nothing but noise.

Response to noise is unfortunately not an empirical absolute, as it is seen as a multi-faceted psychological concept, including behavioural and evaluative aspects. For instance, in some cases, annoyance is seen as an outcome of disturbances, in other cases it is seen as an indication of the degree of helplessness with respect to the noise source.

Noise does not need to be loud to be considered "disturbing". One can refer to a dripping tap in the quiet of the night, or the irritating "thump-thump" of the music from a neighbouring house at night when one would like to sleep.

Severity of the annoyance depends on factors such as:

- Background sound levels, and the background sound levels the receptor is used to;
- The manner in which the receptor can control the noise (helplessness);
- The time, unpredictability, frequency distribution, duration, and intensity of the noise;
- The physiological state of the receptor; and
- The attitude of the receptor about the emitter (noise source).

5.3 IMPACT ASSESSMENT CRITERIA

5.3.1 Overview: The common characteristics

The word "noise" is generally used to convey a negative response or attitude to the sound received by a listener. There are four common characteristics of sound, any or all of which determine listener response and the subsequent definition of the sound as "noise". These characteristics are:

- Intensity;
- Loudness;
- Annoyance; and
- Offensiveness.

Of the four common characteristics of sound, intensity is the only one which is not subjective and can be quantified. Loudness is a subjective measure of the effect sound

has on the human ear. As a quantity it is therefore complicated, but has been defined by experimentation on subjects known to have normal hearing.

The annoyance and offensive characteristics of noise are also subjective. Whether or not a noise causes annoyance mostly depends upon its reception by an individual, the environment in which it is heard, the type of activity and mood of the person and how acclimatised or familiar that person is to the sound.

5.3.2 Noise criteria of concern

The criteria used in this report were drawn from the criteria for the description and assessment of environmental impacts considering the latest EIA Regulations, SANS 10103:2008 as well as guidelines from the World Health Organization.

There are a number of criteria that are of concern for the assessment of noise impacts. These can be summarised in the following manner:

- *Increase in noise levels:* People or communities often react to an increase in the ambient noise level they are used to, which is caused by a new source of noise. With regards to the Noise Control Regulations (promulgated in terms of the ECA), an increase of more than 7 dBA is considered a disturbing noise. See also **Figure 5-1**.
- *Zone Sound Levels:* Previously referred to as the acceptable rating levels, it sets acceptable noise levels for various areas. See also **Table 5-1**.
- *Absolute or total noise levels:* Depending on their activities, people generally are tolerant to noise up to a certain absolute level, e.g. 65 dBA. Anything above this level will be considered unacceptable.

In South Africa, the document that addresses the issues concerning environmental noise is SANS 10103:2008 (See also **Table 5-1**). It provides the equivalent ambient noise levels (referred to as Rating Levels), $L_{Req,d}$ and $L_{Req,n}$, during the day and night respectively to which different types of developments may be exposed.

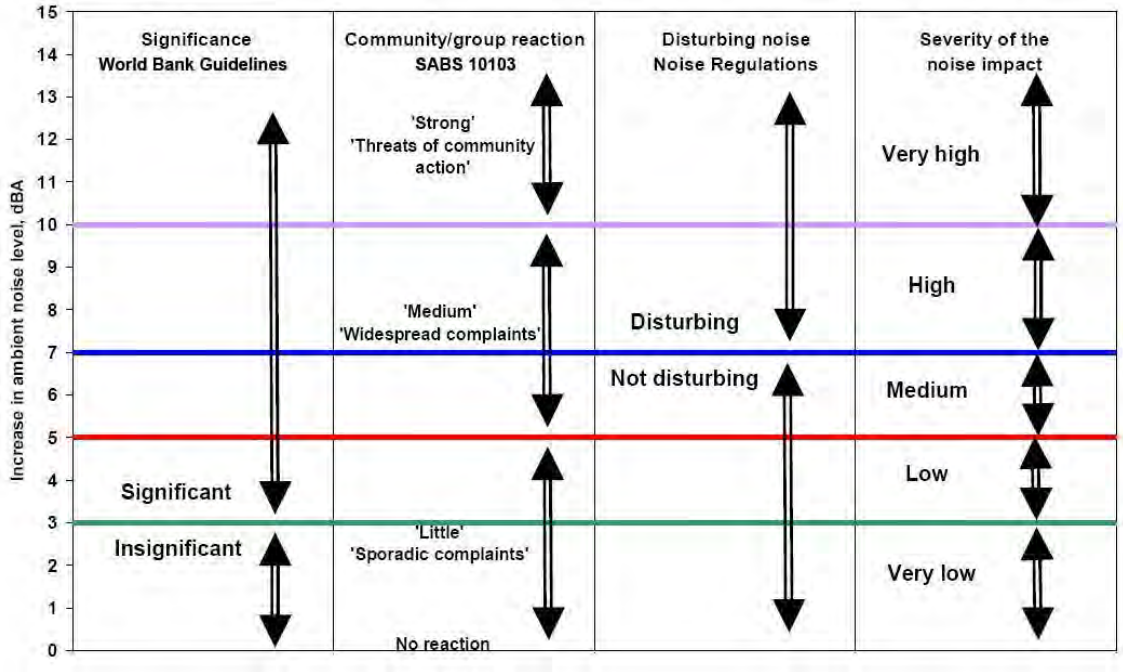

Figure 5-1: Criteria to assess the significance of impacts stemming from noise

SANS 10103:2008 also provides a guideline for estimating community response to an increase in the general ambient noise level caused by an intruding noise. If Δ is the increase in sound level, the following criteria are of relevance:

- **Δ ≤ 3 dBA:** An increase of 3 dBA or less will not cause any response from a community. It should be noted that for a person with average hearing acuity an increase of less than 3 dBA in the general ambient noise level would not be noticeable.
- **3 < Δ ≤ 5 dBA:** An increase of between 3 dBA and 5 dBA will elicit 'little' community response with 'sporadic complaints'. People will just be able to notice a change in the sound character in the area.
- **5 < Δ ≤ 15 dBA:** An increase of between 5 dBA and 15 dBA will elicit a 'medium' community response with 'widespread complaints'. In addition, an increase of 10 dBA is subjectively perceived as a doubling in the loudness of a noise. For an increase of more than 15 dBA the community reaction will be 'strong' with 'threats of community action'.

Note that an increase of more than 7 dBA is defined as a disturbing noise and prohibited (National and Provincial Noise Control Regulations).

Table 5-1: Acceptable Zone Sound Levels for noise in districts (SANS 10103:2008)

1	2	3	4	5	6	7
Type of district	**Equivalent continuous rating level ($L_{Req,T}$) for noise** dBA					
	Outdoors			**Indoors, with open windows**		
	Day/night $L_{R,dn}$[a]	**Daytime $L_{Req,d}$**[b]	**Night-time $L_{Req,n}$**[b]	**Day/night $L_{R,dn}$**[a]	**Daytime $L_{Req,d}$**[b]	**Night-time $L_{Req,n}$**[b]
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

The area to the south, west and north is used for industrial purposes, with ambient sound levels west and north reflecting this industrial use. The closest potential noise-sensitive receptors are located more than 3,000m to the south-east. Ambient sound level measurements in the undeveloped areas (away from industry or dwellings) indicate a quiet rural area, although ambient sound levels are higher closer to the dwellings. However, most of the measurements away from the roads and industries indicates a character typical of a Rural Noise District. Therefore the SANS 10103:2008 rating levels typical of a Rural Noise District will be considered (see also **Table 5-1**):

- Rating Level during the day ($L_{Req,D}$) of 45 dBA; and
- Rating Level during the night ($L_{Req,N}$) of 35 dBA.

The Western Cape Provincial Noise Control Regulations: PN 200 of 2013 will be used in conjunction with the SANS guideline.

International guidelines should also be considered. The International IFC (Equator Principle) Residential; institutional and educational referenced areas includes ratings of:

- Use of $L_{Req,D}$ of 55 dBA during the daytimes; and
- Use of $L_{Req,N}$ of 45 dBA during the night-times.

5.3.3 Evaluation of Impacts – Defining the significance of the impact

The impact assessment criteria are devised from the *ERM IA Standard* as well as the *ERM Noise Impacts* guideline. The process of determining the noise impact significance is illustrated in **Figure 5-2**.

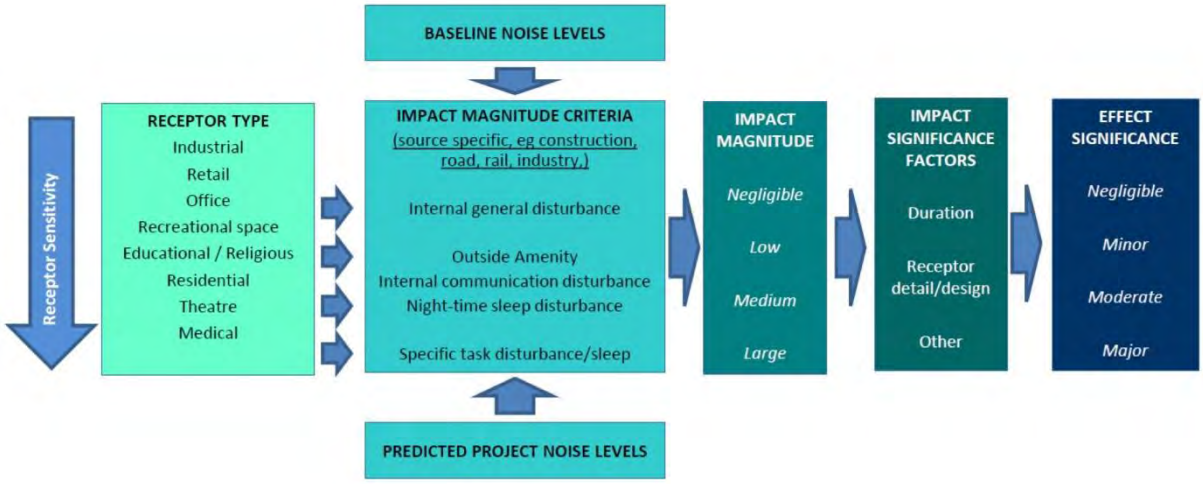

Figure 5-2: Noise Impact Significance Assessment Process

Once the prediction of noise impacts is complete, each impact is described in terms of its various relevant characteristics (e.g., type, scale, duration, frequency, extent). The terminology used to describe impact characteristics is shown in **Table 5-2**.

Table 5-2: Impact Characteristic Terminology

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	Direct Indirect Induced
Extent	The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc.).	Footprint Local Regional International
Duration	The time period over which a resource or / and receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The scale of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	Low Medium Large
Frequency	A measure of the constancy or periodicity of the impact.	[no fixed designations; intended to be a numerical value or a qualitative description]

The definitions for the *type* designations are shown in **Table 5-3**. Definitions for the other designations are resource/receptor-specific, and are discussed in the resource/receptor-specific impact assessment chapters presented later in this report.

Table 5-3: Impact Type Definitions

Designations	Definition
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is *likelihood*. The *likelihood* of an unplanned event occurring is designated using a qualitative scale, as described in **Table 5-4**.

Table 5-4: Definitions for Likelyhood Designations

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent
- Duration
- Scale

- Frequency

Additionally, for unplanned events only, magnitude incorporates the 'likelihood' factor discussed above.

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the descriptions for these designations vary on a resource/receptor-by-resource/receptor basis. The universal magnitude designations are:

- Positive;
- Negligible;
- Small – Changes in ambient sound levels lower than 3 dB;
- Medium – Changes in ambient sound levels between 3 – 7 dBA; and
- Large – Changes in ambient sound levels higher than 10 dBA.

In the case of a *positive* impact, no magnitude designation (aside from 'positive') is assigned. It is considered sufficient for the purpose of the Impact Assessment to indicate that the Project is expected to result in a *positive* impact, without characterizing the exact degree of positive change likely to occur.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation.

In addition to characterizing the magnitude of impact, the other principal impact evaluation step is definition of the sensitivity/vulnerability/importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity/vulnerability/importance of the resource/receptor, which may be physical, biological, cultural or human. Other factors may also be considered when characterizing sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor basis. The sensitivity/vulnerability/importance designations used herein for all resources/receptors are:

- Low
- Medium
- High

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterized, the significance can be assigned for each impact. Impact significance is designated using the matrix shown in *Figure1*.

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Figure 5-3: Impact Significance

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations are factored into the assignment of magnitude and sensitivity/vulnerability/importance designations that enter into the matrix. Box A provides a context for what the various impact significance ratings signify.

It is important to note that impact prediction and evaluation take into account any embedded controls (i.e., physical or procedural controls that are already planned as part of the Project design, regardless of the results of the IA Process). An example of an embedded control is a standard acoustic enclosure that is designed to be installed around a piece of major equipment.

Box 5-1: Context of Impact Significance

An impact of negligible significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of **minor significance** is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of **moderate significance** has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ***as low as reasonably practicable*** (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of **major significance** is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

5.4 REPRESENTATION OF NOISE LEVELS

Preliminary noise rating levels was calculated in this report using both the SANS 10357:2004 (Concave) and ISO 9613-2:1996 sound propagation algorithms. It is however important to understand the difference between sound or noise level as well as the noise rating level (also see Glossary of Terms, **Appendix A**).

Sound or noise levels generally refers to a level as measured using an instrument, whereas the noise rating level refers to a calculated sound exposure level to which various corrections and adjustments was added. These noise rating levels are further processed into a 3D map illustrating noise contours of constant rating levels or noise isopleths. In this noise scoping report it will be used to illustrate the potential extent of the calculated noises of the project and not a noise levels at a specific moment in time.

6 ASSUMPTIONS AND LIMITATIONS

6.1 MEASUREMENTS OF AMBIENT SOUND LEVELS

Limitations associated with ambient sound measurements are discussed in section 3.1.

6.2 CALCULATING NOISE EMISSIONS – ADEQUACY OF PREDICTIVE METHODS

The noise emissions into the environment from the various sources as defined will be estimated for a conceptual operational phase, using the sound propagation algorithms described in SANS 10357:2004 and ISO 9613-2.

The following was considered:

- The octave band sound pressure emission levels of defined equipment;
- The distance of the receiver from the noise sources;
- The impact of atmospheric absorption;
- Potential cumulative effect of numerous equipment operating simultaneously;
- Height corrections were not considered with the entire area assumed at 0m above mean sea level;
- Acoustical characteristics of the ground were not considered and hard ground conditions were modelled.

The noise emission into the environment due to additional road traffic will not be considered in this report due to the low potential of a noise impact on the identified noise sensitive receptors.

6.3 ADEQUACY OF UNDERLYING ASSUMPTIONS

Noise experienced at a certain location is the cumulative result of innumerable sounds emitted and generated both far and close, each in a different time domain, each having a different spectral character at a different sound level. Each of these sounds are also impacted differently by surrounding vegetation, structures and meteorological conditions that result in a total cumulative noise level represented by a few numbers on a sound level meter. As previously mentioned, it is not the purpose of noise modelling to accurately determine a likely noise level at a certain receptor, but to calculate a noise rating level that is used to identify potential issues of concern from the proposed development.

6.4 UNCERTAINTIES OF INFORMATION PROVIDED

While it is difficult to define the character of a measured noise in terms of numbers (third octave sound power levels), it is difficult to accurately model noise levels at a receptor from any operation. The projected noise levels are the output of a numerical model with the accuracy depending on the assumptions made during the setup of the model. Assumptions include:

- The octave sound power levels selected for processes and equipment accurately represent the sound character and power levels of this processes/equipment. The determination of these levels in itself is subject to errors, limitations and assumptions with any potential errors carried over to any model making use of these results;
- Sound power emission levels from processes and equipment change depending on the load the process and equipment is subject too. While the octave sound power level is the average (equivalent) result of a number of measurements, this measurement relates to a period that the process or equipment was subject to a certain load. Normally these measurements are collected when the process or equipment is under high load. The result is that measurements generally represent a worse-case scenario;
- During the scoping phase it is unknown which exact processes and equipment will be operational (and when operational and for how long), modelling considers a scenario where all processes and equipment are under full load for a set time period. Modelling assumptions complies with the precautionary principle and operational time periods, sound power levels and number of equipment operational are frequently overestimated. The result is that projected noise levels would likely over-estimate actual noise levels;
- Ambient sound levels vary over time of day, season and largely depend on the complexity and development character of the surrounding environment. To allow the calculation of change in ambient sound levels, a potential ambient sound level of 20 dBA is assumed. This level represents a very quiet environment.
- Modelling cannot capture the potential impulsive or tonal character of a noise that can increase the potential nuisance factor.
- The impact of atmospheric absorption is simplified and very uniform meteorological conditions are considered. This is an over-simplification and the effect of this in terms of sound propagation modelling is difficult to quantify;
- Acoustical characteristics of the ground are over-simplified with ground conditions accepted as uniform. Considering hard ground conditions will project a worst-case scenario.

7 PROJECTED NOISE RATING LEVELS

7.1 CONSTRUCTION PHASE NOISE IMPACT

Construction activities are highly variable, taking place at different locations, using various equipment, each piece of equipment operating under a different load. As a result, noises generated during the construction phase are highly variable and cannot be defined. The approach taken in this assessment is to assume a number of construction activities at numerous locations using various equipment, all operating at full load.

This is an unrealistic scenario, and will represent a worst-case situation. Construction activities take place in various phases, with the first equipment normally a grader to start with site clearing, building up as more equipment is delivered and construction activities proceeds. Typical equipment that is used on a project site includes:

- Numerous road trucks that deliver various construction equipment;
- Earthworks using a combination of one or more graders, bulldozers, excavators and front-end-loaders for the clearing of vegetation, the levelling of the ground surface as well as the developing access roads;
- The development of laydown areas for equipment and material;
- Dump or road trucks to deliver road building material as well as equipment used in road construction (grader, vibratory steel drum roller, bitumen sprayer, paver, roller and water truck);
- The use of one or more backhoe-loaders for the digging of trenches, foundations and assist in the installation of security fencing;
- Piling activities if required;
- The development of onsite batching plants or the delivery of ready-mix concrete using trucks, formwork, rebar construction and the pouring of concrete;
- Construction of buildings and installation of power generation structures and components (road trucks, cranes, welding, various impulsive sounds);
- Cleaning of site, loading and removal of unused construction equipment.

As the project will take place in phases, the construction of the second phase will coincide with the operation of phase 1 equipment. The general arrangement of infrastructure for the proposed power station is presented in **Figure 7-1**, with the location of the conceptual construction noise sources indicated in **Figure 7-2**[6]. The contours of construction noise rating levels are presented in **Figure 7-3** (day) and **Figure 7-4** (night).

[6] General noise represents a number of equipment operating simultaneously.

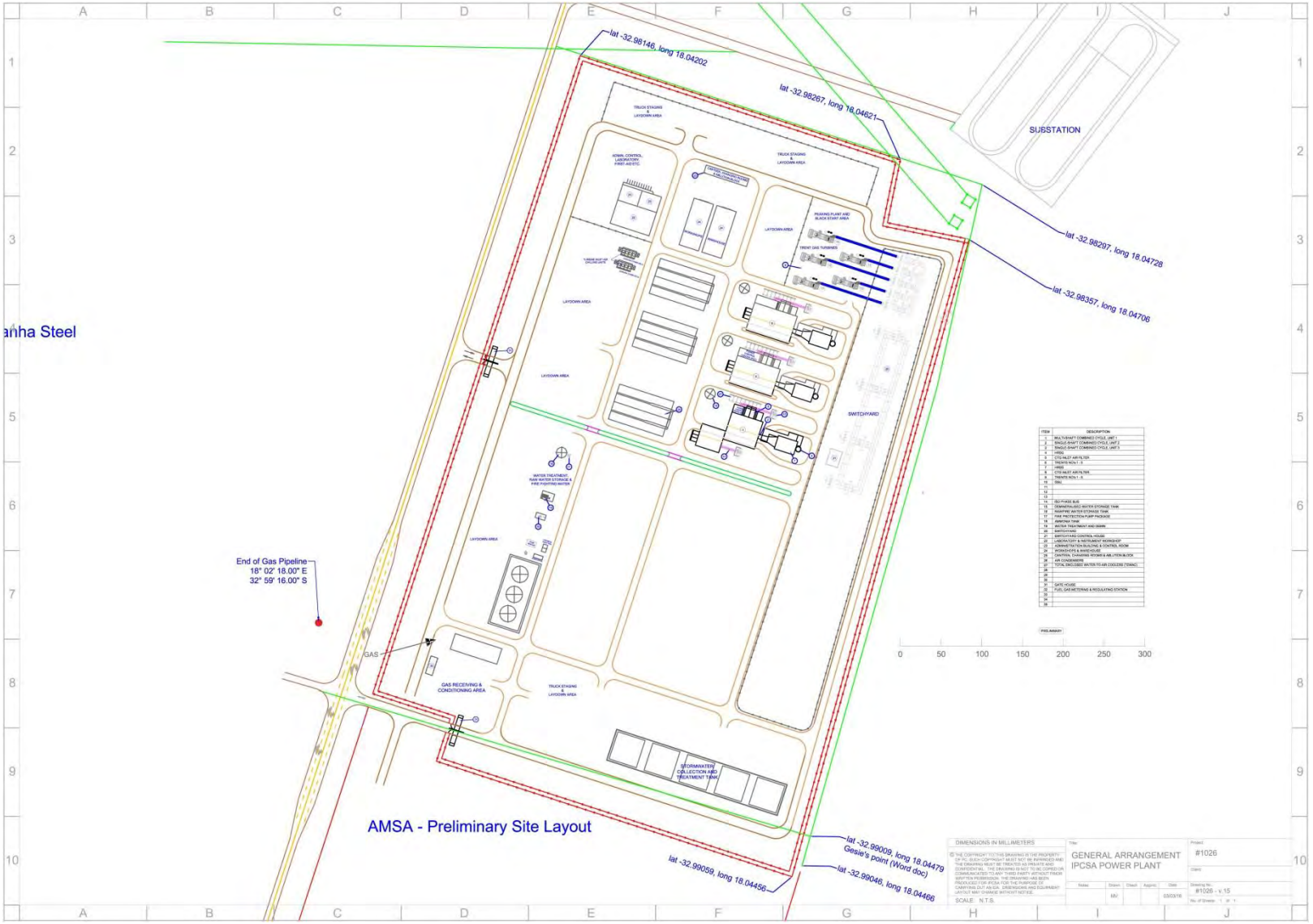

Figure 7-1: Layout as conceptualised and evaluated – General Arrangement IPCSA Power Plant

Figure 7-2: Location of construction activities as conceptualized and evaluated

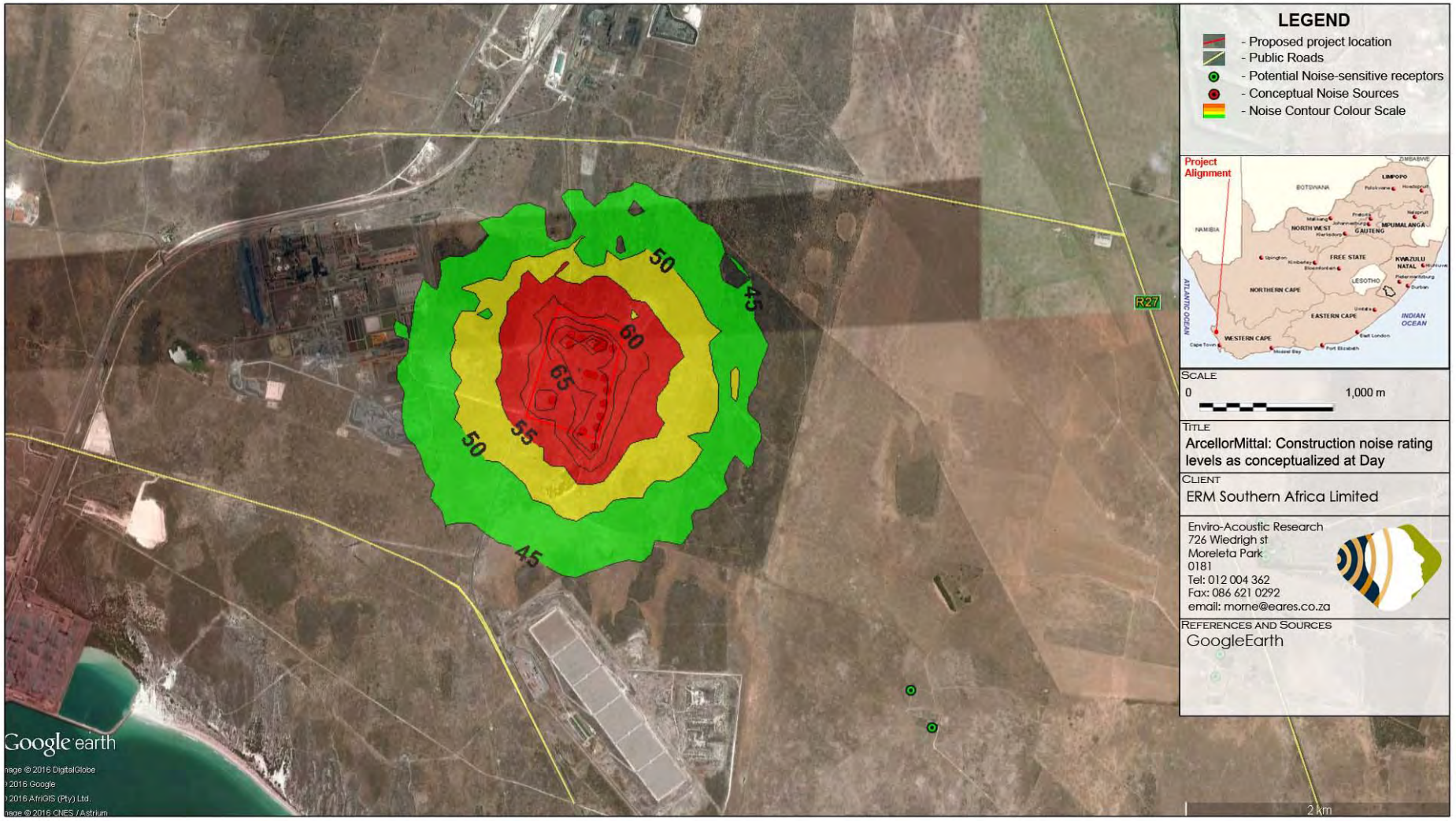

Figure 7-3: Contours of Noise Rating Levels for daytime construction activities

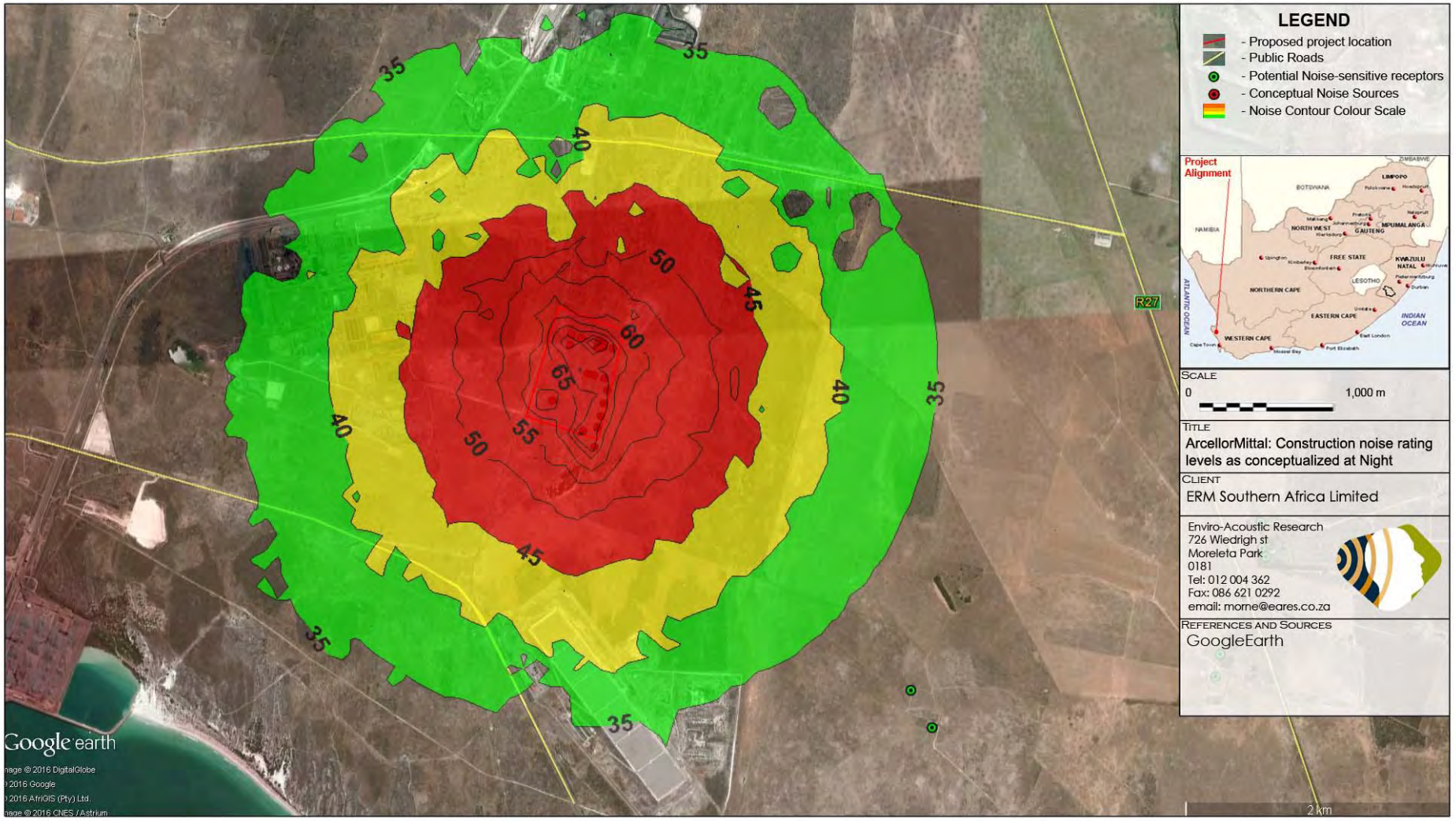

Figure 7-4: Contours of Noise Rating Levels for night-time construction activities

7.2 OPERATIONAL PHASE NOISE IMPACT

The project will be developed in two phases, with phase one including the construction and operation of:

- Five Siemens Trent60 50MW open cycle gas turbines for peak power generation (six will be constructed with one turbine as backup) and ancillary equipment.

Phase 2 will be the addition of:

- Three complete Siemens SGT5-4000F combined cycle power plant (gas turbines, heat recovery boilers, steam turbines, steam turbine condensers) and ancillary equipment.

The daytime period however, was not considered for the EIA because noise generated during the day by the power plant may be masked by other noises from a variety of sources surrounding potentially noise-sensitive developments. However, times when a quiet environment is desired (at night for sleeping, weekends etc.) ambient sound levels are more critical. The time period investigated therefore would be a quieter period, normally associated with the 22:00 – 06:00 timeslot.

The model considers the following input constants:

- Air temperature of 20^{O}C, humidity of 80% and air pressure of 100 kPA;
- Ground surface is 50% acoustically absorbent for the entire area, and;
- Windless conditions (worst-case scenario as the predominant wind will increase ambient sound levels and assist in the refraction of noise away from the closest NSD).

7.2.1 Worse-case scenario – Peak Power

This scenario consider the operation of all the turbines simultaneously, including all three Siemens SGT5-4000F 435 MW open cycle power plants and the five Trent60 gas turbines. Noise sources include:

- Intake air filters (assuming a bank of fans) on the SGT5 and the Trent60 plants;
- Cooling fans located on the enclosed water-to-air coolers on the SGT5 plant;
- The exhaust stack on the SGT5 and the Trent60 plants
- Fans located at the Turbine Inlet Air Chilling Units, and;
- The gas turbine and generator (located inside a structure).

Conceptual noise sources are represented in **Figure 7-5** with the projected contours of noise rating levels presented in **Figure 7-6**.

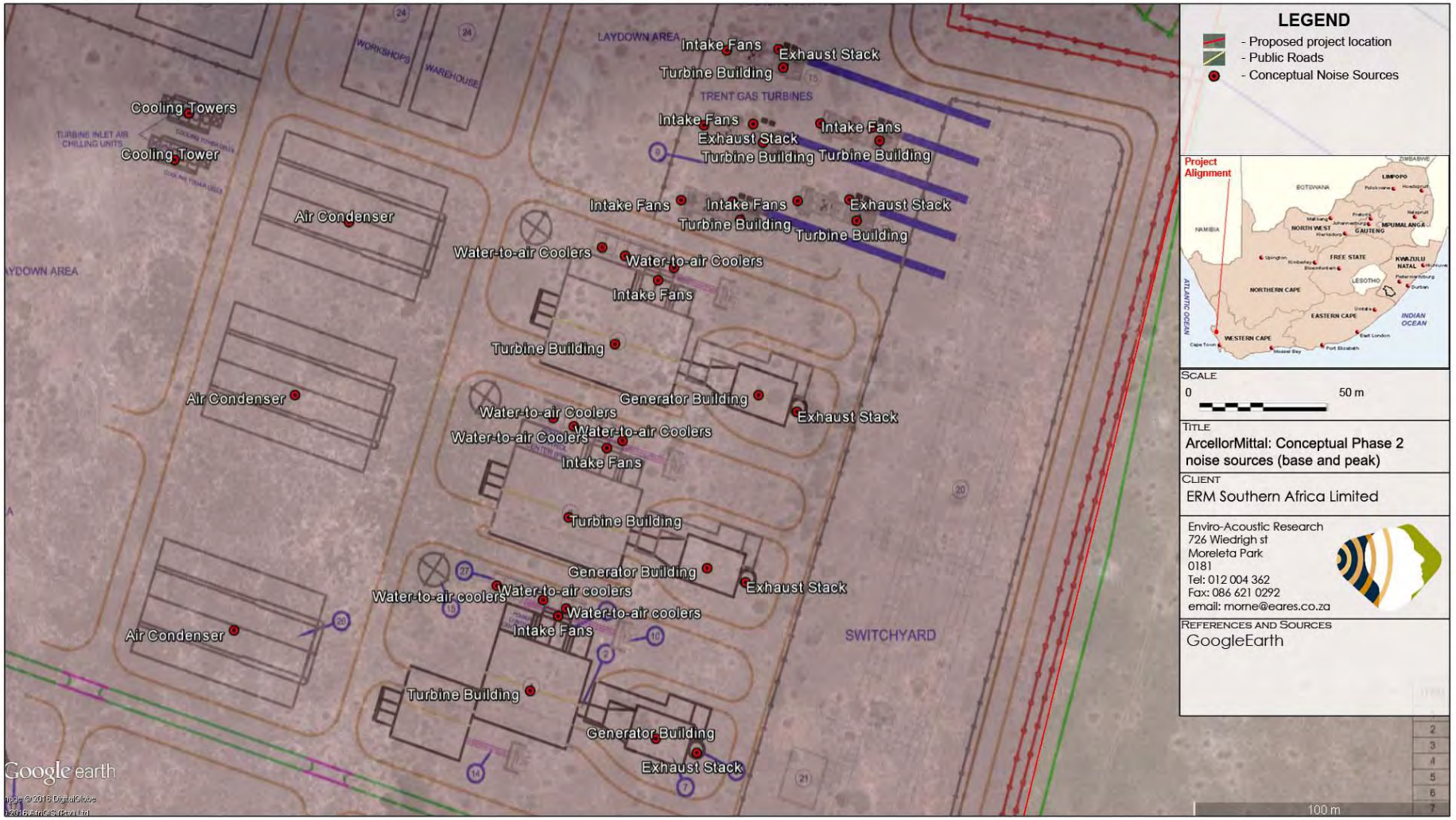

Figure 7-5: Conceptual Noise Sources – Operation Phase 2 (Peak Power with all equipment operating at night)

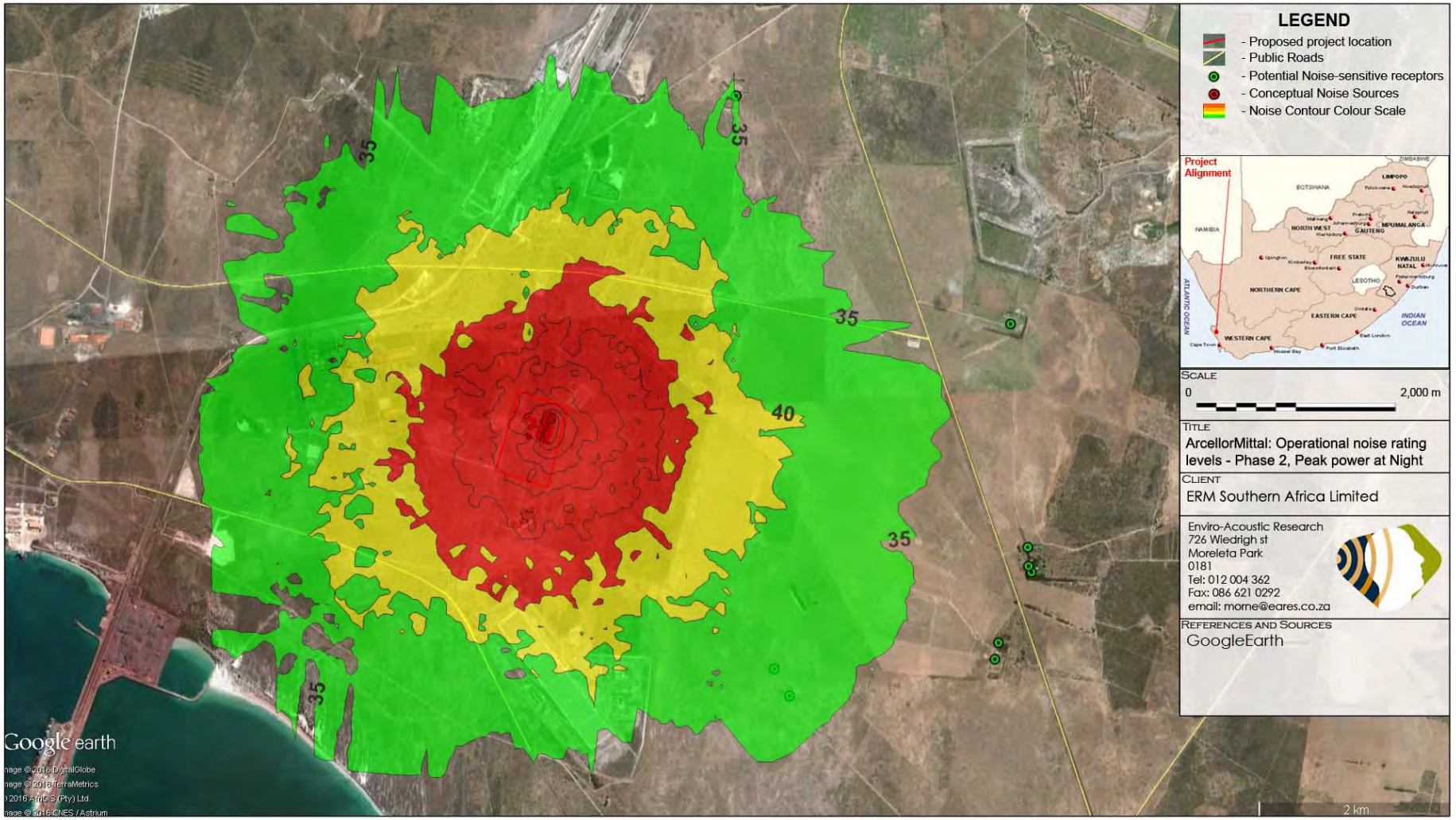

Figure 7-6: Contours of constant noise levels – Operational activities for peak power generation, phase 2

8 SIGNIFICANCE OF THE NOISE IMPACT

8.1 CONSTRUCTION PHASE NOISE IMPACT

The impact assessment for the various activities defined in **Section 4.1** and assessed in **Section 7.1** that can create noise and may impact on the surrounding environment is summarized in **Table 8-1**.

Table 8-1: Impact Assessment: Daytime Construction Activities at Power Plant

Construction activities may increase the ambient sound levels in the vicinity of the project during the day.		
Criterion	**Rating**	**Comment**
Nature	Negative	The project will result in changes in the ambient sound levels in the vicinity of project.
Type	Direct	Construction sounds will affect the project and surrounding areas.
Duration	Short-term	The impact will be short-term (construction phase), but will extent into the operational of phase 1.
Extent	Local	The sound will be audible up to 1,000m (quiet times) from potential construction activities.
Scale	Low	Increases in sound levels will impact the project footprint and up to 1,000m from the construction activities. It will impact the surrounding area.
Frequency	Constant	Construction noises will occur as long as construction activities take place.
Magnitude	Negligible	The change in ambient sound levels at the surrounding potential noise-sensitive receptors will be negligible.
Receptor Sensitivity	Medium to high	It is assumed that receptors in the area are sensitive to noise.
Confidence in assessment	High	Considering the conceptualized construction activities, the location of the activities and the worst-case scenario as evaluated confidence levels is high.
Significance	Negligible	The significance of the noise impact during daytime construction activities will be negligible.

Table 8-2: Impact Assessment: Night-time Construction Activities

Construction activities may increase the ambient sound levels in the vicinity of the plant.		
Criterion	**Rating**	**Comment**
Nature	Negative	The project will result in changes in the ambient sound levels in the vicinity of project.
Type	Direct	Construction sounds will affect the project and surrounding areas.
Duration	Short-term	The impact will be short-term (construction phase), but will extent into the operational of phase 1.
Extent	Local	The sound will be audible up to 3,000 m (quiet times) from potential construction activities, especially impulsive noises.
Scale	Low	Increases in sound levels will impact the project footprint and up to 2,500m from the construction activities. It will impact the surrounding area.
Frequency	Constant	Construction noises will occur as long as construction activities take place.
Magnitude	Negligible	The change in ambient sound levels at the surrounding potential noise-sensitive receptors will be negligible.
Receptor Sensitivity	Medium to high	The receptors in the area are sensitive to noise.
Confidence in assessment	High	Considering the conceptualized construction activities, the location of the activities and the worst-case scenario as evaluated confidence levels is high.
Significance	Negligible	The significance of the noise impact during night-time construction activities will be negligible.

8.2 OPERATIONAL PHASE NOISE IMPACT

The impact assessment for the various activities defined in **Section 4.2** and calculated in **section 7.2** could increase the ambient noise levels in the area. The noise impact is assessed and summarized in the following **Table 8-3**. Only the night-time scenario was assessed as this is the most critical time period when a quiet environment is desired.

Table 8-3: Impact Assessment: Operational Activities – Phase 1, Base Power

Operational noise from night-time power generation may increase the ambient sound levels at night.		
Criterion	**Rating**	**Comment**
Nature	Negative	The project may result in slight changes in the ambient sound levels in the surrounding environment.
Type	Direct	Power generation sounds will affect the area around the project.
Duration	Long-term	The impact will be long-term (full operational phase).
Extent	Local	The sound could be audible up to 3,000 m from the power plant.
Scale	Low	Increases in sound levels will impact the project footprint and an area up to 3,000m from the activity.
Frequency	Constant	Operational noises will occur for the duration of power generation activities.
Magnitude	Negligible	The change in ambient sound levels will be negligible at the closest noise-sensitive receptors.
Receptor Sensitivity	Medium to high	The receptors are in the area are likely sensitive to noise.
Confidence in assessment	High	Worse-case scenario assessed that project noise levels would be 3 – 5 dBA higher than the actual operational noise level.
Significance	Negligible	The noise impact during operation will be negligible for the closest noise-sensitive receptors.

Table 8-4: Impact Assessment: Operational Activities – Phase 1, Peak Power

Operational noise from night-time power generation may increase the ambient sound levels at night.		
Criterion	**Rating**	**Comment**
Nature	Negative	The project may result in slight changes in the ambient sound levels in the surrounding environment.
Type	Direct	Power generation sounds will affect the area around the project.
Duration	Long-term	The impact will be long-term (full operational phase).
Extent	Local	The sound could be audible up to 3,000 m from the power plant.
Scale	Low	Increases in sound levels will impact the project footprint and an area up to 3,000m from the activity.
Frequency	Constant	Operational noises will occur for the duration of power generation activities.
Magnitude	Negligible	The change in ambient sound levels will be negligible at the closest noise-sensitive receptors.
Receptor Sensitivity	Medium to high	The receptors are in the area are likely sensitive to noise.
Confidence in assessment	High	Worse-case scenario assessed that project noise levels would be 3 – 5 dBA higher than the actual operational noise level.
Significance	Negligible	The noise impact during operation will be negligible for the closest noise-sensitive receptors.

Table 8-5: Impact Assessment: Operational Activities – Phase 2, Base Power

Operational noise from night-time power generation may increase the ambient sound levels at night.		
Criterion	**Rating**	**Comment**
Nature	Negative	The project may result in slight changes in the ambient sound levels in the surrounding environment.
Type	Direct	Power generation sounds will affect the area around the project.
Duration	Long-term	The impact will be long-term (full operational phase).
Extent	Local	The sound could be audible up to 3,000 m from the power plant.
Scale	Low	Increases in sound levels will impact the project footprint and an area up to 3,000m from the activity.
Frequency	Constant	Operational noises will occur for the duration of power generation activities.
Magnitude	Negligible	The change in ambient sound levels will be negligible (just higher than 35 dBA at NSD01 and NSD02) compared to ambient sound levels of around 40 – 45 dBA.
Receptor Sensitivity	Medium to high	The receptors are in the area are likely sensitive to noise.
Confidence in assessment	High	Worse-case scenario assessed that project noise levels would be 3 – 5 dBA higher than the actual operational noise level.
Significance	Minor	The noise impact during operation will be minor for the closest noise-sensitive receptors.

Table 8-6: Impact Assessment: Operational Activities – Phase 2, Peak Power

Operational noise from night-time power generation may increase the ambient sound levels at night.		
Criterion	**Rating**	**Comment**
Nature	Negative	The project may result in slight changes in the ambient sound levels in the surrounding environment.
Type	Direct	Power generation sounds will affect the area around the project.
Duration	Long-term	The impact will be long-term (full operational phase).
Extent	Local	The sound could be audible up to 3,000 m from the power plant.
Scale	Low	Increases in sound levels will impact the project footprint and an area up to 3,000m from the activity.
Frequency	Constant	Operational noises will occur for the duration of power generation activities.
Magnitude	Negligible	The change in ambient sound levels will be small (just higher than 35 dBA at NSD01 (36 dBA) and NAS02 (37 dBA)).
Receptor Sensitivity	Medium to high	The receptors are in the area are likely sensitive to noise.
Confidence in assessment	High	Worse-case scenario assessed that project noise levels would be 3 – 5 dBA higher than the actual operational noise level.
Significance	Minor	The noise impact during operation will be minor for the closest noise-sensitive receptors.

8.3 DECOMMISSIONING PHASE NOISE IMPACT

Final decommissioning activities will have a noise impact lower than either the construction or operational phases. This is because decommissioning and closure activities normally take place during the day using minimal equipment (due to the decreased urgency of the project). While there may be various activities, there is a very small risk for a noise impact.

8.4 CUMULATIVE NOISE IMPACT

Ambient sound levels is the cumulative effect of sound from sources both near and far, natural and man-made, with each sound being a complex mix of air pressure in different phases (with various interaction) with different spectral or transient character. As such the sounds we hear are generally the cumulative effect of numerous other sounds, with certain sounds dominating.

However, audibility does not necessary mean that there is a noise impact. In reality, sound sources only contribute significant levels to the soundscape if the levels are at least 3 dBA higher than the typical ambient sound levels. For an industrial activity or road traffic it requires the activity to be relative close to a receptor (depends on the character and magnitude of the noise source).

If noise-generating activities are further than 2,000 – 4,000m from a potential noise-sensitive receptor, the magnitude of noises levels are generally low, decreasing the further the activity are located from the receptor(s) up to a point where it becomes inaudible at all times (when further than 10,000m it should be inaudible for most industry). Therefore, to significantly contribute to the soundscape, or the cumulative sound level, activities should be located closer than 2,000m.

At the closest receptor (NSD02), the dominating sounds were due to noises from the house as well as natural sounds. Sounds of passing traffic (on the R27) and from the Saldanha Steel operation was audible at times but not dominant (definitely less than 3 dBA from the typical ambient sound levels).

Other industries that may contribute sounds include:

- The Namakwa Sands plant (source of broadband noises mainly);
- SALKOR railway shunting yard (potential source of transient noises);

- Saldanha Oil Storage (quiet, broadband noises at times during pumping.

These activities however are all further then 2,000m from receptor NSD02, with the proposed Saldanha Power Plant being almost 4,000m from NSD09. At NSD09 the dominant sound will be from the SALKOR and Namakwa Sands operations, less from the R27 with the proposed power plant being too far from NSD09 to cumulatively add any significant sound levels to the ambient levels at NSD09.

Considering the ambient sound levels (between 40 and 45 dBA) measured at NSD02 as well as the projected noise levels from the proposed power plant (around 37 dBA at peak) and the potential cumulative noises levels from other industries in the area will even be less. The risk of cumulative noise impacts will be low as defined in **Table 8-7**.

Table 8-7: Impact Assessment: Operational Activities – Potential Cumulative

Operational noises from the power plant will, together with noises from various other activities (industry and roads), cumulatively increase the ambient sound levels		
Criterion	**Rating**	**Comment**
Nature	Negative	The project may cumulatively add to the ambient sound levels in the surrounding environment.
Type	Direct	Power generation sounds will affect the area around the project.
Duration	Long-term	The impact will be long-term (full operational phase).
Extent	Local	The sound could cumulatively add the ambient sound levels up to 4,000m from the power plant (NSD02 and NSD09).
Scale	Low	Cumulatively increases in sound levels could impact the project footprint and up to 4,000m from the activity.
Frequency	Constant	Operational noises will occur for the duration of power generation activities.
Magnitude	Negligible	The cumulative addition will be low at NSD02 and NSD09 and insignificant to people located further from the activity.
Receptor Sensitivity	Medium to high	The receptors are in the area are likely sensitive to noise.
Confidence in assessment	High	Worse-case scenario assessed that project noise levels would be 3 – 5 dBA higher than the actual operational noise level.
Significance	Minor	The noise impact during operation will be minor for the closest noise-sensitive receptors.

9 EVALUATION OF ALTERNATIVES

9.1 ALTERNATIVE 1: NO-GO OPTION

The ambient sound levels will remain as is.

9.2 ALTERNATIVE 2: PROPOSED POWER GENERATION ACTIVITIES

The proposed activities (worse-case evaluated) will likely be audible. Therefore, in terms of acoustics there is no benefit to the surrounding environment (closest receptors). It is however difficult to assume how surrounding receptors may perceive the project, as there are numerous factors that will influence the attitude of receptors to the project.

However, the project will greatly assist in the economic growth and development challenges South Africa is facing by means of assisting in providing electricity, employment and other business opportunities. People in the area that is not directly affected by increased noises will have a positive perception of the project.

10 MITIGATION OPTIONS

10.1 CONSTRUCTION PHASE MITIGATION MEASURES

The study considers the potential noise impact on the surrounding environment due to construction activities during the day and potentially the night-time periods. It was determined that the potential noise impact would be of negligible significance and mitigation measures are not required or recommended.

10.1.1 Mitigation options available to reduce Construction Noise Impact

No mitigation options are proposed due to the low risk of a noise impact to occur during the construction phase. The developer is implementing the following mitigation measures to minimize construction noises:

- During construction the larger steam pipelines, being uncoated, will be internally 'steel-brushed' before being assembled. This may reduce total 'blow-out' time.
- For safety valve testing , there is no mitigation procedure other than advising people, close to the facility a day in advance, of the times during which high noise levels would be generated, and recommending any recommended ear safety procedures if warranted.

10.2 OPERATIONAL MITIGATION MEASURES

10.2.1 Mitigation options available to reduce Operational Noise Impact

The significance of noise during the operational phase is negligible and additional mitigation measures are not required. The developer will implement the following mitigation measures to minimise potential operational noises:

- Proper stack and ducting design, verified by finite element analysis of the various exhaust path sections;
- Nullifying the potential amplification of pulsating exhaust disturbances by incorporating sound attenuation lining within the flue stacks itself;
- Increased stack diameter and reduced exhaust stack temperature through better, more efficient heat recovery and HRSG design.
- The power plant is located in a in a slight depression. Areas outside the 1.5 km circle are shielded from any potential noise by rising land.
- The use of sound attenuation in the buildings that will houe noise generating equipment.

10.3 MITIGATION MEASURES TO MANAGE CUMULATIVE IMPACTS

The mitigation of potential impacts due to cumulative noises is mainly a function of government. It is generally managed with strategic development frameworks and long-term planning that can define acceptable areas for certain land uses, considering the feasibility of existence close to each other.

This can include, amongst others the planning and development of special industrial zones where heavy industry can be developed with a buffer area of at least 2,000m around these zones. No residential developments should be allowed within these buffer areas without special permission.

10.4 DECOMMISSIONING PHASE MITIGATION MEASURES

10.4.1 Mitigation options available to reduce Decommissioning Noise Impact

The significance of noise during the decommissioning phase would be similar as the construction phase, if the development character stays similar as the current character. It would remain low and additional mitigation measures will not be required.

10.5 SPECIAL CONDITIONS

10.5.1 Mitigation options that should be included in the EMP

No mitigation measures are recommended for inclusion in the Environmental Management Programme.

10.5.2 Special conditions that should be included in the Environmental Authorization

No special conditions are recommended for inclusion in the Environmental Authorization.

11 ENVIRONMENTAL MANAGEMENT OBJECTIVES

Environmental Management Objectives are difficult to be defined for noise because ambient sound levels would in any event slowly increase as developmental pressures increase in the area. This is due to increased traffic associated with increased development, human habitation, agriculture and even eco-tourism. While these increases in ambient sound levels may be low (and insignificant) it has the effect of cumulatively increasing the ambient sound levels.

The moment the power generation plant stops operation, ambient sound levels will drop to levels similar to the pre-plant levels, or to new levels (typical of other areas with a similar developmental character) if other development has occurred in the interim.

12 ENVIRONMENTAL MONITORING PLAN

Environmental Noise Measurement can be divided into two distinct categories, namely:

- Passive measuring − the registering of any complaints (reasonable and valid) regarding noise; and
- Active measuring − the measurement of noise levels at identified locations.

No active environmental noise monitoring is recommended due to the low significance for a noise impact to develop. Currently there are no people living sufficiently close (within 2,000m) to the power plant where increased sound levels may impact significantly on them, although, this may change in the future. Then, should a reasonable and valid complaint about noise be registered, it is the responsibility of the developer to investigate this complaint as per the following sections. It is recommended that the noise investigation be done by an independent acoustic consultant.

While this section recommends a noise monitoring programme, it should be used as a guideline as site specific conditions may require that the monitoring locations, frequency or procedure be adapted.

12.1 MEASUREMENT LOCALITIES AND PROCEDURES

12.1.1 Measurement Localities

No routine noise measurements or locations are recommended. Noise measurements must be conducted at the location of the person that registered a valid and reasonable noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading. A second instrument should ideally be deployed at a control point close to the potential noise source during the measurement period.

12.1.2 Measurement Frequencies

Once-off measurements if and when a reasonable and valid noise complaint is registered. Results and feedback must be provided to the complainant. If required and recommended by an acoustic consultant, there may be follow-up measurements or a noise monitoring programme can be implemented.

12.1.3 Measurement Procedures

Ambient sound measurements should be collected as defined in SANS 10103:2008. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 24 hours, covering at least a full day- (06:00 – 22:00) and night-time (22:00 – 06:00) period. Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Spectral frequencies should also be measured to define the potential origin of noise. When a noise complaint is being investigated, measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event.

12.2 RELEVANT STANDARD FOR NOISE MEASUREMENTS

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. It should be noted that the SANS standard also refers to a number of other standards.

12.3 DATA CAPTURE PROTOCOLS

12.3.1 Measurement Technique

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008.

12.3.2 Variables to be analysed

Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Noise levels should be co-ordinated with the 10-m wind speed. Spectral frequencies should also be measured to define the potential origin of noise.

12.3.3 Database Entry and Backup

Data must be stored unmodified in the electronic file saved from the instrument. This file can be opened to extract the data to a spread sheet system to allow the processing of

the data and to illustrate the data graphically. Data and information should be safeguarded from accidental deletion or corruption.

12.3.4 Feedback to Receptor

A measurement report must be compiled considering the requirements of the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. The facility must provide feedback to the potential noise-sensitive receptors using the channels and forums established in the area to allow interaction with stakeholders, alternatively in a written report.

12.4 STANDARD OPERATING PROCEDURES FOR REGISTERING A COMPLAINT

When a noise complaint is registered, the following information must be obtained:

- Full details (names, contact numbers, location) of the complainant;
- Date and approximate time when this non-compliance occurred;
- Description of the noise or event;
- Description of the conditions prevalent during the event (if possible).

13 CONCLUSIONS AND RECOMMENDATIONS

Enviro-Acoustic Research CC was contracted to conduct an Environmental Noise Impact Assessment (ENIA) to determine the potential noise impact on the surrounding environment due to the development of Independent Gas Power Plant near Saldanha, Western Cape Province.

Ambient sound levels were measured at one location for a two night-time period during May 2016 using a class-1 Sound Level Meter. The sound level meters would measure "average" sound levels over a 10 minutes period, save the data and start with a new 10 minute measurement till the instrument was stopped. This data was also augmented with additional measurements at three locations during the day and night.

Longer term measurements indicated a location with a complex sound character, where the cumulative combination of natural (ocean and wind) and anthropogenic (sounds from the house, road traffic and Saldanha Steel) sounds resulted in an elevated ambient sound level more typical of an urban area.

Short term measurements indicated ambient sound levels typical of an urban noise district (with main roads, business and workshops) closer to the project site. Daytime ambient sound levels are higher, mainly due to road traffic, although wind-induced noises also contributed to the ambient sound levels. Short term measurements away from roads, business and residential dwellings indicate an area with the potential to be very quiet.

A SANS 10103:2008 rating typical of an urban noise district (at the closest receptors) was assigned due to the character of the area. Therefore, the criteria used to evaluate the potential of a noise impact included:

- The projected noise rating levels when compared to the SANS 10103:2008 rating level of 45 dBA (52 dBA for a disturbing noise);
- The potential change in ambient sound levels, with a change less than 3 dB ideal.

The projected noise rating levels were calculated using a sound propagation model. Conceptual scenarios were developed for a construction and four scenarios during the operational phase with the output of the modelling exercise indicated that there is

negligible risk of a noise impact for both the construction and operational phases. This would be even less for the decommissioning phase.

While the maximum projected noise rating level could be as high as 36 dBA (at NSD02) during peak operation once fully commissioned, this is significantly less than the night-time ambient sound level and the potential noise impact is considered insignificant. The change in ambient sound levels is expected to be significantly less than 3 dBA at all the surrounding noise-sensitive receptors.

Mitigation is not required due to the low significance of a noise impact, neither is a routine noise measurement programme recommended. Measurement locations, frequencies and procedures are provided as a guideline for the developer to consider should there be a noise complaint if people in the future settle closer than 2,000m from the plant (unlikely as the land belongs to ArcellorMittal).

Due to economic and environmental advantages, power generation does provide valuable employment and business opportunities. It must be noted when such projects are close to potential noise-sensitive receptors, consideration must be given to ensuring a compatible co-existence.

This does not suggest that the sound from the facility should not be audible under all circumstances as this is an unrealistic expectation that is not required or expected from any other agricultural, commercial, industrial or transportation related noise source,– but rather that the sound due to the power generation activities should be at a reasonable level in relation to the ambient sound levels.

While this project will have a noise impact of a number of the closest noise-sensitive receptors, these impacts are of low significance and can be considered insignificant.

It is therefore the opinion of the Author that the increases in noise levels are of minor significance. It is therefore the recommendation that the project should be authorised (from a noise impact perspective).

14 THE AUTHOR

The Author started his career in the mining industry as a bursar Learner Official (JCI, Randfontein), working in the mining industry, doing various mining related courses (Rock Mechanics, Surveying, Sampling, Safety and Health [Ventilation, noise, illumination etc] and Metallurgy. He did work in both underground (Coal, Gold and Platinum) as well as opencast (Coal) for 4 years. He changed course from Mining Engineering to Chemical Engineering after his second year of his studies at the University of Pretoria.

After graduation he worked as a Water Pollution Control Officer at the Department of Water Affairs and Forestry for two years (first year seconded from Wates, Meiring and Barnard), where duties included the perusal (evaluation, commenting and recommendation) of various regulatory required documents (such as EMPR's, Water Licence Applications and EIA's), auditing of licence conditions as well as the compilation of Technical Documents.

Since leaving the Department of Water Affairs, Morné has been in private consulting for the last 15 years, managing various projects for the mining and industrial sector, private developers, business, other environmental consulting firms as well as the Department of Water Affairs. During that period he has been involved in various projects, either as specialist, consultant, trainer or project manager, successfully completing these projects within budget and timeframe. During that period he gradually moved towards environmental acoustics, focusing on this field exclusively since 2007.

He has been interested in acoustics as from school days, doing projects mainly related to loudspeaker design. Interest in the matter brought him into the field of Environmental Noise Measurement, Prediction and Control. He has been doing work in this field for the past 8 years, and was involved with the following projects in the last few years:

Wind Energy Facilities	*Zen (Savannah Environmental – SE), Goereesoe (SE), Springfontein (SE), Garob (SE), Project Blue (SE), ESKOM Kleinzee (SE), iNCa Gouda (Aurecon SA), Kangnas (Aurecon), Walker Bay (SE), Oyster Bay (SE), Hidden Valley (SE), Happy Valley (SE), Deep River (SE), Saldanha WEF (Terramanzi), Loeriesfontein (SiVEST), Noupoort (SiVEST), Prieska (SiVEST), Plateau East and West (Aurecon), Saldanha (Aurecon), Veldrift (Aurecon), Tsitsikamma (SE), AB (SE), West Coast One (SE), Namakwa Sands (SE), Dorper (SE), VentuSA Gouda (SE), Amakhala Emoyeni (SE), Klipheuwel (SE), Cookhouse (SE), Cookhouse II (SE), Canyon Springs (Canyon Springs), Rheboksfontein (SE), Suurplaat (SE), Karoo Renewables (SE), Outeniqwa (Aurecon), Koningaas (SE), Eskom Aberdene (SE), Spitskop (SE), Rhenosterberg (SiVEST), Bannf (Vidigenix), Wolf WEF (Aurecon), Umsinde*

	Emoyeni (ARCUS, Komsberg (ARCUS)
Mining and Industry	*BECSA – Middelburg (Golder Associates), Kromkrans Colliery (Geovicon Environmental), SASOL Borrow Pits Project (JMA Consulting), Lesego Platinum (AGES), Tweefontein Colliery (Cleanstream), Evraz Vametco Mine and Plant (JMA), Goedehoop Colliery (Geovicon), Hacra Project (Prescali Environmental), Der Brochen Platinum Project (J9 Environment), Delft Sand (AGES), Brandbach Sand (AGES), Verkeerdepan Extension (CleanStream), Dwaalboom Limestone (AGES), Jagdlust Chrome (MENCO), WPB Coal (MENCO), Landau Expansion (CleanStream), Stuart Coal – Weltevreden (CleanStream), Otjikoto Gold (AurexGold), Klipfontein Colliery (MENCO), Imbabala Coal (MENCO), ATCOM East Expansion (Jones and Wagner), IPP Waterberg Power Station (SE), Kangra Coal (ERM), Schoongesicht (CleanStream), EastPlats (CleanStream), Chapudi Coal (Jacana Environmental), Generaal Coal (JE), Mopane Coal (JE), Boshoek Chrome (JMA), Langpan Chrome (PE), Vlakpoort Chrome (PE), Sekoko Coal (SE), Frankford Power (REMIG), Strahrae Coal (Ferret Mining), Transalloys Power Station (Savannah), Pan Palladum Smelter, Iron and PGM Complex (Prescali)*
Road and Railway	*K220 Road Extension (Urbansmart), Boskop Road (MTO), Sekoko Mining (AGES), Davel-Swaziland-Richards Bay Rail Link (Aurecon), Moloto Transport Corridor Status Quo Report and Pre-Feasibility (SiVEST), Postmasburg Housing Development (SE), Tshwane Rapid Transport Project, Phase 1 and 2 (NRM Consulting/City of Tshwane)*
Airport	*Oudtshoorn Noise Monitoring (AGES), Sandton Heliport (Alpine Aviation), Tete Airport Scoping*
Noise monitoring	*Peerboom Colliery (EcoPartners), Thabametsi (Digby Wells), Doxa Deo (Doxa Deo), Harties Dredging (Rand Water), Xstrata Coal – Witbank Regional, Sephaku Delmas (AGES), Amakhala Emoyeni WEF (Windlab Developments), Oyster Bay WEF (Renewable Energy Systems), Tsitsikamma WEF (Cennergi and SE), Hopefield WEF (Umoya), Wesley WEF (Innowind), Ncora WEF (Innowind), Boschmanspoort (Jones and Wagner), Nqamakwe WEF (Innowind), Dassiesfontein WEF Noise Analysis (BioTherm), Transnet Noise Analysis (Aurecon), Jeffries Bay Wind Farm (Globeleq)*
Small Noise Impact Assessments	*TCTA AMD Project Baseline (AECOM), NATREF (Nemai Consulting), Christian Life Church (UrbanSmart), Kosmosdale (UrbanSmart), Louwlardia K220 (UrbanSmart), Richards Bay Port Expansion (AECOM), Babalegi Steel Recycling (AGES), Safika Slag Milling Plant (AGES), Arcelor Mittal WEF (Aurecon), RVM Hydroplant (Aurecon), Grootvlei PS Oil Storage (SiVEST), Rhenosterberg WEF, (SiVEST), Concerto Estate (BPTrust), Ekuseni Youth Centre (MENCO), Kranskop Industrial Park (Cape South Developments), Pretoria Central Mosque (Noman Shaikh), Soshanguve Development (Maluleke Investments), Seshego-D Waste Disposal (Enviroxcellence), Zambesi Safari Equipment (Owner), Noise Annoyance Assessment due to the Operation of the Gautrain (Thornhill and Lakeside Residential Estate), Upington Solar (SE), Ilangalethu Solar (SE), Pofadder Solar (SE), Flagging Trees WEF (SE), Uyekraal WEF (SE), Ruuki Power Station (SE), Richards Bay Port Expansion (AECOM), Babalegi Steel Recycling (AGES), Safika Ladium (AGES), Safika Cement Isando (AGES), Natref (NEMAI), RareCo (SE), Struisbaai WEF (SE), Paulputs CSP (SE)*
Project reviews and amendment reports	*Loperberg (Savannah), Dorper (Savannah), Penhoek Pass (Savannah), Oyster Bay (RES), Tsitsikamma (Cennergi), Amakhala Emoyeni (Windlab), Spreeukloof (Savannah), Spinning Head (Savannah), Kangra Coal (ERM), West Coast One (Moyeng Energy), Rheboksfontein (Moyeng Energy)*

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APPENDIX A

Glossary of Acoustic Terms, Definitions and General Information

1/3-Octave Band	A filter with a bandwidth of one-third of an octave representing four semitones, or notes on the musical scale. This relationship is applied to both the width of the band, and the centre frequency of the band. See also definition of octave band.
A – Weighting	An internationally standardised frequency weighting that approximates the frequency response of the human ear and gives an objective reading that therefore agrees with the subjective human response to that sound.
Air Absorption	The phenomena of attenuation of sound waves with distance propagated in air, due to dissipative interaction within the gas molecules.
Alternatives	A possible course of action, in place of another, that would meet the same purpose and need (of proposal). Alternatives can refer to any of the following, but are not limited hereto: alternative sites for development, alternative site layouts, alternative designs, alternative processes and materials. In Integrated Environmental Management the so-called "no go" alternative refers to the option of not allowing the development and may also require investigation in certain circumstances.
Ambient	The conditions surrounding an organism or area.
Ambient Noise	The all-encompassing sound at a point being composed of sounds from many sources both near and far. It includes the noise from the noise source under investigation.
Ambient Sound	The all-encompassing sound at a point being composite of sounds from near and far.
Ambient Sound Level	Means the reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such a meter was put into operation. In this report the term Background Ambient Sound Level will be used.
Amplitude Modulated Sound	A sound that noticeably fluctuates in loudness over time.
Applicant	Any person who applies for an authorisation to undertake a listed activity or to cause such activity in terms of the relevant environmental legislation.
Assessment	The process of collecting, organising, analysing, interpreting and communicating data that is relevant to some decision.
Attenuation	Term used to indicate reduction of noise or vibration, by whatever method necessary, usually expressed in decibels.
Audible frequency Range	Generally assumed to be the range from about 20 Hz to 20,000 Hz, the range of frequencies that our ears perceive as sound.
Ambient Sound Level	The level of the ambient sound indicated on a sound level meter in the absence of the sound under investigation (e.g. sound from a particular noise source or sound generated for test purposes). Ambient sound level as per Noise Control Regulations.
Broadband Noise	Spectrum consisting of a large number of frequency components, none of which is individually dominant.
C-Weighting	This is an international standard filter, which can be applied to a pressure signal or to a *SPL* or *PWL* spectrum, and which is essentially a pass-band filter in the frequency range of approximately 63 to 4000 Hz. This filter provides a more constant, flatter, frequency response, providing significantly less adjustment than the A-scale filter for frequencies less than 1000 Hz.
Controlled area (as per National Noise Control Regulations)	a piece of land designated by a local authority where, in the case of- (a) road transport noise in the vicinity of a road- (i) the reading on an integrating impulse sound level meter, taken outdoors at the end of a period extending from 06:00 to 24:00 while such meter is in operation, exceeds 65 dBA; or (ii) the equivalent continuous "A"-weighted sound pressure level at a height of at least 1,2 metres, but not more than 1,4 metres, above the ground for a period extending from 06:00 to 24:00 as calculated in accordance with SABS 0210-1986, titled: "Code of Practice for

	calculating and predicting road traffic noise", published under Government Notice No. 358 of 20 February 1987, and projected for a period of 15 years following the date on which the local authority has made such designation, exceeds 65 dBA; (b) aircraft noise in the vicinity of an airfield, the calculated noisiness index, projected for a period of 15 years following the date on which the local authority has made such designation, exceeds 65 dBA; or (c) industrial noise in the vicinity of an industry- (i) the reading on an integrating impulse sound level meter, taken outdoors at the end of a period of 24 hours while such meter is in operation, exceeds 61 dBA; or (ii) the calculated outdoor equivalent continuous "A"-weighted sound pressure level at a height of at least 1,2 metres, but not more than 1,4 metres, above the ground for a period of 24 hours, exceeds 61 dBA;
dB(A)	Sound Pressure Level in decibel that has been A-weighted, or filtered, to match the response of the human ear.
Decibel (db)	A logarithmic scale for sound corresponding to a multiple of 10 of the threshold of hearing. Decibels for sound levels in air are referenced to an atmospheric pressure of 20 μ Pa.
Diffraction	The process whereby an acoustic wave is disturbed and its energy redistributed in space as a result of an obstacle in its path, Reflection and refraction are special cases of diffraction.
Direction of Propagation	The direction of flow of energy associated with a wave.
Disturbing noise	Means a noise level that exceeds the zone sound level or, if no zone sound level has been designated, a noise level that exceeds the ambient sound level at the same measuring point by 7 dBA or more.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group; these circumstances include biophysical, social, economic, historical, cultural and political aspects.
Environmental Control Officer	Independent Officer employed by the applicant to ensure the implementation of the Environmental Management Plan (EMP) and manages any further environmental issues that may arise.
Environmental impact	A change resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organisation's activities or may be indirectly caused by them.
Environmental Impact Assessment	An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy that requires authorisation of permission by law and that may significantly affect the environment. The EIA includes an evaluation of alternatives, as well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures for enhancing the positive aspects of the proposal, and environmental management and monitoring measures.
Environmental issue	A concern felt by one or more parties about some existing, potential or perceived environmental impact.
Equivalent continuous A-weighted sound exposure level ($L_{Aeq,T}$)	The value of the average A-weighted sound pressure level measured continuously within a reference time interval *T*, which have the same mean-square sound pressure as a sound under consideration for which the level varies with time.
Equivalent continuous A-weighted rating level ($L_{Req,T}$)	The Equivalent continuous A-weighted sound exposure level *($L_{Aeq,T}$)* to which various adjustments has been added. More commonly used as ($L_{Req,d}$) over a time interval 06:00 – 22:00 (T=16 hours) and ($L_{Req,n}$) over a time interval of 22:00 – 06:00 (T=8 hours). It is a calculated value.
F (fast) time weighting	(1) Averaging detection time used in sound level meters. (2) Fast setting has a time constant of 125 milliseconds and provides a fast

	reacting display response allowing the user to follow and measure not too rapidly fluctuating sound.
Footprint area	Area to be used for the construction of the proposed development, which does not include the total study area.
Free Field Condition	An environment where there is no reflective surfaces.
Frequency	The rate of oscillation of a sound, measured in units of Hertz (Hz) or kiloHertz (kHz). One hundred Hz is a rate of one hundred times per second. The frequency of a sound is the property perceived as pitch: a low-frequency sound (such as a bass note) oscillates at a relatively slow rate, and a high-frequency sound (such as a treble note) oscillates at a relatively high rate.
Green field	A parcel of land not previously developed beyond that of agriculture or forestry use; virgin land. The opposite of Greenfield is Brownfield, which is a site previously developed and used by an enterprise, especially for a manufacturing or processing operation. The term Brownfield suggests that an investigation should be made to determine if environmental damage exists.
G-Weighting	An International Standard filter used to represent the infrasonic components of a sound spectrum.
Harmonics	Any of a series of musical tones for which the frequencies are integral multiples of the frequency of a fundamental tone.
I (impulse) time weighting	(1) Averaging detection time used in sound level meters as per South African standards and Regulations. (2) Impulse setting has a time constant of 35 milliseconds when the signal is increasing (sound pressure level rising) and a time constant of 1,500 milliseconds while the signal is decreasing.
Impulsive sound	A sound characterized by brief excursions of sound pressure (transient signal) that significantly exceed the ambient sound level.
Infrasound	Sound with a frequency content below the threshold of hearing, generally held to be about 20 Hz. Infrasonic sound with sufficiently large amplitude can be perceived, and is both heard and felt as vibration. Natural sources of infrasound are waves, thunder and wind.
Integrated Development Plan	A participatory planning process aimed at developing a strategic development plan to guide and inform all planning, budgeting, management and decision-making in a Local Authority, in terms of the requirements of Chapter 5 of the Municipal Systems Act, 2000 (Act 32 of 2000).
Integrated Environmental Management	IEM provides an integrated approach for environmental assessment, management, and decision-making and to promote sustainable development and the equitable use of resources. Principles underlying IEM provide for a democratic, participatory, holistic, sustainable, equitable and accountable approach.
Interested and affected parties	Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.
Key issue	An issue raised during the Scoping process that has not received an adequate response and that requires further investigation before it can be resolved.
L_{A90}	the sound level exceeded for the 90% of the time under consideration
Listed activities	Development actions that is likely to result in significant environmental impacts as identified by the delegated authority (formerly the Minister of Environmental Affairs and Tourism) in terms of Section 21 of the Environment Conservation Act.
L_{AMin} *and* L_{AMax}	Is the RMS (root mean squared) minimum or maximum level of a noise source.
Loudness	The attribute of an auditory sensation that describes the listener's ranking of sound in terms of its audibility.
Magnitude of impact	Magnitude of impact means the combination of the intensity, duration and extent of an impact occurring.
Masking	The raising of a listener's threshold of hearing for a given sound due to the

	presence of another sound.
Mitigation	To cause to become less harsh or hostile.
Negative impact	A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, or by causing nuisance).
Noise	a. Sound that a listener does not wish to hear (unwanted sounds). b. Sound from sources other than the one emitting the sound it is desired to receive, measure or record. c. A class of sound of an erratic, intermittent or statistically random nature.
Noise Level	The term used in lieu of sound level when the sound concerned is being measured or ranked for its undesirability in the contextual circumstances.
Noise-sensitive development	developments that could be influenced by noise such as: a) districts (see table 2 of SANS 10103:2008) 1. rural districts, 2. suburban districts with little road traffic, 3. urban districts, 4. urban districts with some workshops, with business premises, and with main roads, 5. central business districts, and 6. industrial districts; b) educational, residential, office and health care buildings and their surroundings; c) churches and their surroundings; d) auditoriums and concert halls and their surroundings; e) recreational areas; and f) nature reserves. In this report Noise-sensitive developments is also referred to as a Potential Sensitive Receptor
Octave Band	A filter with a bandwidth of one octave, or twelve semi-tones on the musical scale representing a doubling of frequency.
Positive impact	A change that improves the quality of life of affected people or the quality of the environment.
Property	Any piece of land indicated on a diagram or general plan approved by the Surveyor-General intended for registration as a separate unit in terms of the Deeds Registries Act and includes an erf, a site and a farm portion as well as the buildings erected thereon
Public Participation Process	A process of involving the public in order to identify needs, address concerns, choose options, plan and monitor in terms of a proposed project, programme or development
Reflection	Redirection of sound waves.
Refraction	Change in direction of sound waves caused by changes in the sound wave velocity, typically when sound wave propagates in a medium of different density.
Reverberant Sound	The sound in an enclosure which results from repeated reflections from the boundaries.
Reverberation	The persistence, after emission of a sound has stopped, of a sound field within an enclosure.
Significant Impact	An impact can be deemed significant if consultation with the relevant authorities and other interested and affected parties, on the context and intensity of its effects, provides reasonable grounds for mitigating measures to be included in the environmental management report. The onus will be on the applicant to include the relevant authorities and other interested and affected parties in the consultation process. Present and potential future, cumulative and synergistic effects should all be taken into account.
S (slow) time weighting	(1) Averaging times used in sound level meters. (2) Time constant of one [1] second that gives a slower response which helps average out the display fluctuations.
Sound Level	The level of the frequency and time weighted sound pressure as determined by

	a sound level meter, i.e. A-weighted sound level.
Sound Power	Of a source, the total sound energy radiated per unit time.
Sound Pressure Level (SPL)	Of a sound, 20 times the logarithm to the base 10 of the ratio of the RMS sound pressure level to the reference sound pressure level. International values for the reference sound pressure level are 20 micropascals in air and 100 millipascals in water. SPL is reported as L_p in dB (not weighted) or in various other weightings.
Soundscape	Sound or a combination of sounds that forms or arises from an immersive environment. The study of soundscape is the subject of acoustic ecology. The idea of soundscape refers to both the natural acoustic environment, consisting of natural sounds, including animal vocalizations and, for instance, the sounds of weather and other natural elements; and environmental sounds created by humans, through musical composition, sound design, and other ordinary human activities including conversation, work, and sounds of mechanical origin resulting from use of industrial technology. The disruption of these acoustic environments results in noise pollution.
Study area	Refers to the entire study area encompassing all the alternative routes as indicated on the study area map.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs (Brundtland Commission, 1987).
Tread braked	The traditional form of wheel brake consisting of a block of friction material (which could be cast iron, wood or nowadays a composition material) hung from a lever and being pressed against the wheel tread by air pressure (in the air brake) or atmospheric pressure in the case of the vacuum brake.
Zone of Potential Influence	The area defined as the radius about an object, or objects beyond which the noise impact will be insignificant.
Zone Sound Level	Means a derived dBA value determined indirectly by means of a series of measurements, calculations or table readings and designated by a local authority for an area. This is similar to the Rating Level as defined in SANS 10103:2008.

APPENDIX B

Photos of measurement locations

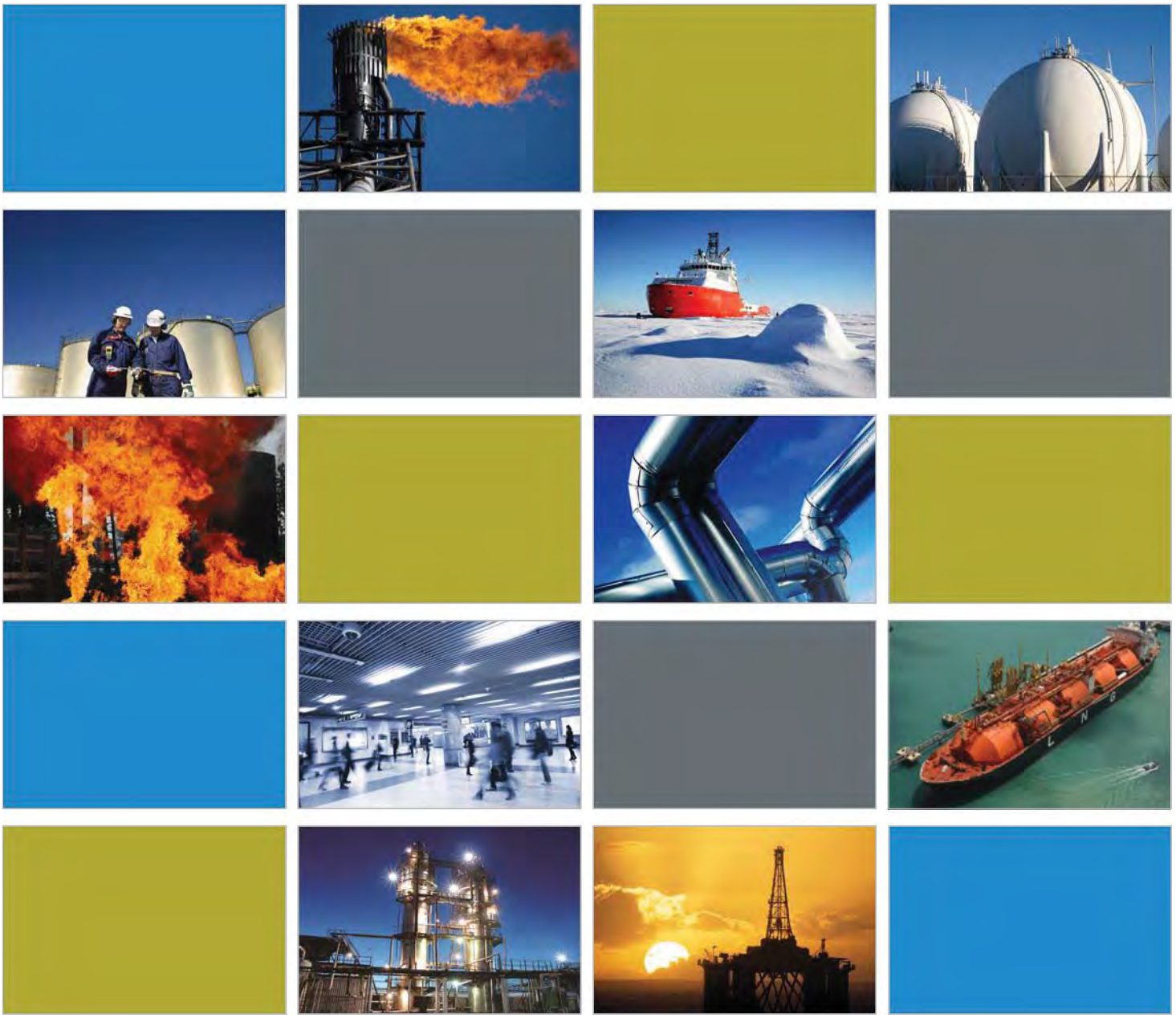
Photo 1: Measurement location AMSGLTASL01

Photo 2: Measurement location AMSGSTASL01

Photo 3: Measurement location AMSGSTASL02

Photo 4: Measurement location AMSGSTASL03

End of Report



Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay V1

Quantified Risk Assessment Report

Reference: 0315829

September 2016

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The business of sustainability

CONTENTS

The International Power Consortium South Africa (IPCSA), have developed a solution to Saldanha Steel's requirement for stable, economical electricity supply over the long term. This solution consists of a 1507 MW Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site.

The project will support both Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel supply. CNG and LNG could be supplied by ship to the Port of Saldanha, where it will be offloaded via a submersible pipeline. LNG, which will be regasified and CNG processing will take place within the Port boundary and will be the subject of another environmental authorisation application. The preparation of either of these feedstocks will result in pressurised Natural Gas being exported to the plant via two proposed pipelines. ERM have undertaken an environmental impact assessment (EIA) on behalf of Saldanha Steel for the CCGT power plant and associated pipelines. The project will involve the construction of the CCGT power plant as well as the Natural Gas pipeline. The CCGT power plant will also operate a 2 MW Propane fuelled black start generator which will be utilised by the site during the construction phase of the project as well as in the event of black starts for the power plant.

The cross country pipelines will comprise two identical 300 mm diameter pipelines running side by side in the same servitude, with a design pressure of 90 barg and an average operating pressure of 67 barg. The pipeline servitude route will extend from the port of Saldanha approximately 4.6 km to the gas receiving station within the Saldanha Steel's site boundary.

In order to better understand the risks posed by the CCGT power plant project, specifically the Natural Gas pipelines and the Propane generator, on the surroundings, a baseline Quantitative Risk Assessment (QRA) was carried out. The objective of this QRA was to assess the risk to the workers associated with the construction and operation phase of the project as well as the general public who could be in the vicinity of the pipelines servitude or CCGT power plant site. The risk assessment utilised the Land Use Planning (LUP) and location specific individual risk (LSIR) of dangerous dose Risk Tolerability approaches.

The scope of work for this specialist study included:

- Conducting a major accident Quantitative Risk Assessment (QRA) of the IPCSA Saldanha Steel Natural Gas pipeline route as well as the construction phase and operation phase of the propane fuel storage installations.

- Focusing on potential incidents that could result in fatalities or serious injury to the public from the Natural Gas pipelines and the Propane fuel storage installation;

- Utilising international best practices i.e. the UK's HSE Land Use Planning (LUP) and Risk Tolerability criteria focussing on Individual Risk of Fatality to assess the acceptability of the risk.

  The scope of work for this specialist study excludes the LNG and CNG processing facilities in the port. Only hazards relating to the release of Natural Gas from the cross country pipelines or Propane from the Propane generator installation have been considered for the power station.

CONCLUSIONS

A (QRA) was carried out for the proposed construction of the Saldanha Steel Combined Cycle Gas Turbine (CCGT) power plant. This project includes the construction of two Natural Gas pipelines and a Propane backup electricity generator. The study has shown that the operations have the potential to adversely affect the health and safety of the general public as well as workers within the Saldanha Port area and those workers involved in the construction and operation of the CCGT power plant.

The potential hazards from the proposed project include jet fires, flash fires, vapour cloud and gas cloud explosions, boiling liquid evaporating vapour explosions and fireballs. The risk from these hazards was assessed according to the location specific individual risks (LSIR) of fatality as well as Land Use Planning (LUP) methodologies. An impact assessment was also carried out according to ERM's impact assessment methodology.

The current land uses are considered tolerable from a risk perspective for the proposed development. Future land use around the pipelines' servitude and power plant site should adhere to the restrictions set about by the UK HSE. As the Propane consumption at the power plant site is understood to be highest in the second year of construction, the surrounding land use during this period will be the most restricted.

The location specific individual risk of fatality for persons located indoors and outdoors has also been calculated for the proposed pipelines as well as the proposed Propane generator. During the construction and operational phases of the CCGT power plant project the risks are not considered intolerable. Due to the LSIR level on the CCGT power plant site as well as the area surrounding the site and along the pipelines' servitude, the risk can only be considered tolerable if it can be demonstrated by the site that the risks are As Low As Reasonably Practicable (ALARP).

As the detailed design of the CCGT power plant is not complete at this stage of the project, a risk assessment of the gas receiving station was not

completed. However in the event of a release from this equipment a flammable gas cloud explosion was considered possible. This was modelled and found to extend 57m from the centre of the gas receiving area to a dangerous dose overpressure end point. This does not extend beyond the proposed power plant site boundary.

IMPACT ASSESSMENT

The hazards, as described above, would result in a **direct negative** type of impact on the natural vegetation, structures, employees and people in the immediate area but not within the site boundaries in close proximity of the Natural Gas pipelines as well as the CCGT power plant site.

The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.

The extent for the impact is **local** as the impact of the worst case hazards extends beyond the boundaries of the pipelines' servitude as well as the CCGT power plant site.

The **scale** of the hazard effects to a Dangerous Dose from the Natural Gas pipelines are as follows:

- Jet Fire: 156 m;
- Flash Fire: 676 m; and
- Gas Cloud Explosion: 57 m.

The **scale** of the hazard effects to a Dangerous Dose from the Propane generator installations are as follows:

- Jet Fire: 173 m;
- Flash Fire: 239 m;
- Vapour Cloud Explosion: 13 m; and
- Boiling Liquid Evaporating Vapour Explosion / Fireball: 114 m.

Certain design standards have been assumed for the Natural Gas pipelines and Propane installations. These largely follow prescribed standards, however of particular note is the following:

- Multiple (at least two) safety systems will be implemented for Propane offloading. Such systems include wheel chocks, interlock brakes, interlock barriers, etc. In addition the site will implement an effective pull away mitigation system and inspection and pressure/leak tests to prevent transfer system leaks and bursts.

If facilities and equipment are designed to the prescribed specifications and standards the likelihood of such an events occurring is considered **unlikely**.

The sensitivity of receptors can be differentiated into those associated with the current land use of the area, as addressed by the LUP assessment, and individuals, as addressed by the LSIR assessment.

The area surrounding the Natural Gas pipelines' servitude is currently open land with the exception of Camp road. A portion of this servitude also passes through an area owned by the Port. As these areas are not currently inhabited and future land use within the Port is understood to be categorised as Industrial the land use sensitivity in these areas is categorised as **low**.

The area surrounding the proposed CCGT power plant site is similarly unused with the exception of a small access road. Therefore this land use sensitivity is also categorised as **low**.

Considering individuals, it is understood that the area surrounding the Natural Gas pipelines' servitude is not permanently inhabited as no homes, work places or other gathering areas exist in the vicinity. The general public does however have access to the area surrounding the servitude (with the exception of the Port property). Therefore the sensitivity of the general public in the area surrounding the Natural Gas pipelines' servitude is categorised as **medium**. For workers involved in the construction phase or operational phase of the CCGT power plant project the sensitivity is categorised as **low**. This is due to these individuals being aware of the risks and being more adequately prepared to handle them as a result of emergency planning , PPE, etc.

A similar situation exists for the proposed CCGT power plant site and surrounding area. The general public sensitivity is categorised as **medium** while worker sensitivity is categorised as **low**.

The impact has been assessed for a number of different scenarios which are described below:

- Land Use Planning Impact for the construction phase (represented for the second year of construction) for the Natural Gas pipelines
- Land Use Planning Impact for the construction phase (represented for the second year of construction) for the Propane generator installations
- Location Specific Individual Risk Impact for the construction phase (represented for the second year of construction) for the entire project
- Land Use Planning Impact for the operational phase for the Natural Gas pipelines
- Land Use Planning Impact for the operational phase for the Natural Gas pipelines
- Location Specific Individual Risk Impact for the operational phase for the entire project

Box 1.1 Land Use Planning Impact: Construction Phase: Natural Gas Pipelines

Impact Magnitude – Negligible
The Natural Gas pipelines are understood to only become operational during the operations phase of the project. Therefore no hazards exist during the construction phase

Likelihood – Unlikely

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR NATURAL GAS PIPELINES (PRE-MITIGATION) – NEGLIGIBLE – The hazards will not exist for the Natural Gas Pipelines during the construction phase

Box 1.2 Land Use Planning Impact: Construction Phase: Propane Generator Installations

Impact Magnitude – Low

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest land use restriction extends 140 m to the west and 60 m to the north of the CCGT site boundary, centred on the Propane generator.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely.**

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR PROPANE GENERATOR (PRE-MITIGATION) – NEGLIGIBLE – As the majority of the land surrounding the CCGT power plant is unused and uninhabited the impact from hazards is unlikely to have large offsite effects.

Box 1.3 Location Specific Individual Risk Impact: Construction Phase: Natural Gas Pipelines and Propane Generator Installations

Impact Magnitude – High

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest LSIR contours extend 360 m to the west, 320 m to the north and 80 m to the east of the CCGT site boundary, centred on the Propane generator. The area considered intolerable for the general public extends 60 m to the north of the CCGT site boundary. An area centred on the Propane generator is considered intolerable for workers.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely**. As stated, no hazards for the Natural Gas pipelines will be realised during the construction phase.

Receptor Sensitivity – The LSIR receptor sensitivity has been categorised as **medium** for the general public as they can access these areas but do not inhabit them and **low** for workers involved in the construction of the project as they are aware and prepared for the risks.

LSIR IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR NATURAL GAS PIPELINES AND PROPANE GENERATOR (PRE-MITIGATION) – MODERATE – As the general public and workers are not exposed to LSIR that is considered intolerable.

Box 1.4 Land Use Planning Impact: Operation Phase: Natural Gas Pipelines

Impact Magnitude – Low

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 676 m. The largest land use restriction extends 140 m from the pipeline due to proposed bends which increase the risk in these areas. Risk transects indicate the normal pipeline area restrictions extend 68 m from the centre of the Natural Gas pipelines' servitude.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely.**

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING OPERATION PHASE FOR NATURAL GAS PIPELINES (PRE-MITIGATION) – NEGLIGIBLE – As the majority of the land surrounding the Natural Gas Pipelines' servitude is unused and uninhabited the impact from hazard is unlikely to have large offsite effects. Areas within the Port are understood to be reserved for industrial land use.

Box 1.5 Land Use Planning Impact: Operation Phase: Propane Generator Installations

Impact Magnitude – Low

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest land use restriction extends 120 m to the west and 60 m to the north of the CCGT site boundary, centred on the Propane generator.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely.**

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING OPERATION PHASE FOR PROPANE GENERATOR (PRE-MITIGATION) – NEGLIGIBLE – As the majority of the land surrounding the CCGT power plant is unused and uninhabited the impact from hazards is unlikely to have large offsite effects.

Box 1.6 Location Specific Individual Risk Impact: Operation Phase: Natural Gas Pipelines and Propane Generator Installations

Impact Magnitude – High

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 676 m. The largest LSIR contours extend 110 m to the west and 240 m to the north of the CCGT site boundary, centred on the Propane generator.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely**.

Receptor Sensitivity – The LSIR receptor sensitivity has been categorised as **medium** for the general public as they can access these areas but do not inhabit them and **low** for workers involved in the construction of the project as they are aware and prepared for the risks.

LSIR IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR NATURAL GAS PIPELINES AND PROPANE GENERATOR (PRE-MITIGATION) – MODERATE – As no areas which are considered intolerable for the general public or workers exists.

Mitigation measures have been proposed for the design, safety and operation of the Natural Gas pipelines and Propane generator installations. The purpose of these measures is to avoid or minimise the risk of an incident (i.e. fire or explosion) occurring from a loss of containment of Natural Gas or Propane from facilities or ancillary equipment.

Certain key mitigation measures are listed below:

The following proposed engineering design features for the Natural Gas Pipelines that reduce risks should be implemented:

- The pipelines should be designed to an international standard such as:
  - BS EN 14161: *Petroleum and natural gas industries – Pipeline transportation systems*;
  - ASME B31.8 *Gas Transmission and Distribution Piping Systems*; or
  - Other internationally recognised standards.

The following proposed engineering design features for the Propane generator installations that reduce risks should be implemented:

- The installation must comply with all the requirements of SANS 10087-3:2015 *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 L*

The following protective measures for the Propane generator installations should be put in place to reduce the risks:

- Active or passive fire protection on the Propane storage bullet in line with SANS 10087-3:2015;

If mitigation measures as described above are implemented, the residual impact significance will change to for the construction phase as described in *Table 1* as the only receptors will be workers involved in the construction and operation of the CCGT power plant and their sensitivity is classed as **low.** The residual risk from the operation phase will remain the same.

Table 1 ***Pre- and Post- Mitigation Significance: QRA: Storage Facility***

Phase and Assessment	Pre- and Post- Mitigation Significance:	Residual Significance (Post-mitigation)
Construction Phase, Natural Gas Pipelines, LUP Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Construction Phase, Propane Generator, LUP Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Construction Phase, Natural Gas Pipelines and Propane Generator, LSIR Assessment	**MODERATE**	**MODERATE**
Operation Phase, Natural Gas Pipelines, LUP Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Operation Phase, Propane Generator, LSIR Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**

Phase and Assessment	Pre- and Post- Mitigation Significance:	Residual Significance (Post-mitigation)
Operation Phase, Natural Gas Pipelines and Propane Generator, LSIR Assessment	**MODERATE**	**MODERATE**

IMPACT STATEMENT

The findings of the Quantified Risk Assessment for the Saldanha Steel Independent Gas-fired Power Plant indicate that the Project will have negative impacts on the immediate areas around the developments by increasing the risk of a major accident. However the risk levels from the developments are not considered intolerable according to the criteria utilised for this assessment. In addition these risks can be managed through the implementation of the mitigation measures outlined in this QRA, the EIR and other specialist reports

It is, therefore, recommended that the Project be supported subject to the implementation of the mitigation measures outlined in this QRA, the EIR and other specialist reports.

1 INTRODUCTION

1.1 PROJECT DESCRIPTION AND LOCATION

The International Power Consortium South Africa (IPCSA), have developed a solution to Saldanha Steel's requirement for stable, economical electricity supply over the long term. This solution consists of a 1507 MW Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the Bankable Feasibility Study (BFS) completion.

The project will support both Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel supply. CNG and LNG could be supplied by ship to the Port of Saldanha, where it will be offloaded via a submersible pipeline. LNG, which will be regasified and CNG processing will take place within the Port boundary and will be the subject of another environmental authorisation application. The preparation of either of these feedstocks will result in pressurised Natural Gas being exported to the plant via two proposed pipelines.

The project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160MW of base load energy, peaking up to 250MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

ERM have undertaken an environmental impact assessment (EIA) on behalf of Saldanha Steel for the CCGT power plant and associated pipelines. The project will involve the construction of the CCGT power plant as well as the Natural Gas pipeline. The CCGT power plant will also operate a 2 MW Propane fuelled black start generator which will be utilised by the site during the construction phase of the project as well as in the event of black starts for the power plant.

The cross country pipelines will comprise two identical 300 mm diameter pipelines running side by side in the same servitude, with a design pressure of 90 barg and an average operating pressure of 67 barg. The pipeline servitude route will extend from the port of Saldanha approximately 4600m to the gas receiving station within the Saldanha Steel's site boundary. The location of the proposed Project is shown in *Figure 1.1.*

Figure 1.1 ***A Map of the Proposed Natural Gas Pipelines to the Proposed CCGT Power Plant***

A series of major accidents at fuel storage, handling and production facilities as well as a number of incidents involving cross-country pipelines have focused worldwide attention on the need to control the design and management of facilities and cross-country pipelines where potential for major accidents exists.

In order to better understand the risks posed by the CCGT power plant project, specifically the Natural Gas pipelines and the Propane generator, on the surroundings, a baseline Quantitative Risk Assessment (QRA) was carried out. The objective of this QRA was to assess the risk to the workers associated with the construction and operation phase of the project as well as the general public who could be in the vicinity of the pipelines servitude or CCGT power plant site. The risk assessment utilised the Land Use Planning (LUP) and location specific individual risk (LSIR) of dangerous dose Risk Tolerability approaches.

1.2 *SCOPE OF THE SPECIALIST STUDY*

The scope of work for this specialist study included:

- Conducting a major accident Quantitative Risk Assessment (QRA) of the IPCSA Saldanha Steel Natural Gas pipeline route as well as the

construction phase and operation phase of the propane fuel storage installations.

- Focusing on potential incidents that could result in fatalities or serious injury to the public from the Natural Gas pipelines and the Propane fuel storage installation;

- Utilising international best practices i.e. the UK's HSE Land Use Planning (LUP) and Risk Tolerability criteria focussing on Individual Risk of Fatality to assess the acceptability of the risk.

The scope of work for this specialist study excludes the LNG and CNG processing facilities in the port. Only hazards relating to the release of Natural Gas from the cross country pipelines or Propane from the Propane generator installation have been considered for the power station.

1.3 CONTENT OF THE SPECIALIST REPORT CHECKLIST

The content of this report has been prepared in terms of Regulation GNR 982 of 2014, Appendix 6, as shown in *Table 1.1.*

Table 1.1 Specialist Report Checklist

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	**Cross-reference in this report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	*Section 1.4*
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Section 1.4.1*
(c) an indication of the scope of, and the purpose for which, the report was prepared;	*Section 1.2*
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not Applicable
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	*Section 2*
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	*Sections 7.1* and *7.2*
(g) an identification of any areas to be avoided, including buffers;	None
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Not Applicable
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	*Section 4.3*
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	*Sections 7* and *8*
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to Comments and Responses Report, Annex B
(p) any other information requested by the competent authority.	*Section 7.4*

1.4 SPECIALIST DETAILS

This Risk assessment was carried out by Tim Price and Peter Instone.

Tim Price is a Senior Consultant in ERM Southern Africa's Risk Team. Prior to joining ERM, Tim completed his Masters Degree in Chemical Engineering at the University of Pretoria in the field of Process Integration and Optimisation. His Masters thesis focused on the modelling and analysis of steam systems, specifically heat exchanger networks (HENs) and steam boilers with a focus on boiler efficiency and pressure drop. While at ERM, he has been involved with all aspects of Major Hazard Installation Risk Assessments including consequence modelling, frequency and risk analysis of explosive liquids and gasses as well as toxic substances. He has also developed emergency response plans and worked on the creation of a fit for purpose Quantitative Risk Assessment and Operational Safety Case for an offshore platform. In work not related to risk assessments he has been involved in basic fuel site environmental assessments and was involved in the creation of a multi-site and fuel refinery carbon footprint calculator tool.

Peter Instone joined ERM in 2012 as a Consultant within the specialist Industrial Risk team of ERM based in the Johannesburg Office in South Africa. Peter has a background in Mechanical Engineering and has completed a MEng at Durham University in the United Kingdom in 2011. In the field of Industrial Risk, Peter has been involved in several Quantitative Risk Assessments, many of which were to allow the clients to comply with the requirements of the South African Major Hazard Installation Risk Assessments. These MHI Risk Assessments covered a wide and diverse range of industrial installations. Peter has acquired skills in project management, consequence modelling, risk estimation and risk analysis. Peter has also been involved in Qualitative Risk Assessments such as Hazard and Operability Studies (HAZOPs), Hazard Identification Studies (HAZIDs) and Process Hazard Analysis studies (PHAs).

1.4.1 Declaration of Independence

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for environmental authorisation National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Specialist:	ERM SSA Risk		
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Telephone:	+27 (0) 11 798 6300	Fax:	
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Project Consultant:	Environmental Resources Management		
Contact person:	Stephan van den Berg		
Postal address:	ERM Cape Town – 2nd Floor, Great Westerford, 240 Main Road, Rondebosch		
Postal code:	7800	Cell:	
Telephone:	021 681 5400	Fax:	
E-mail:	stephan.vandenberg@erm.com		

4.2 The specialist appointed in terms of the Regulations_

I, Tim Price , declare that –

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

ERM

Name of company (if applicable):

06/07/2016

Date:

2 RISK ASSESSMENT & MANAGEMENT METHODOLOGY

2.1 PROCESS OF RISK MANAGEMENT

Risk management has become widely used as a technique to aid decision-making. Five specific elements are involved:

1. **Hazard Identification:** to determine the incident scenarios, hazards and hazardous events, their causes and mechanisms.

2. **Consequence Analysis:** to determine the extent of the consequences of identified hazardous events.

3. **Frequency Estimation:** to determine the frequency of occurrence of identified hazardous events and the various consequences.

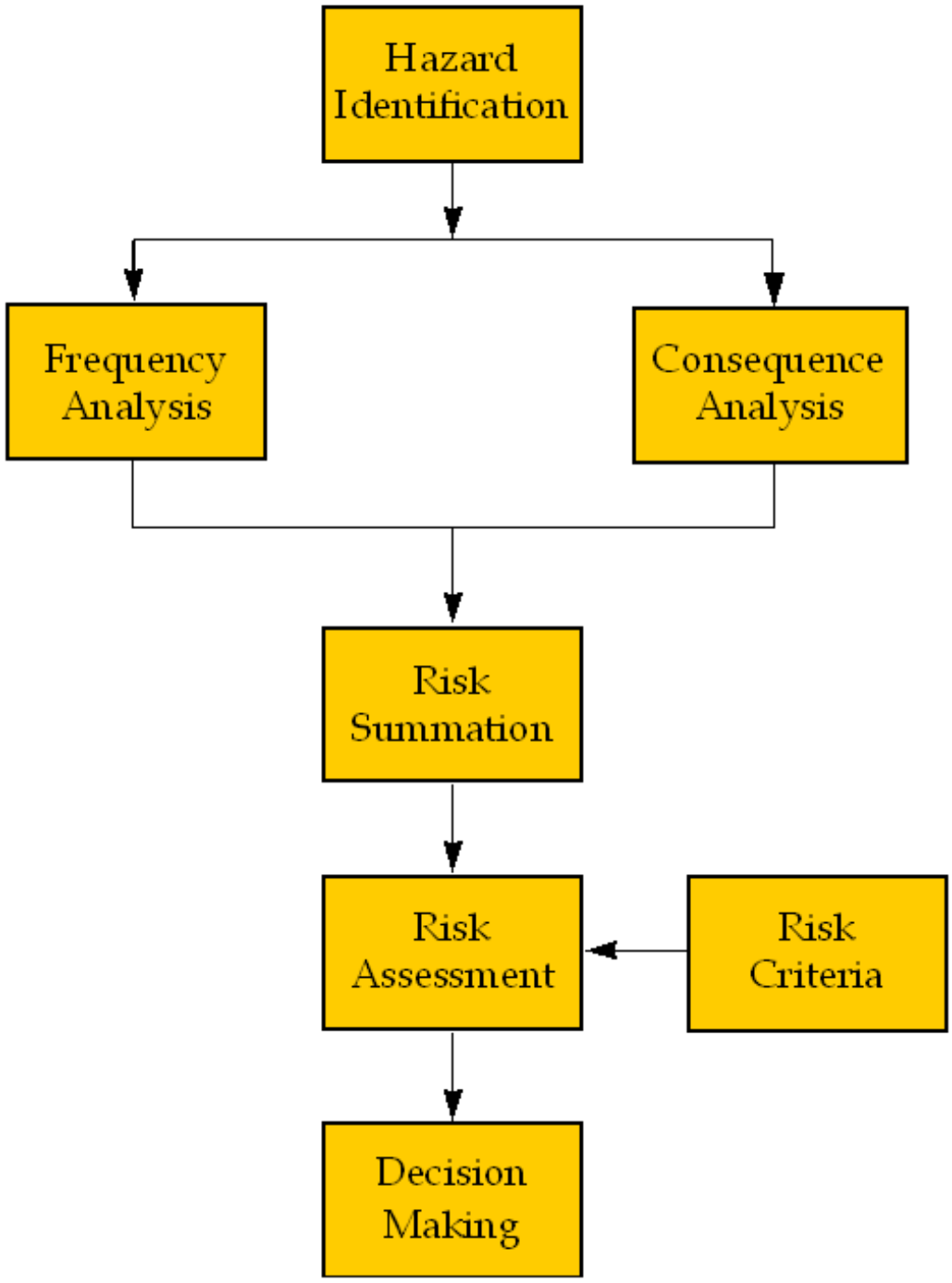
4. **Risk Summation:** to determine the risk levels.

5. **Risk Assessment:** to identify if the risk is tolerable/intolerable and to identify risk reduction or mitigation measures and prioritise these using techniques such as risk ranking and cost-benefit analysis.

These elements are shown in the flow diagram *Figure 2.1*. The elements of the procedure are used both to generate information and as an aid to decision-making in managing the risk. For decision-making, the procedure is only taken as far as is necessary to generate the information required or to make the decision.

The extent of application of the various elements and degree of quantification employed therefore varies significantly from one situation to another.

Figure 2.1 *Risk Assessment Process*



2.2 HAZARD IDENTIFICATION

The first stage in any quantified risk assessment is to identify the potential incidents that could lead to the release of a hazardous material from its normal containment, in this case the release of Natural Gas from the Natural Gas pipelines as well as Propane from the Propane generator installations, and result in a major accident. This is achieved by a systematic review of the pipelines to determine where a release of the Natural Gas could occur from the pipelines or their associated equipment.

The major hazards considered are generally one of three types: flammable, reactive and or toxic. In this study, only flammable hazards are relevant involving loss of containment of the flammable Natural Gas being transferred in the pipelines, or the Propane from storage at the power station. Flammable hazards may manifest as high thermal radiation from fires and overpressures following explosions that may cause direct damage, building collapse, etc. Fires may occur if flammable materials are released to the atmosphere and ignition takes place.

2.3 CONSEQUENCE ANALYSIS

2.3.1 Harm Criteria for Consequence Analysis

During the analysis it is necessary to define harm criteria (or 'end points') for use with the consequence models. In the case of this study, these harm criteria are levels of thermal radiation intensity and where relevant, overpressure (in the case of vapour cloud explosions).

The derivation of the harm criteria used in this study is described in *Section 5.2*.

2.3.2 Consequence Modelling

Factors Affecting Consequences

There are several factors which affect the consequences of materials released into the environment. These include (but are not limited to):

- Release quantity or release rate
- Duration of release
- Initial density of the release
- Source geometry
- Source elevation
- Depth of burial of pipelines
- Prevailing atmospheric conditions
- Surrounding terrain
- Physical and chemical properties of the material released
- Risk reduction measures implemented on the pipelines and their servitude.

Such factors will affect the consequence zones for the specific hazardous materials, eg the distance at which the level of thermal radiation from a fire has reduced sufficiently so that it is no longer dangerous.

Factors Affecting Fire Hazards

When considering large Natural Gas fires, the principal hazard is from thermal radiation. The primary concerns are safety of people and potential

damage to nearby facilities or equipment. Determination of thermal radiation hazard zones involves the following three steps:

- Geometric characterisation of the fire, that is, the determination of the burning rate and the physical dimensions of the fire;

- Characterisation of the radiative properties of the fire, that is, the determination of the average radiative heat flux from the flame surface; and

- Calculation of radiant intensity at a given location.

These, in turn, depend upon the nature of the flammable material, size and type of fire, prevailing atmospheric conditions and the location and orientation of the target/receptor.

Consequence Models

The hazards described above can be modelled analytically by standard models used for consequence analysis. Many of these models are performed by computer software and ERM has access to a range of such models. The modelling of event consequences is described in *Section 6.2*.

2.4 FREQUENCY OF MAJOR ACCIDENT HAZARDS

For each hazard identified, the frequency is assessed.

A simple way of defining the frequency of major accident events within a QRA is to use a 'top down' approach. This provides frequencies of the events of interest (fires, explosions, etc.) by reference to historical accident data sources regarding pipelines, without considering the causes or development of these events in detail.

Alternatively, if more detail is required, a 'bottom up' approach may be used, where the frequency of individual release scenarios from pipelines is considered. The different outcomes that may result from these releases and the associated frequencies are then developed using techniques such as event tree analysis.

A release of Natural Gas from the pipelines, or the Propane storage may be considered for a range of hole sizes, which will depend on the various causes considered. For example, a leak from a pipeline due to corrosion will tend to be small, whereas external impact, say, by a mechanical digger, is likely to produce a much larger hole.

ERM utilises the *Planning Case Assessment Guide* (PCAG) (1) developed by the UK Health and Safety Executive (HSE). ERM has also incorporated historical statistical data from the HSE's Update of pipeline failure rates for land use planning assessments (2), this report summarises data from the CONCAWE group, UKOPA and EGIG. For third party activity, a modifier has been added to reduce the likelihood of TPA for the portion of the proposed pipelines that exist within the Saldanha port boundary as this area is understood to have strict access controls.

The frequency of the various outcomes (accident scenarios) is then estimated by multiplying the frequency of the release by the probability of the various outcomes. In this study, for flammable releases from the pipelines, these outcomes are principally jet fires and explosions of various sizes.

2.5 RISK CALCULATION

The individual risk for a specified level of harm is calculated taking the following variables into consideration:

- The frequency of the hazardous outcome (consequence), e.g. jet fire event
- The probability that the hazardous outcome (consequence) will reach the location specified (This includes variation of wind direction with consequent change to flame tilt; both downwind and crosswind distances need to be taken into account)
- Probability of an individual being at the location
- Probability of escape into shelter by an individual
- The probability that, given exposure to the hazardous outcome, the person suffers a defined level of harm.

The frequency of harm (f_h) being present from each hazardous outcome (consequence) event must be calculated and summed to give the maximum individual risk (IR) from all events at one location.

$$IR_{(max)} = \sum_{\text{for all consequences}} f_h$$

As individual risk is location specific, the above process needs to be repeated for each location considered. The individual risk from other facilities can be summed to give the overall individual risk level from several major hazards. Calculation can be avoided if it is obvious that the event would not be able to affect a location e.g. the specified location is too far away.

(1) Planning Case Assessment Guide, 09/07/2002
(2) HSE Research report RR1035

The frequency of harm will be different for differing weather categories and needs to be calculated for each weather category used. The frequency of harm for a given consequence and weather category is expressed as follows:

$$f_h = f_e \times P_w \times P_d \times P_{exp} \times P_{harm}$$

Where:

f_e = frequency of the hazardous outcome (consequence)

P_w = probability of that weather category

P_d = probability of the wind blowing in the required direction for event to affect the individual (P_d = 0 if event cannot reach a particular location)

P_{exp} = probability of exposure

P_{harm} = probability that defined level of harm results given that exposure has occurred

The probability of the wind blowing in the required direction depends on the angle of entrapment, or the circular sector where a particular hazardous outcome encompasses the specified location. This is a function of the distance from the source, the size, and shape of the hazard 'footprint'.

The size and shape of the footprint is determined from the results of the consequence analysis, but gives a complex shape and is correspondingly difficult to calculate the angle of entrapment. These complex shapes are often simplified to regular shapes in order to calculate the angle of entrapment.

The frequency of harm for a specific event is the sum of the frequencies of harm for the different weather conditions:

$$f_h = \sum_{\text{all weathers}} f_{h,\text{weather } i}$$

The stability category and wind speed combinations used in the study are discussed in *Section 4.6*.

ERM's proprietary *ViewRisk* computer software has been used to calculate iso-risk transects, which show the distribution of individual risk of harm to people from the centre of the pipelines.

2.6 *RISK ASSESSMENT*

The final and most significant step in the process is the assessment of the meaning and significance of the calculated risk levels. Risk assessment is a process by which the results of a risk evaluation are used to make judgements,

either through relative risk ranking of risk reduction strategies or through comparison with established risk targets (criteria).

Where off-site risk criteria relevant to QRA have been issued (in this case based on criteria used in the UK), it is possible to assess the calculated risk levels against these set criteria.

This determines whether the risks are tolerable, broadly acceptable, or if risk reduction/mitigation measures are required to reduce the risk to levels which can be considered to be as low as reasonably practicable (ALARP). The risk events can then be ranked to determine the relative contribution of each to the overall risk level.

In general the higher risk events should be examined for possible areas of reduction or mitigation as a first step. Measures that prevent the potential incident from occurring should be considered first, followed by measures that reduce the probability (e.g. reduction in flanges, increased pipeline wall thickness), then measures that may limit the amount released (e.g. remotely operated valves, ROVs) and finally measures that may reduce the potential consequences (e.g. water sprays).

The risk assessment will thus enable decisions to be made on whether an investment should be made on particular risk reduction or mitigation measures so that the risk is effectively managed. The residual risk will then be managed by appropriate safety management systems to ensure safe operations, maintenance, good practice, etc.

The risk criteria used in this study are presented in *Section 3.2*.

3 APPROACH TO THE ASSESSMENT

3.1 TERMINOLOGY

Individual Risk: The frequency at which an individual may be expected to sustain a given level of harm from the realisation of specific hazards. It is a measure of the risk of harm to an individual with defined characteristics at a given point.

Maximum Individual Risk: The individual risk to persons exposed to the highest risk in an exposed population.

Risk Contours: Lines that connect points of equal risk around the facility or installation (also known as risk iso-lines).

Risk Notation: The numerical expression of risk. Risk assessment results involve small numbers and so an exponential notation or a scientific notation is often used. A 'unit conversion table' is presented in *Table 3.1*.

Table 3.1 Risk Notation Conversion Table

Exponential/ scientific	Power	Decimal	Chance per Million (cpm)	Description
1 E-05/yr	1×10^{-5}/yr	0.00001/yr	10 cpm	1 in 100 000 per year
1 E-06/yr	1×10^{-6}/yr	0.000001/yr	1 cpm	1 in million per year
1 E-07/yr	1×10^{-7}/yr	0.0000001/yr	0.1 cpm	1 in 10 million per year

3.2 ASSESSMENT CRITERIA

South Africa does not currently offer criteria with which to assess the acceptability of developments from a major accident risk perspective. Therefore the risk criteria used are based on those adopted by the Health and Safety Executive (HSE) in the United Kingdom. This methodology is internationally recognised and accepted as a basis for risk management.

The HSE has developed different sets of risk criteria for different applications. One role that the HSE fulfils in the UK is to advise on development of land in the vicinity of existing major hazard installations. For this purpose the HSE uses its so-called land use planning (LUP) criteria. Another set of criteria is used by the HSE to judge the acceptability of risk from existing major hazard installations. These are known as risk tolerability criteria.

For this QRA the proposed Natural Gas pipelines as well as the Propane generator will be assessed against the UK HSE LUP methodology in order to ascertain whether the surrounding developments are compatible with the risks posed by the proposed pipelines servitude.

The Individual Risk tolerability criteria will also be used to assess whether the risks posed by the Natural Gas pipelines or Propane generator are acceptable to individuals in the vicinity of the pipeline servitude. These criteria are now described in more detail.

3.2.1 Land Use Planning Around Hazardous Installations

A number of countries have well developed approaches to land-use planning around major hazard installations and hazardous pipeline servitudes, being either primarily probabilistic (i.e. risk based) or deterministic (i.e. consequence based).

The purpose of such systems is to prevent the growth of incompatible land-uses around major hazard sites or hazardous pipeline servitudes, or the location of new major hazard sites in inappropriate locations. An overview of the approach used by the UK HSE is given below(1):

A three zone system is applied - Inner Zone, Middle Zone and Outer Zone with the outermost extent of the Outer Zone referred to as the Consultation Distance (CD). In combination with this, land-uses are classified according to Sensitivity Level, with Sensitivity Level 1 (typically places of work) being the least sensitive and Sensitivity Level 4 (typically large schools or hospitals) being the most sensitive. A set of rules (in the form of a 'decision matrix') is applied to determine which land-uses are appropriate for which zones.

In practice, the zones are related to the risk of an individual being exposed to a dangerous dose or load which would "...cause severe distress to almost everyone, many [would] require medical treatment, some [would] be seriously injured and highly vulnerable people might be killed". This approach appreciates the general public's aversion not only to fatality but also to injury and other distress (i.e. the concept of harm) - and is distinct from approaches solely related to fatality.

Proposals for new developments in the vicinity of major hazardous sites or hazardous pipeline servitudes are assessed by the authorities. Different types of developments are assigned to different 'sensitivity levels', with schools and hospitals being amongst the most sensitive; and factories the least sensitive. The authorities recommend that a proposed development does not proceed if the level of risk is above the value that has been established for developments of that type. Similar approaches may be used for new hazardous installations or hazardous pipelines in developed areas.

The extent of the three zones may be determined by either a probabilistic assessment (i.e. on a risk basis) or by performing a consequence assessment (i.e. on a 'protection' basis). For this study, the extent of each zone is based on probabilistic assessment, taking account of, *inter alia*:

(1) PADHI, HSE's land use planning methodology, Health and Safety Executive, May 2011

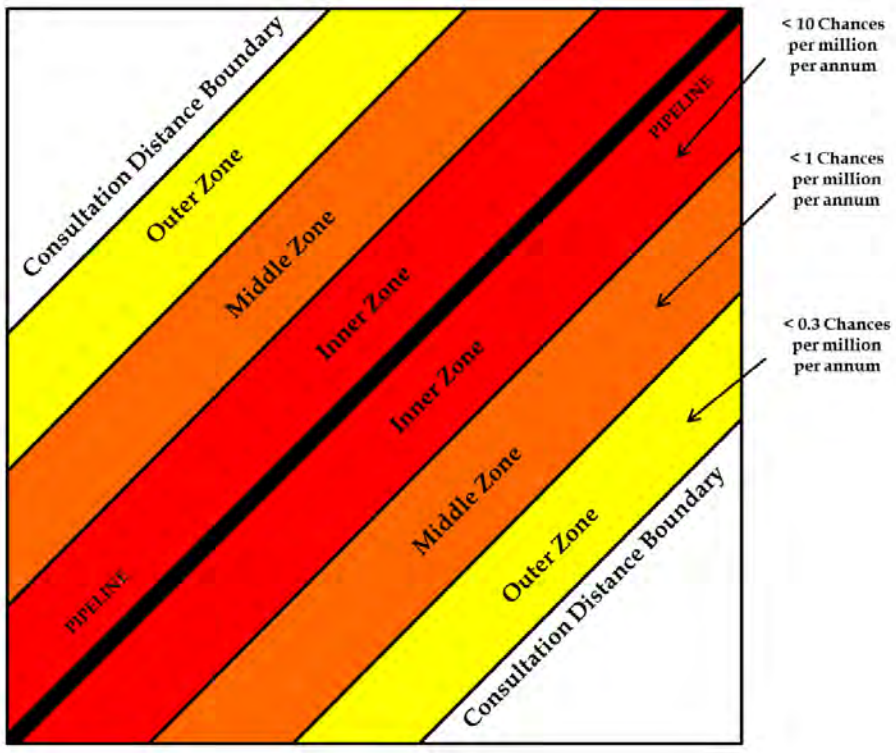
- Control measures;
- Frequency of events;
- Event duration;
- Weather conditions;
- Specified harm criteria; and
- Likelihood of exposure.

In the absence of 'official' South African guidance, the risk levels applied in this assessment are those employed by the UK Health and Safety Executive (HSE) when setting zones around cross country pipelines. The zones for an annual individual being harmed from exposure to flame/heat, explosion overpressure, toxic gas or asphyxiant (i.e. a specified frequency of receiving a dangerous dose); have been set to correspond to the following risk levels:

- Inner Zone - 10 chances per million per year (1×10^{-5});
- Middle Zone - 1 chance per million per year (1×10^{-6}); and
- Outer Zone (Consultation Distance) - 0.3 chances per million per year (3×10^{-7}).

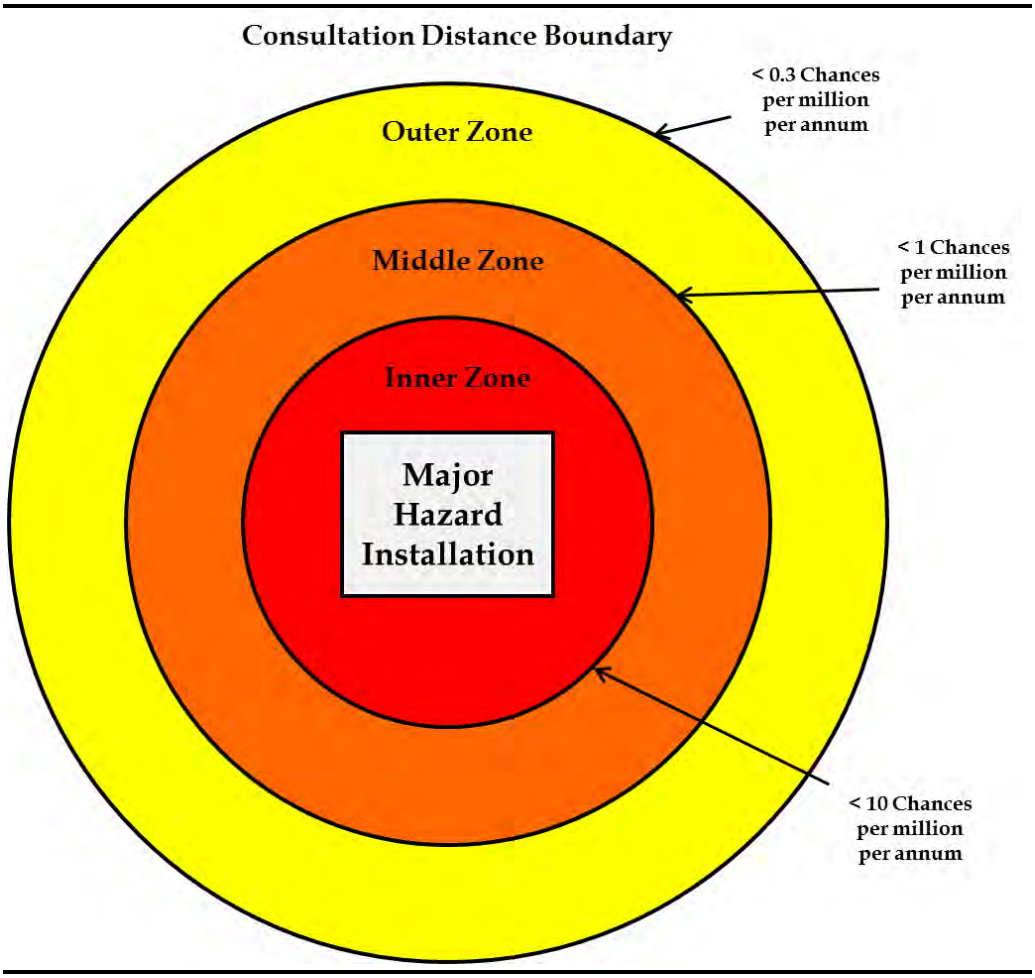
An example of the various zones for cross country pipelines are shown in *Figure 3.1.*

Figure 3.1 Land Use Planning Consultation Zones around Hazardous Pipelines



Examples of the various zones for major hazard sites are shown in *Figure 3.2*.

Figure 3.2 Land Use Planning Consultation Zones around Hazardous Sites



In November 2001 the UK HSE modified its zoning criteria. This is summarised in *Table 3.2* with proposed developments categorised as either 'advise against' (AA) or 'don't advise against' (DAA). This refers to the advice the HSE would give to the local authority in relation to a development proposal of a given type in the vicinity of hazardous pipelines.

For example, the HSE would advise the local authority against building of a new housing development in the inner zone.

Table 3.2 Land-use Sensitivity to Risk

Level of Sensitivity	Inner Zone	Middle Zone	Outer Zone
1. The normal working public	DAA	DAA	DAA
2. The general public at home	AA	DAA	DAA
3. Vulnerable members of the public (schools, hospitals, etc.)	AA	AA	DAA
4. Large examples of No 3 & large outdoor examples of No 2 (i.e. recreational areas)	AA	AA	AA

Note that some types of development can change Sensitivity Level depending on their size. For example, large industrial / office land-uses (for more than 100 persons) would move up a Sensitivity Level from Sensitivity Level 1 to Sensitivity Level 2.

It should also be noted that HSE does not apply these criteria retrospectively to existing land-use around existing major hazardous sites or hazardous pipeline servitudes. This is because the cost of turning down proposals for a development that does not yet exist is much lower than the costs involved in relocating existing land-uses. For example, the costs involved in relocating the occupants of houses in a residential area to new housing elsewhere would be very large compared to the cost of turning down a similar development before it is built. For this reason the land-use planning risk criteria are somewhat more stringent than the criteria applied to existing major hazardous sites.

As stated above, the HSE uses these criteria to consider the suitability of proposed, new land-uses in the vicinity of an existing major hazardous sites or hazardous pipeline servitude. In this study, the criteria have been used as a screening step to judge whether further risk assessment studies would be appropriate.

Where land-uses are identified that would be advised against if they were submitted as new applications, this is used to indicate that further risk studies, potentially with application of risk reduction measures at the site or on the pipelines are required to show that the risks are as low as reasonably practicable (ALARP). Land-uses that would be advised against if they were proposed as new applications are termed 'potentially incompatible'.

The presence of potentially incompatible land-uses does not necessarily mean that the risks from the major hazardous site or the pipelines are intolerable. It simply means that further studies would be worthwhile to determine whether or not more needs to be done to reduce the risk.

If no potential incompatibilities are identified, then further, more detailed risk analyses would not be considered necessary at this time.

In this assessment it was found that the consequences could extend beyond the pipelines' servitude as well as the CCGT power plant site boundary and affect members of the public. Further calculations were undertaken to show whether the risks can be considered to be as low as reasonable practicable.

3.2.2 Risk Tolerability Criteria

The HSE risk tolerability criteria are used to judge the acceptability of the risks from existing MHIs or pipeline servitudes. In the HSE tolerability of risk

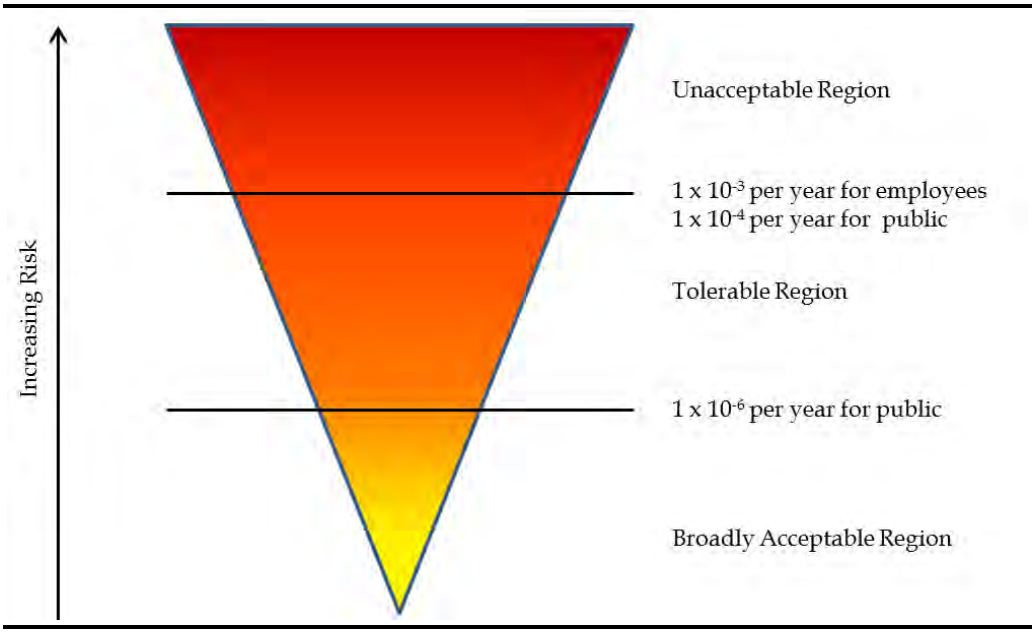
framework [1], risk levels are divided into three bands of increasing risk, as shown in *Figure 3.3.*

In the lowest band, within the 'broadly acceptable' region, the risk is considered to be insignificant and adequately controlled. Risks that are within the 'unacceptable' level fall into the uppermost band. In such cases, either action should be taken to reduce the risk levels, or the activity giving rise to the risk should be halted.

Between the unacceptable and broadly acceptable regions, the risk is considered to be tolerable if it is As Low As Reasonably Practicable (ALARP). The risk is ALARP when the cost of any further risk reduction measures would be grossly disproportionate to (ie much greater than) the benefits gained.

This is demonstrated in *Figure 3.3.*

Figure 3.3 HSE Risk Criteria Framework



3.2.3 Individual Risk of Fatality Criteria

The individual risk is the risk to which a hypothetical person (usually with defined characteristics and behaviour pattern) is exposed. The HSE criteria [2] are stated in terms of individual risk of fatality for two types of hypothetical person: a person who is engaged in the industrial activity under consideration (eg, an employee); and, a person who is not involved in the activity (eg, a member of the public).

(1) HSE (2001). Reducing Risks, Protecting People. HSE Books, C100.
(2) HSE (2001). *Reducing Risks, Protecting People.* HSE Books, C100.

The HSE has provided individual risk values corresponding to the boundaries between the different regions indicated in *Figure 3.3*. These are summarised in *Table 3.3*.

Table 3.3 Individual Risk Criteria

Level	Individual Risk to Personnel Engaged in the Activity (/yr)	Individual Risk to People not Engaged in the Activity (/yr)
Unacceptable	Greater than 1 in 1,000 (10^{-3})	Greater than 1 in 10,000 (10^{-4})
Broadly Acceptable	No greater than 1 in 1,000,000 (10^{-6})	No greater than 1 in 1,000,000 (10^{-6})

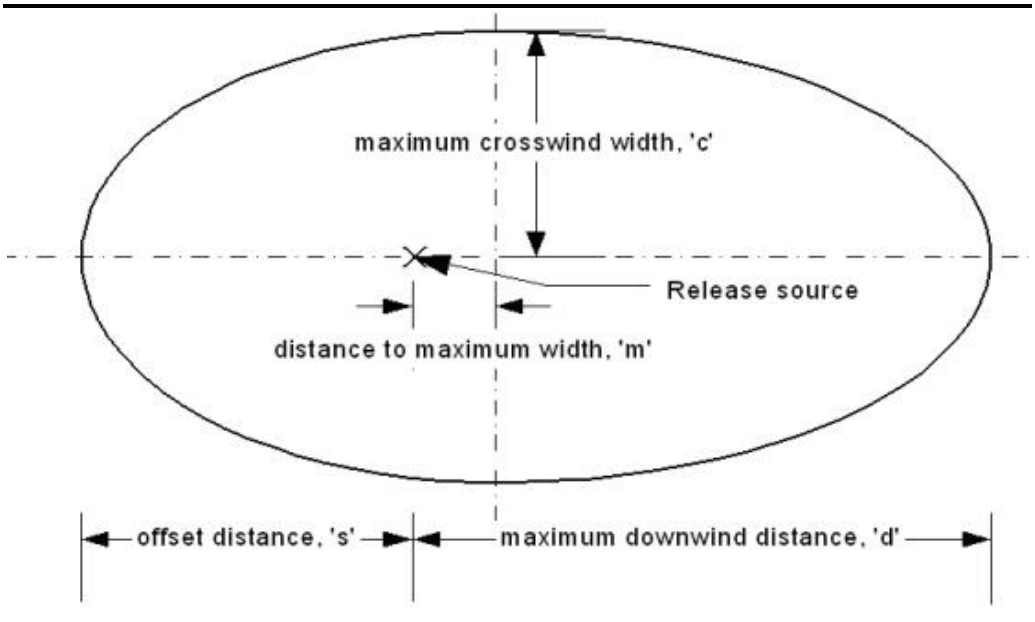
3.3 METHODOLOGY

The source term and thermal radiation analyses were undertaken using the *DNV Phast v6.7* package. This package has been developed by DNV and has been used extensively globally for modelling such incidents. The software package integrates a suite of programmes to perform consequence calculations related to release events and quantifies the resulting hazardous effects and calculates the impact at a specified distance or target.

The *ViewRisk* risk summation package (developed by ERM) was used for the summation, analysis and presentation of risks related to the installations. The results from the consequence analysis were used as inputs to calculate risks for every scenario.

Consequence dimensions are expressed in terms of a number of parameters as illustrated in *Figure 3.4*.

Figure 3.4 Harm Envelope Dimension Parameters



4.1 NATURAL GAS PIPELINES' CHARACTERISTICS

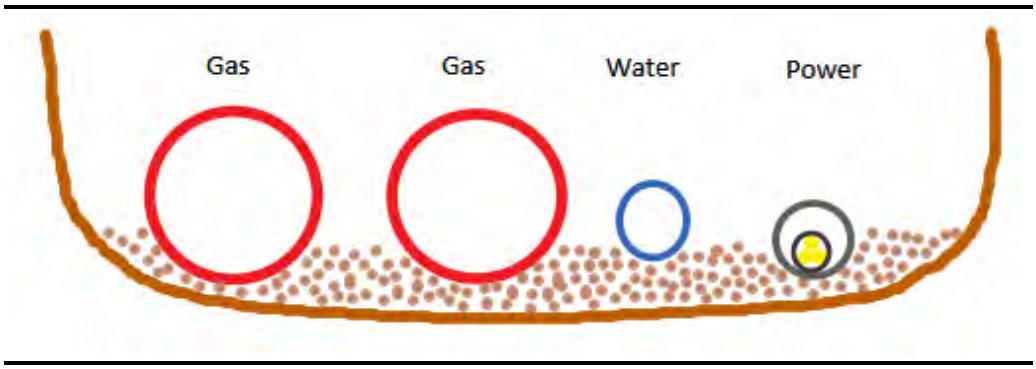
The Natural Gas pipeline route is described in *Section 1.* The pipelines are approximately 4.6 km long and have control values to limit flow in emergency shut downs. For this assessment the pipeline has been considered from the downstream of the gasification plan to upstream of the power plant. General pipeline characteristics are shown in *Table 4.1*.

Table 4.1 Pipelines Characteristics

Product	Line Diameter (mm)	Line Length (km)	Max Pumping Pressure (barg)	Average Pumping Pressure (barg)
Natural Gas	300	4.6	90	67

It is understood that the two Natural Gas pipelines will run side by side in the pipeline servitude. The intention of the dual pipeline arrangement is understood to be for security of continuous supply. The pipeline servitude will also contain a seawater line and an electrical conduit line. A cross section of the servitude is shown in *Figure 4.1.*

Figure 4.1 Cross Section of Pipeline Servitude



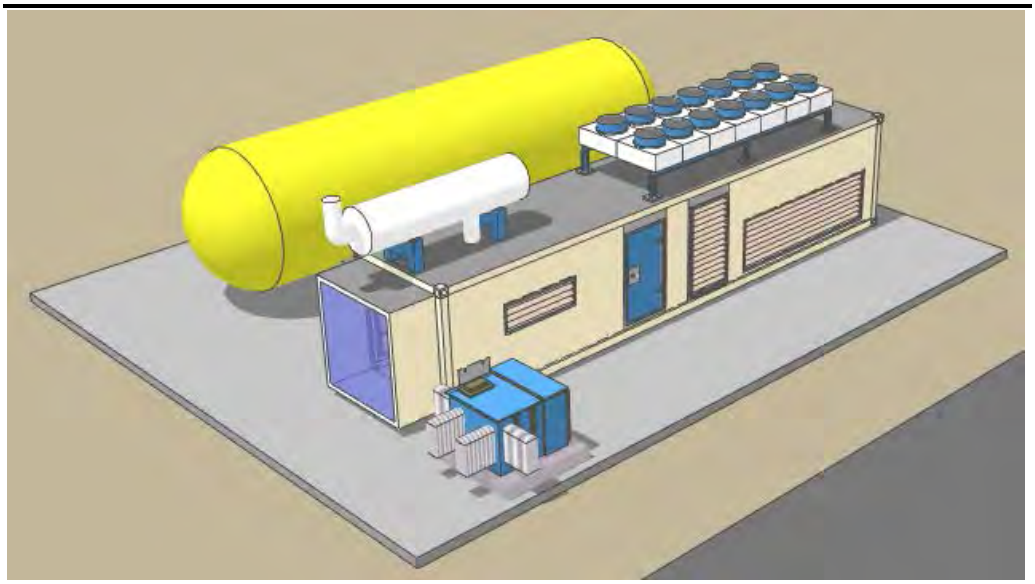
4.2 PROPANE INSTALLATION CHARACTERISTICS

It is understood that a single Propane storage vessel will be installed on site to power any one of three specialised generators. The characteristics of the vessel are shown in *Table 4.2.* Due to the current stage of this project, only the maximum volume of the storage vessel has been confirmed by IPCSA. The operating volume, operating temperature and operating pressure have been therefore been assumed. A design impression of the Propane vessel has been shown in *Figure 4.2.* The location of the vessel on the site was taken from the general arrangement site layout.

Table 4.2 ***Propane Vessel Characteristics***

Product	Maximum Volume (m^3)
Propane	30

Figure 4.2 ***Design Impression of Propane Vessel***



During the construction phase it is understood the Propane backup generator will operate in two different modes:

- First year operation: the generator will operate at 1.5 MW and consume approximately 389 kg/hr and operate for approximately 3,000 hours; and

- Second year operation: the generator will operate at 2 MW and consume approximately 518 kg/hr and operate for approximately 3,000 hours

During normal operation the generator is understood to operate for approximately 100 hours per year. It is assumed that during this period the Propane consumption will be equivalent for the 2.0 MW generation case at 518 kg/hr.

4.3 ASSUMPTIONS

Based on information provided to ERM, further assumptions for the models were considered and are listed. Where information was unavailable or not confirmed due to the current stage of the project, assumptions were made in line with good design practice.

4.3.1 Pipelines

Assumptions regarding the Natural Gas pipelines are shown in *Table 4.3*.

Table 4.3 Assumptions Register

Question	Answers
Pipeline coating	Yes with fusion bonding epoxy
Impressed current cathodic protection (CP)	Yes
Pipeline wall thickness	10.31 mm buried
ILI (intelligent pigging)	Yes
Pipeline in urban area	No
Pipeline cover depth (CD)	>1 m normal burial depth
Pipeline marker posts	Within line of site
Concrete slab at road crossing	Yes
Plastic marker tape (above pipeline)	Assumed yes in line with good practice
Pipeline protection in the trench	No
Continuous awareness programme	Assumed yes in line with good practice
ROW inspections	Assumed yes in line with good practice
Pipeline security guards	Assumed yes in line with good practice
SMS and training programme	Assumed yes in line with good practice
Landslide areas	Assumed no
Seismic fault crossings	Design assumed no in line with good practice

It is understood that details of the pipelines' tie ins at the power plant and gas receiving station will be outlined during the detailed design stage of the project but at this stage only the pipelines containing Natural Gas are considered downstream of the liquefied Natural Gas and CNG processing facilities at the port and the power station tie ins.

4.3.2 Propane Backup Generator

Storage Vessel

Assumptions regarding the Propane vessel are shown in Table 4.4.

Table 4.4 Assumed Propane Vessel Characteristics

Product	Operating Volume (m^3)	Operating Temperature (°C)	Operating Pressure (barg)
Propane	25.5	20	Saturated liquid, ambient temperature

Transfer Pipework

Assumptions regarding the transfer and operation of the Propane backup generator are shown in *Table 4.5*.

Table 4.5 Assumed Propane Transfer Pipework Characteristics

Equipment	Diameter (mm)	Length (m)	Operating Pressure (barg)
Propane offloading pipework to vessel	100	10	Saturated liquid, ambient temperature
Propane transfer pipework to vapouriser	50	20	Saturated liquid, ambient temperature
Propane transfer pipework to generator	50	20	3 barg, ambient temperature

Road Tanker Off-Loading Operations

In addition, the number of road tanker operations has been assumed based on the following:

- The Propane storage vessel will be filled when the contents drops to approximately 30%; and

- Considering the operational fill level of 85%, the Propane storage vessel will require a fill approximately every 8,234 kg.

With this information the following number of fills will be required for the various operational modes (assuming a single fill can deliver the required contents):

- First year operation: 142 fills;
- Second year operation: 189 fills; and
- Normal operation: 7 fill.

It is assumed that the Propane road tanker will have a capacity of 30m^3. It is further assumed Propane will be offloaded from the tanker through a pump on the tanker at a pressure of 10 barg and offloading operations will take 90 minutes to complete and only take place during the day. It is further assumed that multiple (at least two) safety systems will be implemented for Propane offloading. Such systems include wheel chocks, interlock brakes, interlock barriers, etc. In addition the site will implement an effective pull away mitigation system and inspection and pressure/leak tests to prevent transfer system leaks and burst.

Vapouriser

The Propane Vapouriser will be assumed to comprise a shell and tube heat exchanger with the Propane being heated on the tube side. The tube diameter has been assumed as 50 mm.

4.4 DESCRIPTION OF PRODUCTS

The composition of the material transported in the pipelines considered in this QRA was provided to ERM by IPCSA.

The material was classified as Natural Gas and the material composition as broken down in *Table 4.2.*

Table 4.6 Saldanha Steel Natural Gas Pipelines Transported Material Characteristics

Material	Percentage (%)
Methane	96.109
Ethane	1.807
Propane	0.164
i-Butane	0.028
n-Butane	0.011
n-Pentane	0.007
n-Hexane	0.008
n-Heptane	0.013
Nitrogen	0.357
Carbon Dioxide	1.468

The scenarios involving Propane were modelled as pure Propane in *DNV Phast v6.7*.

4.5 LEAK DETECTION AND THIRD PARTY ACTIVITY PREVENTION

Third party activity (TPA) in relation to pipeline operation can include accidental damage to the pipelines as well as intentional damage for the purpose of sabotage or theft.

IPCSA have provided ERM with the document *Pipeline Leak Detection System Selection* (1). This outlines the possible options for leak detection and interference detection.

Third party activity detection and leak detection methods limit the size of consequences from potential incidents by enabling detection once leaks have occurred and enacted emergency shutdown procedures. This can limit the release duration from the pipelines.

The following leak detection measures are understood to have been included in the project for the pipelines:

- In – pipeline instrumentation based on acoustic sensors;
- In – pipeline condition assessment with pigging;

(1) #1026.1.3 EIA/ Pipeline specialist study information

- Above-ground air sampling along the pipeline route (drone or manually operated);

- Detection of tracer chemical introduced into the gas pipeline which can be detected above ground;

- Automatic solar-powered leak detection sensors capable of triggering a control room alarm;

- Radio/WiFi instrumentation information transmitted to control room/pipeline operator; and

- Pipeline monitoring data collected regularly by plant operated security drone.

Leak detection and third party activity (TPA) has been considered in this assessment to limit consequence size and frequency. For TPA the assessment assumes that adequate measures will be taken to limit TPA in line with the standards at which the pipelines investigated under the HSE pipeline failure data that were developed.

This assumption has been carried forward for all areas accessible to the general public, which are understood to be outside the Transnet National Port Authorities (TNPA) port boundary. Within the port boundary third party activity around the pipelines is anticipated to be reduced, therefore a reduction in the likelihood of TPA failure scenarios of one order of magnitude has been assumed.

4.6 METEOROLOGY

Typically, quantitative risk assessments (QRAs) require information regarding the ambient temperatures, wind speed, wind direction and stability class.

Atmospheric stability is difficult to measure and often varies dramatically over relatively short distances. Atmospheric stability classes need to be defined in the dispersion modelling to facilitate estimates of lateral and vertical dispersion parameters.

The preferred stability classification scheme for use in air quality modelling applications is the scheme proposed by Pasquill (1961).

The Pasquill Stability Classes are defined by the letters A to F and are described as follows:

A. Extremely unstable conditions
B. Moderately unstable conditions
C. Slightly unstable conditions
D. Neutral conditions

E. Slightly stable conditions
F. Moderately stable conditions.

Neutral conditions correspond to a vertical temperature gradient of approximately 1 °C per 100 m. The meteorological conditions defining Pasquill stability classes are given in *Table 4.7.*

Table 4.7 Pasquill Stability Classes

Surface Wind Speed (m/s)	Day-time Insulation			Night-time Insulation	
	Strong	Moderate	Slight	>4/8 low cloud	≤4/8 cloud
<2	A	A - B	B		
2 – 3	A – B	B	C	E	F
3 – 5	B	B - C	C	D	E
5 – 6	C	C - D	D	D	D
>6	C	D	D	D	D

Site-specific wind speed data was obtained for the Port of Saldanha. It is understood that to date no weather stations in South Africa measure both wind speed and stability categories. Therefore, ERM selected the following stability classes and wind speed scenarios as being considered representative for modelling purposes:

- C4 – meaning a stability class of C (slightly unstable conditions) where the wind speed is greater than 4 m/s.

- C8 - meaning a stability class of C (slightly unstable conditions) where the wind speed is greater than 8 m/s.

The above weather scenarios give a conservative daytime weather condition.

- F2 – meaning a stability class of F (moderately stable) where the wind speed is less than or equal to 2 m/s. This class is often used by the US Environmental Protection Agency for determining worse case scenarios for vapour cloud dispersion consequence analysis. F2 gives a conservative night time weather condition.

Selecting the above categories gives an average and a 'worst case' condition for the risk assessment study.

The average ambient temperature and humidity for Saldanha Bay were obtained from www.weatherbase.com. A summary of the data is as follows:

- Average ambient temperature is 15.9 °C; and
- Average relative humidity is 78 %.

5 POTENTIAL MAJOR HAZARDS

5.1 INTRODUCTION

There are a number of hazards that are present for a loss of containment from the pipelines or the Propane installation that may result in injury to people or a fatality in more serious cases. Some hazards may even give rise to multiple fatalities. This study is only concerned with 'major hazards', which are outlined below.

Natural Gas is considered a flammable gas while Propane exists as a flammable liquefied gas in storage which will flash to vapour upon release to the atmosphere.

5.1.1 *Flash Fires*

If a flammable gas release is not immediately ignited then a vapour cloud may be formed and moves away from the point of origin under the action of the wind. If the flammable gas cloud or vapour cloud is unconfined and is less dense than air then it will disperse upwards. However, releases generating gas or vapour that is denser than air tend to stay close to ground level.

This drifting flammable cloud may undergo delayed ignition if an ignition source is reached, resulting in a flash fire if the cloud ignites in an unconfined area or a gas or vapour cloud explosion if within a confined area (an unconfined gas or vapour cloud explosion is also possible under certain conditions).

Upon ignition, the flame front travels back through the cloud towards the release source. The speed of the flame front depends on the material reactivity and the degree of turbulence within the cloud. If the source of material which created the cloud, in this case Natural Gas or Propane is still present then the fire will flash back to the source giving a jet fire which will continue after the flash fire.

The main aim in modelling flash fires is to estimate the size of the flammable cloud. Inside the cloud, direct contact with the burning cloud may cause fatalities, but the relatively short duration of the fire means that thermal radiation effects are not significant outside the cloud.

The flash fire is typically modelled through simulating the dispersion of the initial cloud to the Lower Flammability Limit (LFL). The damage area then corresponds to the LFL cloud footprint.

The material which may cause flash fires is released as Natural Gas or Propane. The effects of flash fires are discussed in *Section 5.2*.

5.1.2 Jet Fires

Jet fires result from ignited continuous releases of pressurised flammable gas The momentum release carries the material forwards in a long plume entraining air to give a flammable mixture. Jet fires have a high flame temperature and can produce very high intensity thermal radiation.

The high temperatures pose a hazard not only from direct effects of heat on human beings, but also from the possibility of event escalation; if a jet flame impinges upon a target such as a vessel, pipe or structural member, it can cause the target to fail within a few minutes.

The material which may cause jet fires in this case is Natural Gas or Propane. As a worst-case scenario, it was assumed that all failures of the pipelines occur at a 45 degree angle to the horizontal as the pipelines are buried, allowing the jet to extend above ground level with all failures of Propane equipment assumed to be in a horizontal position (ie the flame is orientated horizontally).

The effect of jet fires is discussed in *Section 5.2*.

5.1.3 Flammable Gas or Vapour Cloud Explosions

If the generation of heat in a fire involving a flammable vapour-air mixture is accompanied by the generation of pressure then the resulting effect is a flammable gas cloud or a vapour cloud explosion. The amount of overpressure produced in an explosion is determined by the reactivity of the gas, the strength of the ignition source, the degree of confinement of the flammable cloud, the number of obstacles in and around the cloud and the location of the point of ignition with respect to the escape path of the expanding gases.

In most explosions the expanding flame front travels more slowly than the pressure wave; this type of explosion is called a deflagration and the maximum overpressure is determined by the expansion ratio of the burning gases. If the flame front travels fast enough to coincide with the pressure wave then the explosion is called a detonation and very severe overpressures can be produced. Detonation is most likely to occur with more reactive gases such as hydrogen and ethylene.

Effects on people may be primary, secondary or tertiary. Primary effects are injury to the body as a result of the pressure change (overpressure). Secondary effects are injury as a result of fragments or debris produced by the overpressure impacting on the body, eg due to collapse of structures. Tertiary effects are injury as a result of the body being thrown by the explosion and impacting on stationary objects or structures.

The degree of confinement of the flammable cloud and the number of obstacles in and around the cloud for the majority of releases along the length of the pipeline route are considered to be low due to the open area along the

route. The CCGT power plant is likely to provide a degree of confinement and obstacles and therefore explosions will only be considered in this area.

The effect of flammable gas cloud explosions is discussed in *Section 5.2*.

5.1.4 BLEVEs

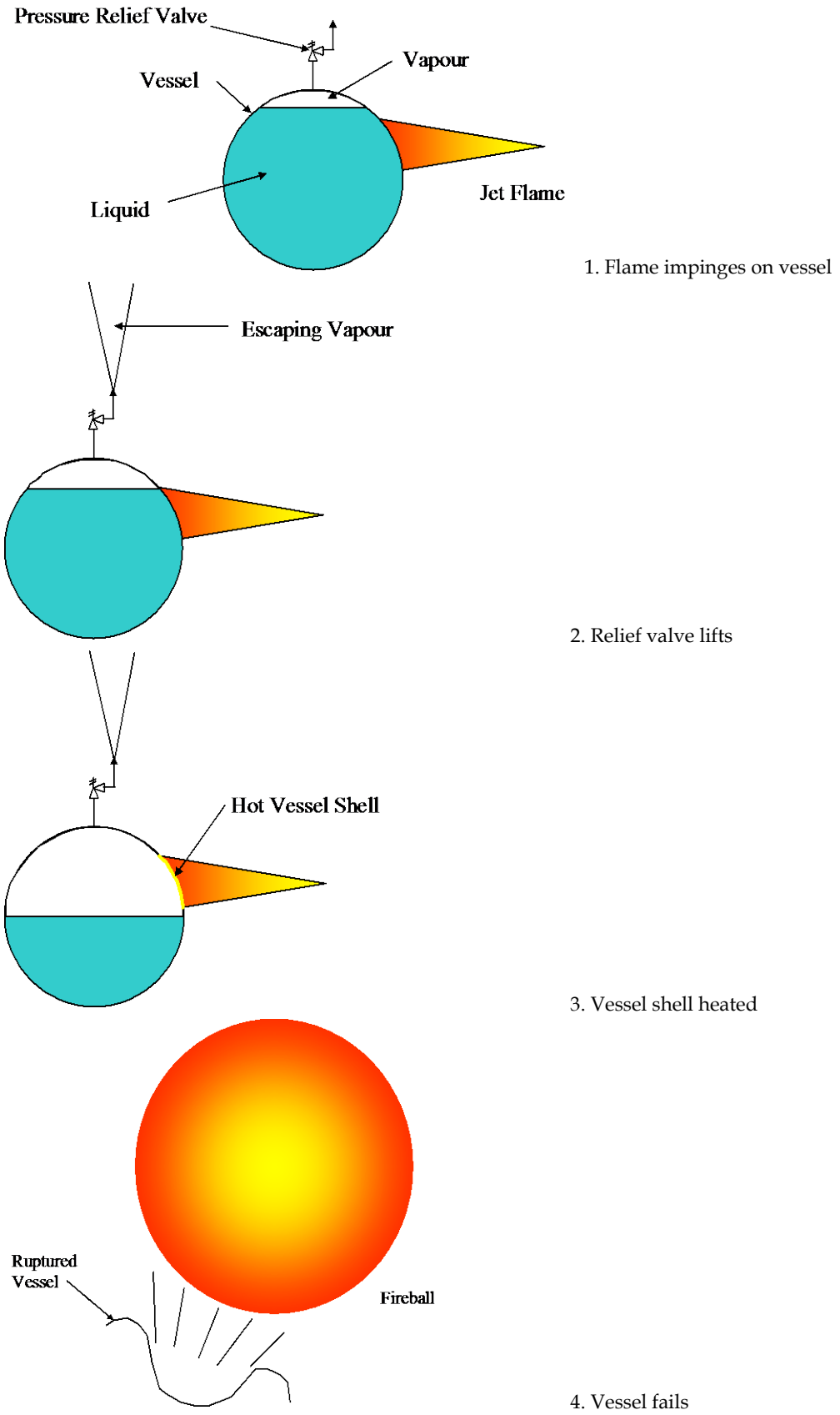
One important flammable vapour hazard is the Boiling Liquid Expanding Vapour Explosion (BLEVE). A BLEVE results from heating of a vessel containing a pressurised liquefied flammable gas. Hence a BLEVE can occur when fire impinges on a flammable vapour vessel shell, particularly at a point or points above the liquid level of the contents of the vessel. This impingement causes the metal to weaken and fail from the internal pressure. The sequence of events that generates a BLEVE is illustrated in *Figure 5.1*.

In *Figure 5.1* (1), a jet fire from another part of the installation impinges upon a vessel containing a pressurised liquefied flammable gas (such as Propane). Although a jet fire is used in this illustration, a pool fire may also result in a BLEVE. The jet flame is in contact with the vessel shell over an area below the initial liquid level. The heat from the jet flame is conducted away from the vessel shell quite effectively by the liquid contents. As a result, the pressure in the vessel begins to increase, until the pressure relief valve (PRV) operates. Operation of the PRV prevents the pressure in the vessel increasing further, but material is lost from the vessel and the liquid level starts to drop, as shown in *Figure 5.1* (2).

Eventually the liquid level falls to a point where the jet flame is impinging on an area of vessel shell that is now in contact with vapour instead of liquid, as illustrated by *Figure 5.1* (3). The vapour is much less effective at conducting heat away from the vessel wall; hence the temperature of the shell in the region of the flame starts to increase markedly. As the shell is heated it begins to lose its strength, until it is no longer able to contain the pressure within the vessel. When this occurs the vessel fails catastrophically, releasing any remaining contents (see *Figure 5.1* (4)). Once pressure is lost, the liquid rapidly and violently transforms into a fuel rich gas cloud, which burns as a fireball when ignited.

Often, the catastrophic failure of the vessel also generates missiles (fragments of the vessel shell), which can be projected considerable distances.

Figure 5.1 BLEVE Mechanism



5.1.5 *Fireballs*

A fireball can also occur following an instantaneous release of flammable vapour due to cold catastrophic failure of the vessel with immediate ignition. A cold catastrophic failure of the vessel can result from mechanical damage, for example. Such events have very high thermal radiation, similar to jet fires.

5.2 *HARM CRITERIA*

5.2.1 *Thermal Radiation*

One of the causes for harm to people considered in this study is thermal radiation, which occurs as a result of a fire. The vulnerability of people exposed to thermal radiation depends on the intensity of the incident radiation and the duration of exposure. Thermal flux values are used as criteria for long duration fires. Thermal dose values are used as criteria for short duration fires.

Fatality Criteria

Thermal flux impact criteria chosen to be used in the fatality assessment have been selected based on the effects of thermal radiation summarised in Lees [(1)] and have been reproduced in *Table 5.1.*

Table 5.1 Thermal Flux Impact Criteria for Fatality Assessments (Lees)

Thermal Flux ($kW.m^{-2}$)	Effect
37.5	Intensity at which damage is caused to process equipment
12.5	Intensity at which piloted ignition of wood occurs
6.3	Intensity in areas where emergency actions lasting up to 1 minute may be required without shielding but with protective clothing

The UK HSE has developed criteria based on a research report [(2)] that used the following relationship to calculate the thermal dose:

$$tdu = tF^{4/3}$$

where

tdu	thermal dose units ($[kW/m^2]^{4/3}$).s
T	time (s)
F	thermal flux (kW/m^2)

The HSE thermal radiation impact criteria for short duration fires are described in *Table 5.2.*

(1) Lees F P (2001). Loss Prevention in the Process Industries. 2nd Edition, reprinted with corrections

(2) Hymes I, The Physiological Effects of Thermal Radiation, SRD R 275, September, 1983.

Table 5.2 Thermal Dose Impact Criteria (HSE)

Thermal Dose (tdu)	Effect
1800	50% fatalities among a 'typical' population
1000	Dangerous dose to a 'typical' population – equates to approximately 1% fatalities
500	Dangerous dose to a vulnerable / sensitive population

This risk assessment uses 1000 tdu as the dangerous dose criterion for land use planning based on the HSE planning case assessment guide (1). Assuming that the maximum exposure time is 30 seconds (allowing for exposed persons to escape or find shelter), the thermal flux required to meet the above criteria of 1000 tdu is 13.9 kW/m^2. These values for land use planning are summarised in *Table 5.3.*

Table 5.3 Thermal Flux Impact Criteria for Land Use Planning Assessments (HSE)

Impact	Effect
1000 tdu	Dangerous dose to a 'typical' population – equates to approximately 1% fatalities
13.9 (kW.m^{-2})	Intensity to reach a thermal dose of 1000 tdu in 30 seconds

5.2.2 Flash Fire Flammability Limit

The extent of a flash fire is defined by dispersion of the released Natural Gas or Propane until the Lower Flammability Limit (LFL) is reached. Within the 0.5LFL contour there is still a possibility of fatality due to exposure to burning pockets of gas. Therefore, for the fatality assessment, the dangerous dose end point criteria for flash fires have been designated as the extent to the LFL and half LFL.

For land use planning, the dangerous dose end point criterion for flash fires has been designated as the extent to the LFL. The dangerous dose end point criteria for flash fires have been highlighted in *Table 5.4*.

Table 5.4 Flash Fire Impact Criteria

Criteria	Effect
LFL	Vapour is able ignite and produce a flash fire
0.5 LFL	Burning pockets of vapour can still occur

5.2.3 Blast Overpressure Criteria

With respect to gas or vapour cloud explosions, the impact criteria used is based on the effects of the blast overpressures. These are discussed in the

(1) Planning Case Assessment Guide, 09/07/2002

TNO Green Book [1], and summarised in *Table 5.5*; furthermore, Clancy [2] describes the effects of blast overpressures which was reproduced by Lees [3] and is shown in *Table 5.6*.

Table 5.5 Direct Effects of Blasts on Structures (TNO Green Book)

Blast Overpressure (kPa)	Effect
8-10	Minor damage to steel frames
20	Collapse of steel frames and displacement of foundation
7	Collapse of roof of storage tank
20-30	Cracking in empty oil storage tanks
50-100	Displacement of cylindrical storage tank, failure of connecting pipes
35-80	Damage to fractionating column
20-30	Slight deformations of a pipe-bridge
35-40	Displacement of pipe-bridge, breakage of piping
40-55	Collapse of a pipe-bridge

Table 5.6 Direct Effects of Blasts on Structures (Lees)

Blast Overpressure (kPa)	Effect
0.2	Occasional breakage of large glass windows already under strain
0.7	Breakage of windows, small, under strain
1.0	Typical pressure for glass failure
3.5-6.9	Large and small windows usually shattered; occasional damage to window frames
4.8	Minor structural damage to house structures
6.9	Partial demolition of houses, made uninhabitable
17.3	50% destruction of brickwork of house
20.7 – 27.6	Steel frame building distorted and pulled away from foundations. Frameless, self-framing steel panel building demolished
34.5 – 48.3	Nearly complete destruction of houses

From the information in these tables, the impact criteria that were considered for the fatality assessment are summarised in *Table 5.7.*

Table 5.7 Blast Overpressure Impact Criteria

Blast overpressure (bar)	Effect
0.35	Almost complete destruction of typical masonry structures. Significant damage to steel frame structures
0.20	Deformation of structures like pipe bridges, steel frames. Serious damage to masonry structures.
0.05	Minor damage to masonry structures. Conventional windows broken.

For land use planning, the dangerous dose end point criterion for blast overpressure is 0.14 bar.

(1) TNO Green Book, Methods for the Determination of Possible Damage to People and Objects Resulting from Releases of Hazardous Materials, CPR 16E, First Edition 1992, Chapter 2, Section 7, Tables 5

(2) Clancy, V.J., 1972, Diagnostic features of explosion damage, 6th Int Mtg of Forensic Sciences, Edinburgh.

(3) Lees F P (2001). Loss Prevention in the Process Industries. 2nd Edition, reprinted with corrections, Chapter 17, Page 201

5.2.4 *Fatality Probabilities*

Based on the impact criteria described in *Section 5.2.2*, fatality probabilities have been assigned based on the information below.

Thermal Radiation

To assign a probability of fatality to people exposed to the thermal flux values in *Table 5.1*, probabilities of fatality have been assigned based on the required time to reach thermal doses and the probability of fatality that the HSE has assigned to these thermal doses shown in *Table 5.2*. Information on the time taken to reach a given thermal dose level at different levels of thermal flux is given in *Table 5.8*.

Table 5.8 Thermal Dose Impact Criteria

Thermal Flux ($kW.m^{-2}$)	Time to 1800 tdu (s)	Time to 1000 tdu (s)	Time to 500 tdu (s)
37.5	14.5	8.0	4.0
12.5	62.0	34.5	17.2
6.3	154.7	85.9	43.0

At a thermal flux of 37.5 $kW.m^{-2}$:

- For outdoors, a high thermal dosage (1800 tdu) is reached rapidly offering little chance of escape and leaving a high probability of fatality; and
- For indoors, although a building may offer some degree of protection, as 37.5 kW.m-2 is above the spontaneous ignition threshold of wood (1) , there is a high probability that the building will catch fire and force occupants to escape into a higher thermal flux field resulting into a high probability of fatality.

At a thermal flux of 12.5 $kW.m^{-2}$:

- For outdoors, a thermal dose of 1000 tdu is reached after 30 seconds and 1800 tdu after 1 minute, leading to a fatality probability of 1% and 50% respectively. This offers some chance of escape at this level; and
- For indoors, piloted ignition of wood is possible during long exposure at this thermal flux causing a building to catch fire. However, even if the building does ignite, there is still a possibility of the occupants escaping to alternative shelter.

(1) Lees F P (2001). Loss Prevention in the Process Industries. 2nd Edition, reprinted with corrections

At a thermal flux of 6.3 $kW.m^{-2}$:

- For outdoors, a thermal dose of 1000 tdu is reached after 1.5 minutes and 1800 tdu after 2.5 minutes, leading to a fatality probability of 1% and 50% respectively. This offers a chance of escape resulting in a low fatality; and

- For indoors, thermal flux levels are below the piloted ignition threshold for wood and therefore the likelihood of fatality for building occupants is considered to be very low.

Therefore the probabilities of fatality are assigned as presented in *Table 5.9*.

Table 5.9 Fatality Probability for Thermal Effects

Thermal Effects	Fatality Probability	
	People Indoors	**People Outdoors**
Jet fire, Flux > 37.5 kW/m^2 (or within flame boundary if not reached); Fireball, Dose> 1800 tdu (or within flame boundary if not reached)	0.80	1.00
Jet fire, 37.5 kW/m^2 / flame < Flux < 12.5 kW/m^2; Fireball, 1800 / Flame< Dose < 1000 tdu	0.25	0.50
Jet fire, 12.5 kW/m^2 < Flux < 6.3 kW/m^2; Fireball, 500 < Dose < 1000 tdu	0.00	0.05

Flash Fires

People outdoors within the LFL envelope will be enveloped by the flash fire and are assumed to be fatally injured. Within the 0.5LFL contour, exposure to burning pockets of vapour is possible, leading to a fatality. A fatality probability of 0.2 is to be assigned in this instance.

For people indoors, contact with the flame might result in ignition of an engulfed building, endangering occupants. A fatality probability of 0.3 is assigned within the LFL envelope. Beyond the LFL boundary, the likelihood of fatality for persons indoors is considered to be very low.

Blast Overpressure

The blast overpressures (peak side-on overpressures) of interest are 35 kPa (350 mbar), 20 kPa (200 mbar) and 5 kPa (50 mbar).

The UK CIA guidance on occupied buildings (1) provides curves of fatality probability against overpressure for a number of structure types. Reading the values from the curve for a concrete-framed office structure gives the data in *Table 5.10*.

(1) CIA (2003). *Guidance for the location and design of occupied buildings on chemical manufacturing sites.* RC21 2nd Edition.

Table 5.10 Fatality Probability for People in Structures Subject to Blast (CIA)

Blast Overpressure (kPa)	Fatality Probability
100	1
60	0.9
50	0.85
30	0.6
20	0.15
< 10	0

The overpressures and corresponding fatality probability values to be used for the study are shown in *Table 5.11*.

Table 5.11 Fatality Probabilities for Blast Overpressure, Summary

Blast Overpressure (kPa)	Fatality Probability, People Indoors	Fatality Probability, People Outdoors
>35	0.75	0.01
20-35	0.45	0
5-20	0.05	0

6 RISK ASSESSMENT

6.1 HAZARD IDENTIFICATION

The main hazards associated with potential releases of Natural Gas from the pipelines or Propane from the Propane storage facility are jet fires (immediate ignition), flash fires (delayed ignition) and explosions (delayed ignition of the gas or vapour in a confined space). The hazards may be realised due to leaks/failures in the pipelines and ancillary equipment, or from the Propane storage vessel, off-loading road tanker or associated equipment, all of which can release significant quantities of flammable materials on failure.

Section 5 previously provided an explanation of the events which may occur as a result of release of flammable gas or vapour, followed by ignition.

6.1.1 Pipeline Leak Scenarios

The following representative scenarios for the pipeline leaks were considered based on the categorisation of the failure frequency.

Table 6.1 Leak sizes modelled

Leak Category	Report range	Size Modelled
Pin hole	<= 25 mm	25 mm
Small hole	>25 to <=75 mm	50 mm
Large hole	>75 to <=110 mm	100 mm
Rupture	> 110 mm	300 mm

Due to the high operating pressure of the system, leaks will result in the depressurisation of the system. Due to the requirements for uninterrupted supply for the power stations, the gas supply control system is assumed to adjust to small changes in conditions. Therefore for all releases, the average pipeline pressure has been utilised. This is taken as 67 barg.

The leak detection and TPA prevention measures are credited to reduce the duration of a release. As such the following assumptions have been made regarding release duration:

- For small hole sizes (pinhole and small) it was assumed that, even with leak detection, small releases would not be detected immediately and therefore it was assumed that release duration would be 15 minutes or until steady state has occurred; and

- For larger hole sizes (large hole and rupture), it is assumed the leak will be detected more rapidly by leak detection systems or human intervention. Therefore shorter release durations were assumed, based on reporting and system shutdown timing, of 5 minutes.

6.1.2 Power Station Scenarios

As information with regards to the Natural Gas infrastructure will be developed in the detail design stage of the project, only a consequence assessment of a Natural Gas release from the power station gas receiving station will be completed.

As the gas pressure is understood to be controlled and restricted at the gas receiving station, the consequences from a release in this area are expected to be smaller than that of a pipeline release. However, if the equipment is located within a confined area there is the potential for a flammable gas cloud or vapour cloud explosion.

Using an approximation of the footprint gas receiving area, an explosion will be modelled with the following characteristics:

- TNO Multi Energy Model – Explosion Curve 5; and
- Confined volume approximately 10,000m^3.

An explosion was also modelled in the vicinity of the Propane bullet and generator. Considering the dimensions of the bullet and generator, the following explosion conditions were modelled:

- TNO Multi Energy Model – Explosion Curve 5; and
- Confined volume approximately 100 m^3 considering the space in and around the Propane storage vessel.

6.1.3 Propane Scenarios

The scenarios considered for the Propane backup generator system will comprise the following elements:

- Propane storage vessel;
- Propane pipework from vessel to vapouriser;
- Propane vapouriser;
- Propane pipework from vapouriser to generator;
- Propane offloading and pipework from road tanker to vessel; and
- Propane road tanker with associated offloading hoses.

These elements have been selected based on the basic system description provided although the system was not described in detail in the documentation provided for the study.

As the planned construction period in the second year is expected to consume the most Propane, this scenario has been modelled along with the proposed normal Propane backup generator operation scenario. As operation of the pipeline is understood to take place after the construction phase, the risk of a Natural Gas release during this phase will not be realised.

6.2 ESTIMATION OF CONSEQUENCES

There is a risk of fire or explosion in relation to the Natural Gas transfer operations via pipelines to the CCGT power plant site or from the Propane generator system on this site. The thermal radiation and explosion overpressures could potentially impact members of the public in the surrounding areas and as well as operational personnel.

This assessment estimates the effects of thermal radiation from fires and overpressures from explosions on human beings. The meteorological characteristics that govern the extent of the thermal radiation and overpressure zones are described in *Section 3.3*.

6.2.1 Jet Fires

Table 6.2 shows the maximum jet fire consequence distances for failure scenarios associated the Natural Gas transfer and the Propane system. The distance to the maximum jet fire consequence envelopes are illustrated in *Figure 6.1*.

Table 6.2 Maximum Jet Fire Consequence Distances

Location and Equipment	Scenario and Weather	Radiation Level (kW/m^2)	Maximum Distance(m)
Pipelines	Pipeline Rupture	37.5	94
		13.9 (Dangerous Dose)	156
		12.5	164
		6.3	323
Propane Installation	Full bore transfer hose failure	37.5	144
		13.9 (Dangerous Dose)	173
		12.5	177
		6.3	207

6.2.2 Flash Fires

Table 6.3 shows the maximum flash fire consequence distances for failure scenarios associated with Natural Gas transfer or the Propane installation. The distance to the maximum flash fire consequence envelopes are illustrated in *Figure 6.2*.

Table 6.3 Maximum Flash Fire Consequence Distances

Location and Equipment	Scenario and Weather	Concentration	Maximum Distance(m)
Pipelines	Catastrophic Failure	LFL (Dangerous Dose)	676
		0.5LFL	998
Propane Installation	Full bore transfer hose failure	LFL (Dangerous Dose)	239

Location and Equipment	Scenario and Weather	Concentration	Maximum Distance(m)
		0.5LFL	501

6.2.3 *Flammable Gas or Vapour Cloud Explosion Overpressure*

Table 6.4 shows the maximum flammable gas or vapour cloud explosion consequence distances for failure scenarios associated with Natural Gas transfer or the Propane installation.

The distance to the maximum flammable gas or vapour cloud explosion consequence envelope is illustrated in *Table 6.4*.

Table 6.4 Maximum Flammable Gas Cloud or Vapour Cloud Explosion Consequence Distances

Location and Equipment	Scenario and Weather	Overpressure (mbar)	Maximum Distance(m)
Gas receiving station	Natural Gas release Confined Volume – 10,000m^3 TNO Explosion Curve 5	140 (Dangerous Dose)	57
Propane backup generator	Propane release Confined Volume – 100m^3 TNO Explosion Curve 5	140 (Dangerous Dose)	13

From *Figure 6.3* it can be seen that these overpressures do not extend beyond the proposed CCGT power plant boundary.

6.2.4 *BLEVEs and Fireballs*

Table 6.5 shows the BLEVE or fireball consequence distances for failure scenarios associated with the Propane generator installation.

The distance to the maximum BLEVE or fireball consequence envelope is illustrated in *Figure 6.4*.

Table 6.5 Maximum Flammable Gas Cloud or Vapour Cloud Explosion Consequence Distances

Location and Equipment	Scenario and Weather	Thermal Dose (tdu)	Maximum Distance(m)
Propane Vessel	BLEVE or fireball, all weather	1,800	82
		1,000 (Dangerous Dose)	114
		500	157
Propane Road Tanker	BLEVE or fireball, all weather	1,800	82
		1,000 (Dangerous Dose)	114
		500	157

Figure 6.1 Areas Enveloped by the Largest Jet Fires

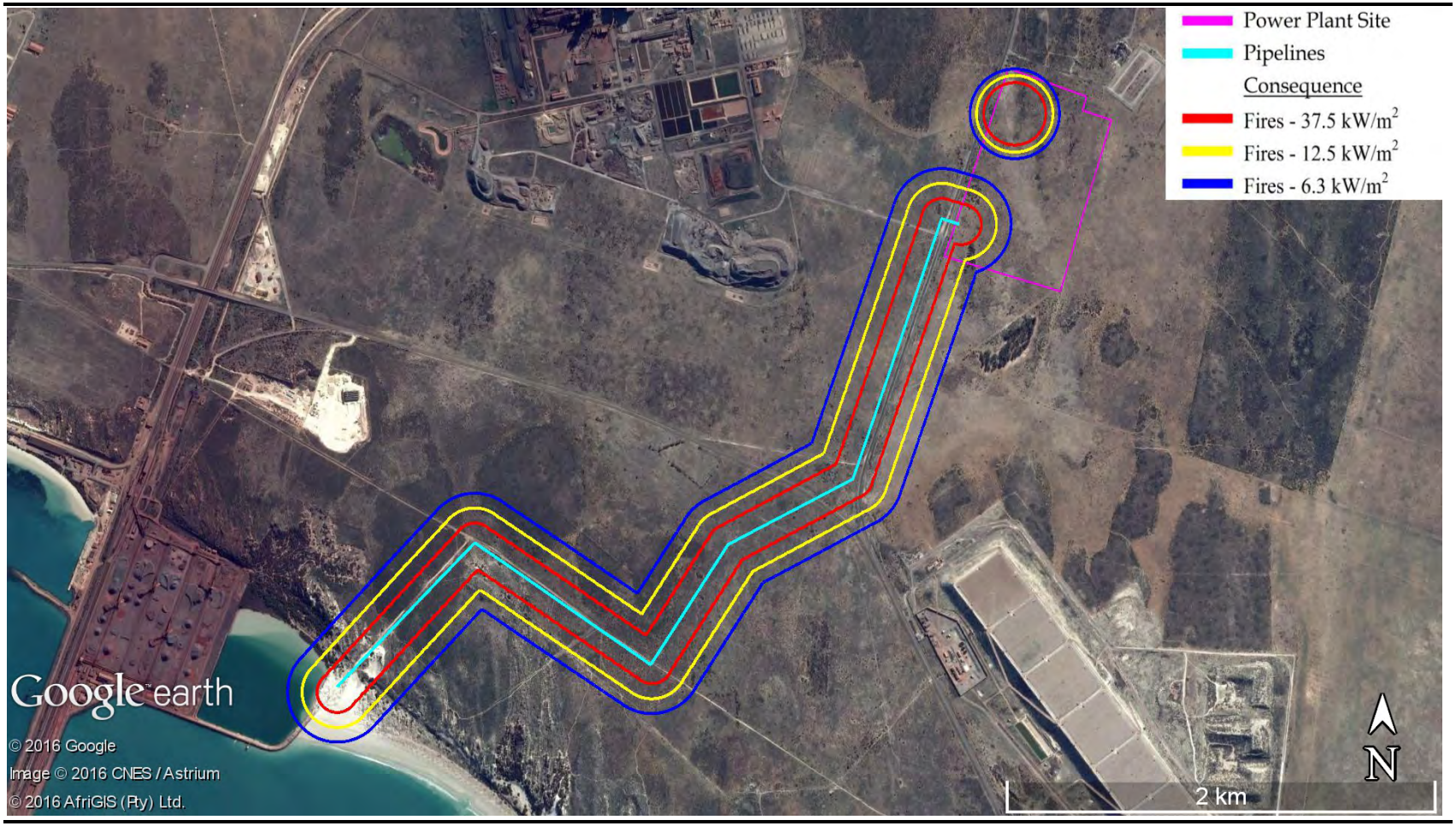
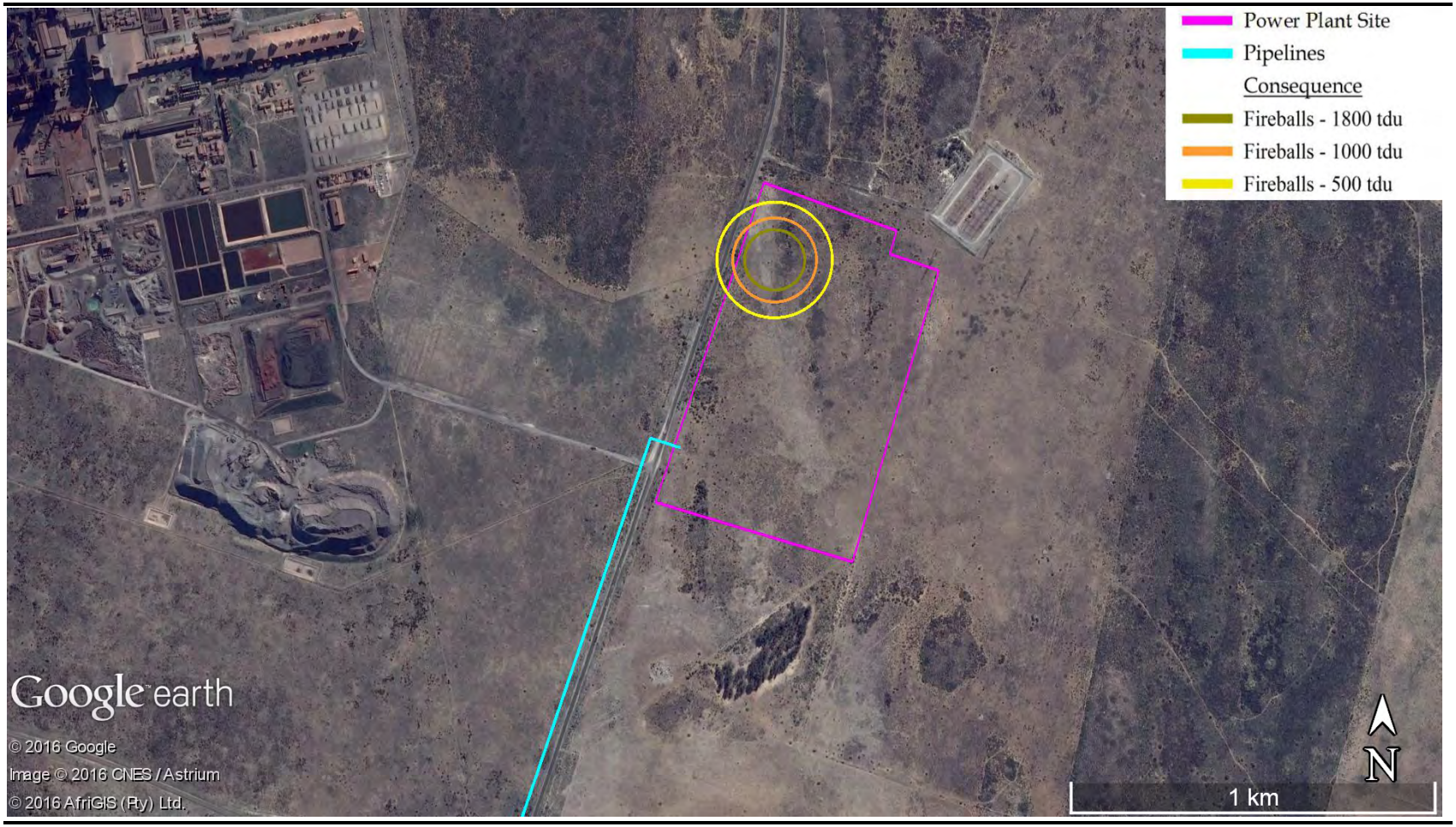


Figure 6.2 *Areas Enveloped by the Largest Flash Fires*

Figure 6.3 *Areas Enveloped by the Largest Flammable Gas Cloud or Vapour Cloud Explosions*

Figure 6.4 *Areas Enveloped by the Largest Flammable Gas Cloud or Vapour Cloud Explosions*



6.3 ESTIMATION OF INCIDENTS

6.3.1 Loss of Containment Frequency Calculations

To determine the probability of a leak occurring on the Natural Gas pipelines, the failure rate leading to a loss of containment needs to be modified by the probability of the Natural Gas finding an ignition source. The frequency of the release scenarios identified in *Section 5* is shown below.

Failure frequency data has been compiled and evaluated by the Health and Safety Laboratory on behalf of the UK's HSE into this report (1). This report uses data from CONCAWE (Conservation of Clean Air and Water in Europe) and UKOPA (United Kingdom Onshore Pipeline Operators Association) collected since 1970 and EGIG.

The report presents updated date for a six different substances, one of which is Natural Gas. This dataset is utilised to represent the frequency of pipeline failure used for this risk assessment and is shown in *Table 6.6*.

Table 6.6 Summary of Pipeline Failure Frequencies (per km per year) (2)

Failure category	Pinhole	Small hole	Large hole	Rupture
Mechanical failure	8.7E-06	1.0E-08	1.0E-08	1.0E-08
Corrosion	1.0E-07	1.0E-08	1.0E-08	1.0E-08
Ground movement/other	1.2E-05	2.5E-06	1.5E-07	2.5E-06
TPA	2.2E-05	2.4E-06	1.0E-07	1.0E-07

It is assumed that this data is for "good practice" pipelines i.e. those pipelines designed, operated and maintained to a good level. For this assessment, this data was used as a baseline for this study. Due to deviations in the design and operating conditions, it is sometimes appropriate to add modifiers to this base data to make the failure frequencies more appropriate to the pipelines of interest.

TPA was considered differently for the section of pipelines within the Transnet National Port Authority (TNPA) area and public areas. Within the controlled area it was considered an order of magnitude less likely that TPA could occur due to the control measures in place and this is reflected in the model.

The failure scenarios considered for the elements of the Propane backup generator system are described in *Section 6.1.3*.

The frequency of the release scenarios for the Propane backup generator system identified in *Section 6.1.3* is represented in *Table 6.7* to *Table 6.11*.

(1) HSE Research report RR1035

(2) CONCAWE Report no 12/13 - Performance of European cross-country oil pipelines. Statistical summary of reported spillages in 2012 and since 1971

Table 6.7 Propane Storage Vessel Failure Rates (1)

Failure Type - Tanks	Frequency
Catastrophic failure – BLEVE (hot failure)	1E-5/ tank year
Catastrophic failure – cold failure	2E-6 / tank year
50 mm hole	5E-6 / tank year
25 mm hole	5E-6 / tank year
13 mm hole	1E-5 / tank year

Table 6.8 Propane Road Tanker and Hose Failure Frequencies

Event	Frequency
Road Tanker Failure	
Catastrophic failure – BLEVE (hot failure) (2)	Sites with small tanks (<5 tons) - 1×10^{-7} / delivery
Catastrophic failure – cold failure (3)	1×10^{-6} / year
Hose Failure (4)	
Full bore	2×10^{-7} per operation
15 mm Hole	4×10^{-7} per operation
5 mm Hole	6×10^{-6} per operation

NOTE Hose Failure Data assumes provision for multiple safety systems as described in the failure data reference

Table 6.9 Failure Frequencies for Propane Pipework(5)

Release Hole Size (mm)	Failure Frequency (per metre year) for Pipe Diameter (mm)				
	<50	50-149	150-299	300-499	500-1000
3	1×10^{-5}	2×10^{-6}			
4			1×10^{-6}	8×10^{-7}	7×10^{-7}
25	5×10^{-6}	1×10^{-6}	7×10^{-7}	5×10^{-7}	4×10^{-7}
1/3 pipe diameter			4×10^{-7}	2×10^{-7}	1×10^{-7}
Full bore	1×10^{-6}	5×10^{-7}	2×10^{-7}	7×10^{-8}	4×10^{-8}

Regasification vapourisers are assumed to be shell and tube heat exchangers. Failure frequencies for heat exchangers are not provided in PCAG and therefore other sources of failure data were sought. OGP provides failure data for tube side failures which is shown in *Table 6.10*.

(1) Failure Rate and Event Data for use within Land Use Planning Risk Assessments – FR 1.1.3.2 LPG Pressure Vessels

(2)Failure Rate and Event Data for use within Land Use Planning Risk Assessments – Item FR3.2.2 Road Tankers

(3)TNO Purple Book, Loss Of Containment from pressurised road tankers – Page 3.14.

(4) Failure Rate and Event Data for use within Land Use Planning Risk Assessments – FR 1.2.3 – Hoses and Couplings

(5) Failure Rate and Event Data for use within Land Use Planning Risk Assessments – FR 1.3 – Pipework

Table 6.10 Propane Vapouriser Release Frequency(1)

Hole Diameter Range (mm)	Release Frequency (per heat exchanger per year)			
	All Releases	Full Releases	Limited Releases	Zero Pressure Releases
1 - 3	$2.0x10^{-3}$	$8.2x10^{-4}$	$7.9x10^{-4}$	$1.8x10^{-4}$
3 - 10	$8.8x10^{-4}$	$3.8x10^{-4}$	$4.3x10^{-4}$	$7.7x10^{-5}$
10 - 50	$4.0x10^{-4}$	$1.8x10^{-4}$	$2.5x10^{-4}$	$3.4x10^{-5}$
>50	$2.0x10^{-4}$	$7.6x10^{-5}$	$1.9x10^{-4}$	$1.3x10^{-5}$
Total	$3.4x10^{-3}$	$1.5x10^{-3}$	$1.7x10^{-3}$	$3.0x10^{-4}$

In line with the OGP usage guidance for coarse QRAs, the frequencies of 'full' and 'limited' releases (highlighted in *Table 6.10*) will be combined in this QRA. These frequencies will be assessed in addition to the general process release frequencies considered earlier in this section, to enable compatibility between the PCAG and OGP datasets. It is assumed that the vapouriser maximum tube diameter will be 50mm. Therefore the release frequencies in the OGP are redistributed into the PCAG hole sizes as shown in *Table 6.11*.

Table 6.11 Hole Size Equivalencies

PCAG Hole Diameter (mm)	OGP Hole Diameter Range (mm)
3	1 – 3
N/A	3 – 10
25	10 – 50
Full Bore Rupture (50mm)	>50

It is conservatively assumed that in the event of a tube failure a loss of containment will occur. Typically heat exchanger shells are able to accommodate the internal tube pressure and any excess pressure will be vented through a pressure relief system.

6.3.2 Ignition Probabilities

Ignition can occur immediately after a loss of containment of the Natural Gas or Propane if an ignition source is present or the initiating event can cause ignition this can result in a jet fire, flash fire or explosion.

Delayed ignition can occur when a flammable cloud encounters an ignition source away from the point of release. This can typically result in larger flash fires or potential explosions if the cloud envelops a congested area.

The ignition probabilities utilised for the Natural Gas pipelines and Propane scenarios are differentiated below.

(1) OGP Risk Assessment Data Directory, Process Release Frequencies, Report No. 434-1, March 2010

Pipelines

OGP(1) specifies immediate ignition probabilities of 0.001. Several other literature sources quote higher immediate ignition probabilities based on initial release rates. BEVI(2) recommends a differentiation of low and high reactivity gasses.

Natural Gas is considered a low reactivity gas. Therefore this immediate ignition probability philosophy will be adopted. For high energy releases, ie some form of third party interference, it has been assumed that immediate ignition will occur.

Delayed ignition probabilities for the pipeline will be modelled as OGP scenario 3 - Pipe Gas LPG Industrial (Gas or LPG release from onshore pipeline in an industrial area). This is due to potential industrial type activity within the Port of Saldanha as well as at Saldanha Steel. This is further supported by the numerous roadways that the pipeline will have to pass below.

Therefore the ignition probabilities used for this assessment have been summarised in *Table 6.12*.

Table 6.12 Ignition Probabilities

Immediate Ignition		
Failure Type	**Ignition Probability**	**Release Rate (kg/s)**
Small	0.02	<10
Medium	0.04	10 – 100
Large	0.09	>100
Third Party Interference	1.0	
Delayed Ignition		
Location	**OGP Scenario**	
Onshore Pipeline	3	

Propane

The ignition frequencies have been taken from the OGP report no. 434-6.1 (3) (March 2010). For the Propane scenarios, Scenario 8 - Large Plant Gas LPG (Gas or LPG release from large onshore plant) is used.

(1) OGP Risk Assessment Data Directory, Ignition Probability, Report No. 434-6.1, March 2010

(2) Reference Manual Bevi Risk Assessments, Version 3.1, The National Institute of Public Health and the Environment (RIVM), 2009.

(3) OGP Risk Assessment Data Directory, Report No. 434-6.1, March 2010

7.1 LAND USE PLANNING (LUP) RISK CALCULATION

The scenario frequencies and consequence results are used within the ERM *ViewRisk* risk summation package to calculate the individual risk of receiving a dangerous dose associated with Natural Gas pipelines.

The results will be presented as risk transects for the Natural Gas pipelines and risk contours for the Natural Gas pipelines and Propane generator. The risk transects and risk contours can be compared with the risk criteria used by the UK Health and Safety Executive (HSE) for deciding upon the risk and hence, acceptability of developments around pipeline servitudes. Individual risk lines at 1×10^{-5}, 1×10^{-6} and 3×10^{-7} chances per year of receiving a dangerous dose or worse will also be indicated on the risk transects and risk contours where applicable

The risk criteria are discussed in more detail in *Section 3.2.1*.shows typical examples of typical installations falling into the various sensitivity categories as defined by the HSE.

Table 7.1 Examples of Sensitivity Levels of Typical Developments

Sensitivity Level	Typical Examples	Allowed In
Level 1	Any general public at work	Inner Zone, Middle Zone, Outer Zone
Level 2	Housing, accommodation, transport links, outdoor use by the public, Level 1 development with >100 occupants per building or buildings greater than 3 stories.	Middle Zone, Outer Zone
Level 3	Institutional accommodation and education (including hospitals and schools), prisons, large examples of Level 2 developments	Outer Zone
Level 4	Institutional accommodation where 24 hour care is provided or larger than 0.25 hectare, schools or day care larger than 1.4 hectare, very large outdoor use by the public (typically > 1,000 people)	Outside Outer Zone Only

The area around the proposed Natural Gas pipelines' route and CCGT power plant site includes the following land uses:

- Sensitivity Level 1: The Saldanha Port area and the access road running adjacent to the CCGT power plant site as this is a single lane road; and
- Sensitivity Level 2: Camp road which is crossed by the pipelines as this is a dual carriageway

7.1.1 Risk Transects

The LUP risk transect for the pipelines in the general public area are shown in *Figure 7.1* and in the port authority area are shown in *Figure 7.2*.

Figure 7.1 *Risk Transect for Land Use Planning for Saldanha Steel Natural Gas Pipelines*

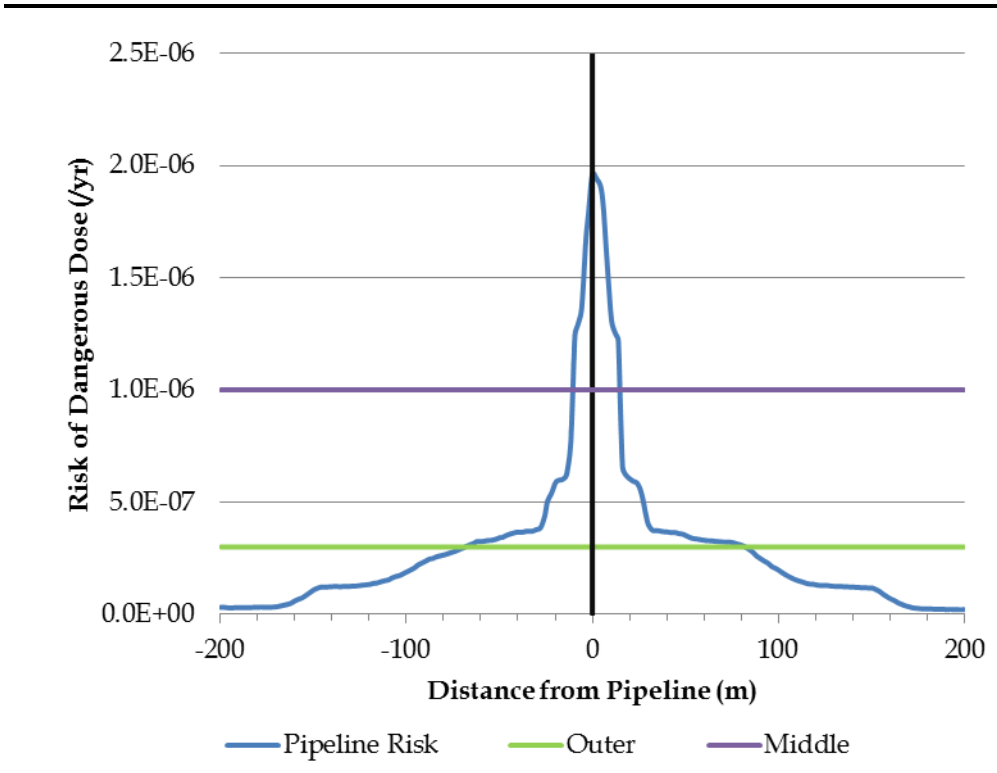
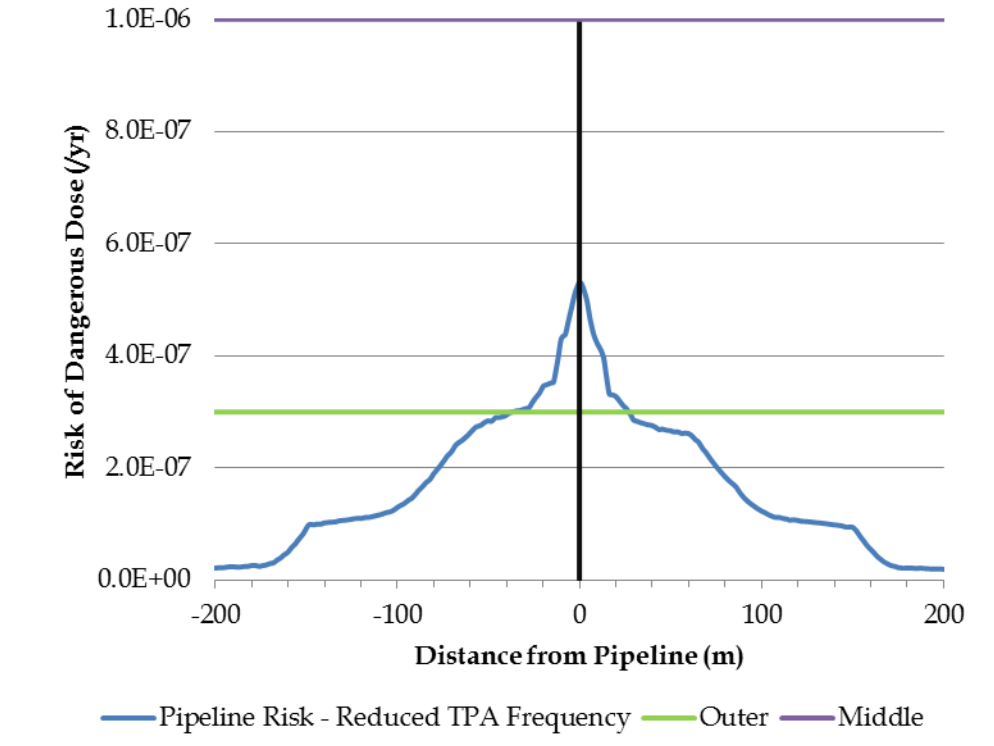


Figure 7.2 *Risk Transect for Land Use Planning for Saldanha Steel Natural Gas Pipelines with Reduced TPA Frequency in the Port Area*



The area of the Natural Gas pipelines that is accessible to the general public has a risk level within the Middle Zone which is approximately 10 m to either side of the pipelines. Therefore no Level 3 or Level 4 developments such as those described in *Table 7.1* should be allowed within 10m of the centre line of the pipeline servitude. No Sensitivity Level 3 or 4 land uses exist in the surrounding area.

The area of the pipeline that is accessible to the public has a risk level within the Outer Zone which is approximately 68m to either side of the pipelines. Therefore no Level 4 developments such as those described in *Table 7.1* should be allowed within 68m of the centre line of the pipeline servitude. No Sensitivity Level 4 land uses exist in the surrounding area.

The area surrounding the pipelines' servitude within the port boundary is understood to be zoned for industrial use and therefore classified as Sensitivity Level 1 in *Table 7.1*.

Based upon the current land uses around the proposed Natural Gas pipelines' route, the risk level would be classified as 'don't advise against' according to the land use planning criteria. Therefore the current land uses can be considered tolerable. Future land uses around the Natural Gas pipelines should adhere to those of *Table 7.1* for the pipelines' risk transects presented in *Figure 7.1* and *Figure 7.2*.

7.1.2 Risk Contours during the Second Year of Construction

The Land Use Planning risk contours for the pipelines and Propane generator operations during the second year of construction are shown in *Figure 7.3*. As the CCGT power plant will be under construction, no risks of a Natural Gas release are realised at this time.

From the figure it can be seen that the increased Propane consumption results in an area outside the power plant site falling within the 1×10^{-5} contour and therefore falling within the Inner Zone. This area extends approximately 110 m to the west and 40 m to the north of the CCGT site boundary as can be seen in *Figure 7.3*. Therefore no Level 2, Level 3 or Level 4 developments such as those described in *Table 7.1* should be allowed within this area during the second year of construction. The only Sensitivity Level 2 land use identified in the surrounding area is Camp road which exists outside of the inner zone.

From the figure it can be seen that an area outside the power plant site falls within the 1×10^{-6} contour and therefore is within the Middle Zone. This area extends approximately 120 m to the west and 50 m to the north of the CCGT site boundary as can be seen in *Figure 7.3*. Therefore no Sensitivity Level 3 or Level 4 developments such as those described in *Table 7.1* should be allowed within this area during the second year of construction. No Sensitivity Level 3 or 4 land uses exist in the surrounding area.

From the figure it can be seen that an area outside the power plant site falls within the 3 x 10^{-7} contour and therefore is within the Outer Zone. This area extends approximately 140 m to the west and 60 m to the north of the CCGT site boundary as can be seen in *Figure 7.3*. Therefore no Sensitivity Level 4 developments such as those described in *Table 7.1* should be allowed within this area during the second year of construction. No Sensitivity Level 4 land uses exist in the surrounding area.

The current land uses within these areas result in the risk level being classified as 'don't advise against' during the second year of construction according to the land use planning criteria. Future land uses around the CCGT power plant site within the second year of construction should adhere to those of *Table 7.1* for risk contours presented in *Figure 7.3*.

7.1.3 Risk Contours during Normal Operation

The Land Use Planning risk contours for the pipelines and Propane generator operations during normal operation are shown in *Figure 7.4*.

From the figure it can be seen that an area outside the power plant site falls within the 1 x 10^{-6} contour and therefore is within the Middle Zone. This area extends approximately 90 m to the west and 50 m to the north of the CCGT site boundary as can be seen in *Figure 7.4*. Therefore no Sensitivity Level 3 or Level 4 developments such as those described in *Table 7.1* should be allowed within this area during normal operation. No Sensitivity Level 3 or 4 land uses exist in the surrounding area.

From the figure it can be seen that an area outside the power plant site falls within the 3 x 10^{-7} contour and therefore is within the Outer Zone. This area extends approximately 120 m to the west and 60 m to the north of the CCGT site boundary as can be seen in *Figure 7.4*. Therefore no Sensitivity Level 4 developments such as those described in *Table 7.1* should be allowed within this area during normal operation. No Sensitivity Level 4 land uses exist in the surrounding area.

The current land uses within these areas result in the risk level being classified as 'don't advise against' during normal operation according to the land use planning criteria. Future land uses around the CCGT power plant site during normal operation should adhere to those of *Table 7.1* for risk contours presented in *Figure 7.4*.

Figure 7.3 ***Risk Contours for Land Use Planning for Saldanha Steel Natural Gas Pipelines and Propane backup generator with High Propane Consumption during the Second Year of Construction***

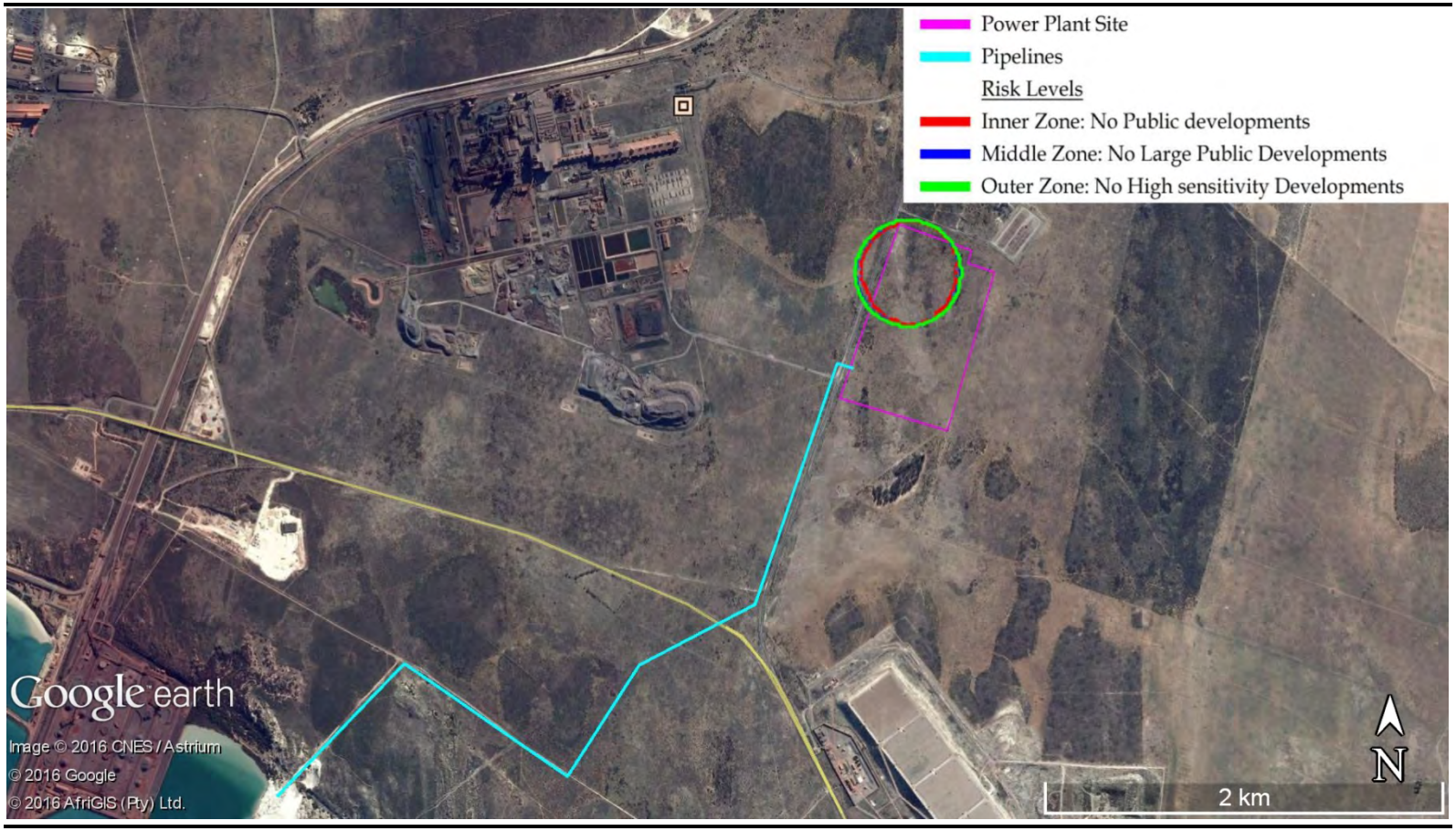


Figure 7.4 ***Risk Contours for Land Use Planning for Saldanha Steel Natural Gas Pipelines and Propane backup generator with Normal Power Plant Operation Propane Consumption***

7.2 *RISK CALCULATION – INDIVIDUAL RISK OF FATALITY*

Individual risks are by definition specific to individuals and need to take into account the extent and circumstances under which exposure arises. For instance, the risk will depend on the amount of time the individual spends outdoors as well as the time they may spend indoors which will afford them some protection. Risks are calculated for hypothetical persons located outdoors and indoors.

The risk contours presented in this section represent Location Specific Individual Risk (LSIR). It should be noted that the LSIR relates to an individual who is permanently exposed 24 hours a day 365 days a year. This is therefore an overestimate of the individual risk to personnel or public who may be present at these locations.

Individual risks of fatality contours for persons located outdoors and indoors at 1×10^{-6}, 1×10^{-5}, 1×10^{-4} and 1×10^{-3} for the Natural Gas transfer operations and Propane installation were calculated using the fatality probabilities detailed in *Section 5.2.4*.

With reference to the risk criteria highlighted in *Section 3.2.3*, the risks posed by the pipelines and Propane installation to areas located beyond the 1×10^{-6} contour would be considered 'broadly acceptable'. The risks posed to areas located between the 1×10^{-6} contour and the 1×10^{-4} contour would be considered tolerable if they can be proved to be As Low as Reasonably Practicable (ALARP) by the Natural Gas pipelines and Propane installation operator. The risks posed to non-Natural Gas operational personnel and establishments as well as sensitive areas within the 1×10^{-4} contour are considered intolerable. The risks posed to Natural Gas pipelines personnel within the 1×10^{-3} contour are considered intolerable and this would constitute a potentially fatal flaw for the development.

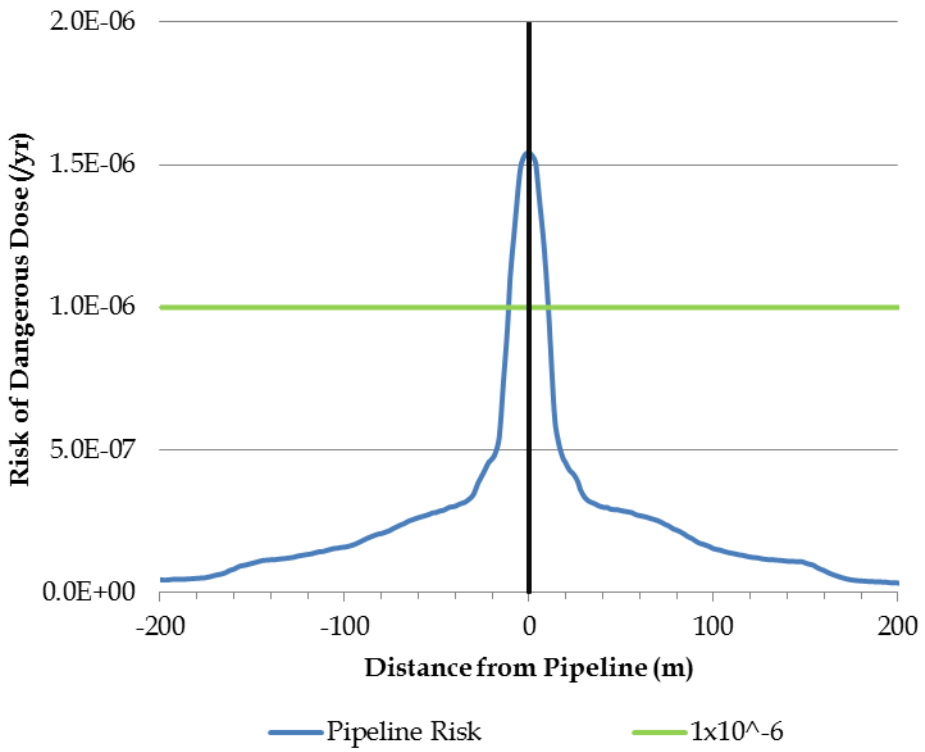
The results will be presented as risk transects which present the risk levels at 90 degrees to the pipelines route as well as risk contours for the pipelines and Propane backup generator developments. The risk contours for the Propane developments will be shown for the second year of construction which represents the largest period of propane consumption as well as for normal Propane backup generator operation.

7.2.1 *Risk Transects*

Risk Transects representing the location specific individual risks (LSIR) risk transect for hypothetical persons located outdoors and indoors for the pipelines were calculated for the areas accessible to the general public as well as those within the Port boundary. Only the transects for persons located outdoors for the area accessible to the general public were found to exceed 1×10^{-6} and therefore all other LSIR transects were excluded from further analysis.

Figure 7.5 represents the location specific individual risks (LSIR) risk transect for hypothetical persons located outdoors for the Natural Gas pipelines. This transect is taken for the area accessible to the general public.

Figure 7.5 Risk Transect for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines – Persons Located Outdoors



From *Figure 7.5* it can be seen that the individual risk of fatality exceeds the 1 x 10^{-6} contour. This extends approximately 10m on either side of the pipelines route. As the risk in this area exceeds 1 x 10^{-6} but does not exceed 1 x 10^{-4} the LSIR for the pipelines for persons located outdoors along the pipeline route is not considered intolerable according to the risk criteria as defined in *Section 3.2.3*. The risks within this area can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

7.2.2 *Risk Contours during the Second Year of Construction*

The LSIR contours for individuals located outdoors and indoors for the proposed Natural Gas pipelines and Propane backup generator developments during the second year of construction are shown in *Figure 7.6* and *Figure 7.7* respectively.

Figure 7.6 represents the location specific individual risks (LSIR) for hypothetical persons located outdoors for the proposed pipelines and Propane generator developments during the second year of construction. The areas

surrounding the proposed developments that fall between the 1 x 10^{-6} contour and the 1 x 10^{-4} contour are small areas to the north and west of the CCGT power plant site. As the risk exceeds 1 x 10^{-6} but does not exceed the 1 x 10^{-4} risk level, the LSIR for the pipelines and Propane backup generator for persons located outdoors in these areas is not considered intolerable according to the risk criteria as defined in *Section 3.2.3*. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1 x 10^{-4} contour exists for the area centred on the Propane backup generator. This contour does not extend offsite, therefore only workers involved in the construction and operation of the CCGT power plant are exposed to this risk level and this is not considered intolerable according to the risk criteria as defined in *Section 3.2.3*. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1 x 10^{-3} LSIR contour do not exist for individuals located outdoors, therefore the risk is below these levels.

No risk contours for persons located outdoors exist around the Natural Gas pipelines as it is understood that these will not be operational during this phase of construction.

Figure 7.7 represents the location specific individual risks (LSIR) for hypothetical persons located indoors for the proposed pipelines and Propane generator developments during the second year of construction. Areas located off the power plant site have an individual risk higher than 1 x 10^{-6}. As the risk exceeds 1 x 10^{-6} but does not exceed 1 x 10^{-4} the LSIR for the pipelines and Propane backup generator for persons located outdoors in these areas is not considered intolerable according to the risk criteria as defined in *Section 3.2.3*. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1 x 10^{-3} and 1 x 10^{-4} LSIR contours do not exist for individuals located indoors, indicating that the risk is lower than this level.

No risk contours for persons located indoors exist around the Natural Gas pipelines as it is understood that these will not be operational during this phase of construction.

7.2.3 Risk Contours during Normal Propane generator Operation

The LSIR contours for individuals located outdoors and indoors for the proposed Natural Gas pipelines and Propane backup generator developments during normal operation are shown in *Figure 7.8* and *Figure 7.9* respectively.

Figure 7.8 represents the location specific individual risks (LSIR) for hypothetical persons located outdoors for the proposed Natural Gas pipelines

and Propane backup generator developments during normal Propane backup generator operation. Areas located off the power plant site have an individual risk higher than 1×10^{-6}. As the risk exceeds 1×10^{-6} but does not exceed the 1×10^{-4} risk level, the LSIR for the pipelines and Propane backup generator for persons located outdoors in these areas is not considered intolerable according to the risk criteria as defined in *Section 3.2.3*. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1×10^{-3} and 1×10^{-4} LSIR contours do not exist for individuals located outdoors, therefore the risk is below these levels.

Figure 7.9 represents the location specific individual risks (LSIR) for hypothetical persons located indoors for the proposed pipelines and Propane backup generator developments during normal Propane backup generator operation. Areas located off the power plant site have an individual risk higher than 1×10^{-6}. As the risk exceeds 1×10^{-6} but does not exceed 1×10^{-4} the LSIR for the pipelines and Propane backup generator for persons located indoors in these areas is not considered intolerable according to the risk criteria as defined in *Section 3.2.3*. The risks can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

The 1×10^{-3} and 1×10^{-4} LSIR contours do not exist for individuals located indoors, therefore the risk is below these levels.

7.3 ESCALATION EFFECTS

7.3.1 Natural Gas Pipelines

No escalation effects (ie a minor incident escalating to a major incident) are considered for the Natural Gas pipelines in this risk assessment. It is judged that escalation impacts (in terms of the immediate effect on members of the public or workers) associated with consequences resulting from incidents involving the hazardous installations are unlikely to result in more severe consequences than the original initiating events.

7.3.2 Propane Installations

The most prevalent escalation effect for pressurised flammable vapour storage vessels is a BLEVE. It is understood that the failure data considered in *Section 6.3.1* includes escalation aspects from pool or jet fires originating from adjacent equipment. Furthermore the assumption and subsequent recommendation that an operator be present during Propane offloading, as well as other fire detection measures has the result that prolonged heating of the Propane vessel are considered unlikely and will not further increase the failure data presented in *Section 6.3.1*.

As such no escalation effects are considered for the Propane installations in this risk assessment. It is judged that escalation impacts associated with consequences resulting from incidents involving the hazardous installations are unlikely to result in more severe consequences than the original initiating events.

7.4 *CUMULATIVE IMPACT ASSESSMENT*

Known development areas are shown in *Figure 7.10*. The known developments are listed as follows:

- The IDZ development
- Afrisam Cement Plant
- LPG storage Facilities – Sunrise and Avidia
- Vredenburg Industrial Development (located between Namaqua Sands and the Fossil Park):
  - Frontier Separation Plant
  - Chlor-Alkali Facility
- Desalination plant
- One additional 1000 MW gas-fired power plant

Those developments not shown in *Figure 7.10* are located beyondthe area presented in this aerial plot.

In order to assess cumulative risk affects from these developments a QRA for each of the sites will need to be carried out. Those sites where a QRA was not considered necessary indicates the risk of a major accident from these sites is considered low by the owner of the site.

ERM has assessed the risk assessments from the Sunrise and Avidia LPG facilities as well as the Chlor-Alkali Facility. These are discussed in more detail below.

7.4.1 *Sunrise LPG Facility*

A QRA for Sunrise was carried out by Riscom in October 2012. The assessment indicates the following hazardous substances stored on site:

- 15 x 2 495 m^3 Liquefied Petroleum Gas (LPG) Vessels (stored at Phase 2 of project).

From a review of the Sunrise LPG QRA, it was found that individual risk of fatality contours from incidents at the Sunrise site would overlap those of the Saldanha Steel Natural Gas pipelines and Propane developments. From observation, the maximum overlap for individual risk of fatality is approximately 1×10^{-6}. This risk level does not however reach the power plant site and therefore does not accumulate with the risk of the Propane facilities. The risk from the Saldanha Steel Natural Gas pipelines is in the order of magnitude of 1×10^{-6} to 1×10^{-5}. Therefore the addition of 1×10^{-6}

from the Sunrise LPG facility will not escalate the risk a further order of magnitude to 1 x 10^{-4}, making the resulting risk level below that which would be considered intolerable according to the criteria shown in *Section 3.2.3*.

It must be noted that this analysis is purely based on observation of the Riscom report supplied. Technical methodologies and assumptions made as part of the QRAs may differ between Riscom and ERM. This has the potential to make the actual cumulative risk results generated by the two Companies QRAs differ slightly.

7.4.2 Avidia LPG Facility

A QRA for Sunrise was carried out by MHR Consultants in July2013. The assessment indicates the following hazardous substances stored on site:

- 32 x 500 m^3 Liquefied Petroleum Gas (LPG) Vessels.

From a review of the Avidia LPG QRA, it was found that individual risk of fatality contours from incidents at the Avidia site would not overlap any contours from the Saldanha Steel Natural Gas pipelines and Propane developments. Therefore no cumulative risk affects are relevant from the Avidia LPG facility. Once again it must be noted that this analysis is purely based on observation of the MHR Consultants report supplied.

7.4.3 Chlor-Alkali Facility

A QRA for Sunrise was carried out by ISHECON in September 2014. The assessment indicates the following hazardous substances stored on site:

- 3 x 500 ton Chlorine Vessels;
- 60 x 1 ton Chlorine Vessels;
- 400 x 0.07 ton Cylinders;
- 150 tons Sodium Hypo-chlorite;
- 4 000 tons Hydrochloric acid (31%);
- 25 tons Sulphuric acid (98%);
- 30 tons Sulphuric acid (70%); and
- 170 tons Liquefied Petroleum Gas (LPG).

From a review of the Chlor-Alki QRA, it was found that individual risk of fatality contours from incidents at the Chlor-Alki site would overlap those of the Saldanha Steel Natural Gas pipelines and Propane developments. From observation, the maximum overlap for individual risk of fatality is approximately 1 x 10^{-9}. This risk level is significantly lower than the risk levels from the Saldanha Steel Natural Gas pipelines and Propane developments. The cumulative risk will therefore not materially increase above those from the Saldanha Steel Natural Gas pipelines and Propane developments.

It must be noted that this analysis is purely based on observation of the ISHECON report supplied. Technical methodologies and assumptions made

as part of the QRAs may differ between ISHECON and ERM. This has the potential to make the actual cumulative risk results generated by the two Companies QRAs differ slightly.

7.4.4 Overall Cumulative

The largest contributor to cumulative risk with the Saldanha Steel Natural Gas pipelines and Propane developments is that of the Sunrise LPG facility. The cumulative risk of all the sites discussed above in the vicinity of the Saldanha Steel Natural Gas pipelines and Propane developments is not expected to exceed 1×10^{-4}, making the resulting risk level below that which would be considered intolerable according to the criteria shown in *Section 3.2.3*.

It must be noted that this analysis is purely based on observation of the various QRA reports supplied. Technical methodologies and assumptions made as part of the QRAs may differ between these Companies and ERM. This has the potential to make the actual cumulative risk results generated by the Companies QRAs differ slightly.

Figure 7.6 *Risk Contours for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines and Propane Developments during the Second Year of Construction – Persons Located Outdoors*

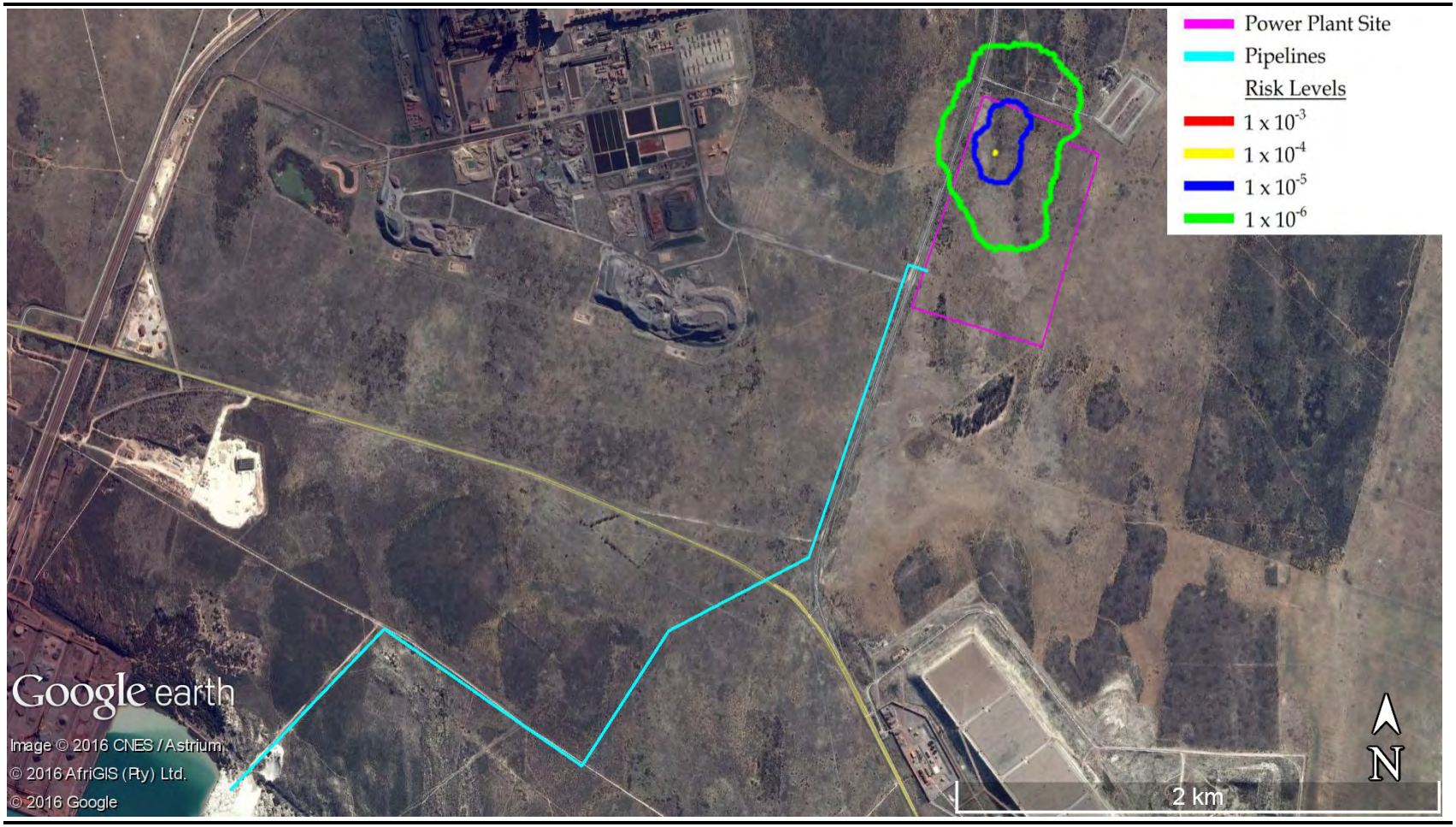


Figure 7.7 ***Risk Contours for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines and Propane Developments during the Second Year of Construction – Persons Located Indoors***

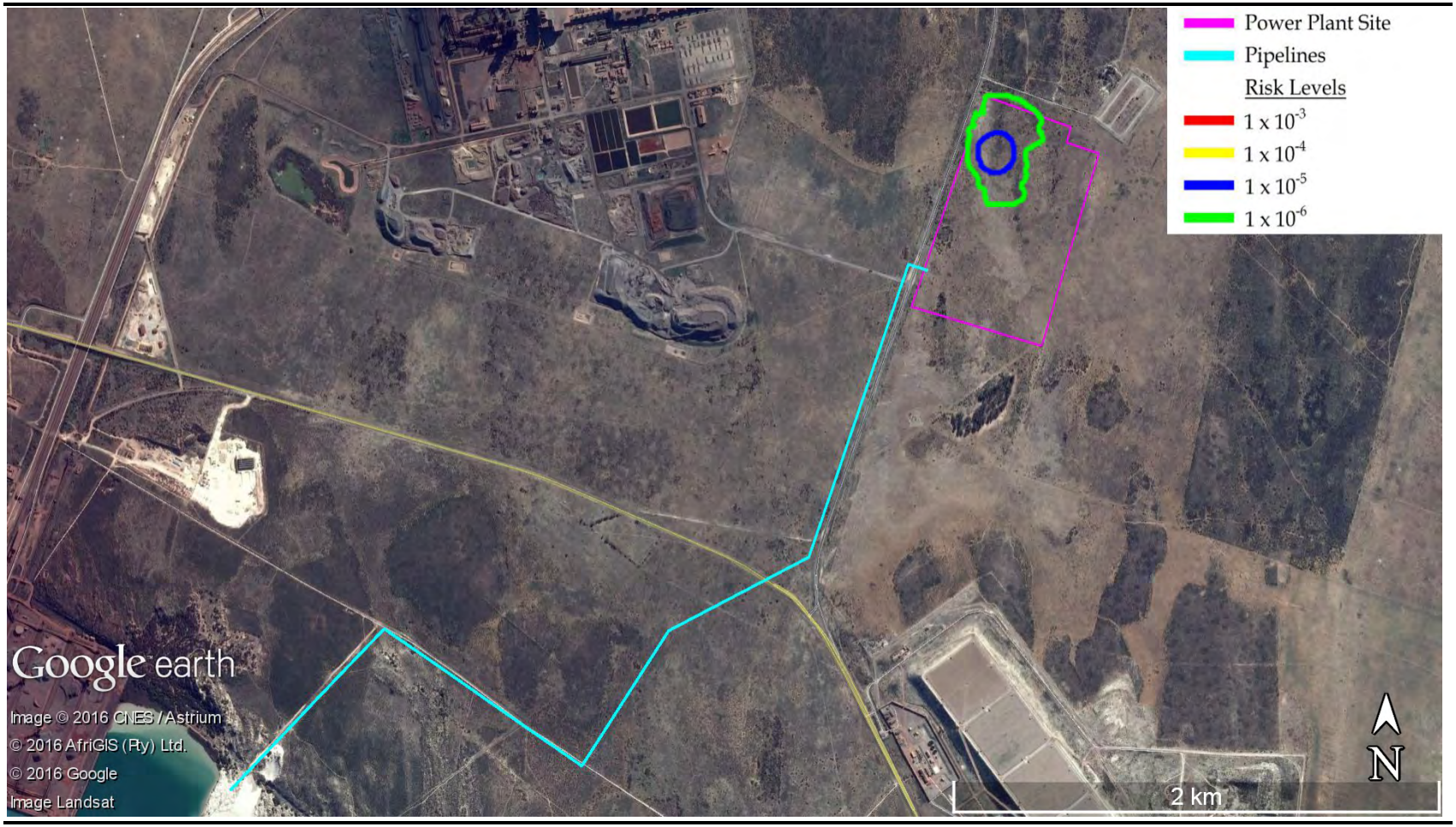


Figure 7.8 ***Risk Contours for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines and Propane Developments during Normal Operation – Persons Located Outdoors***

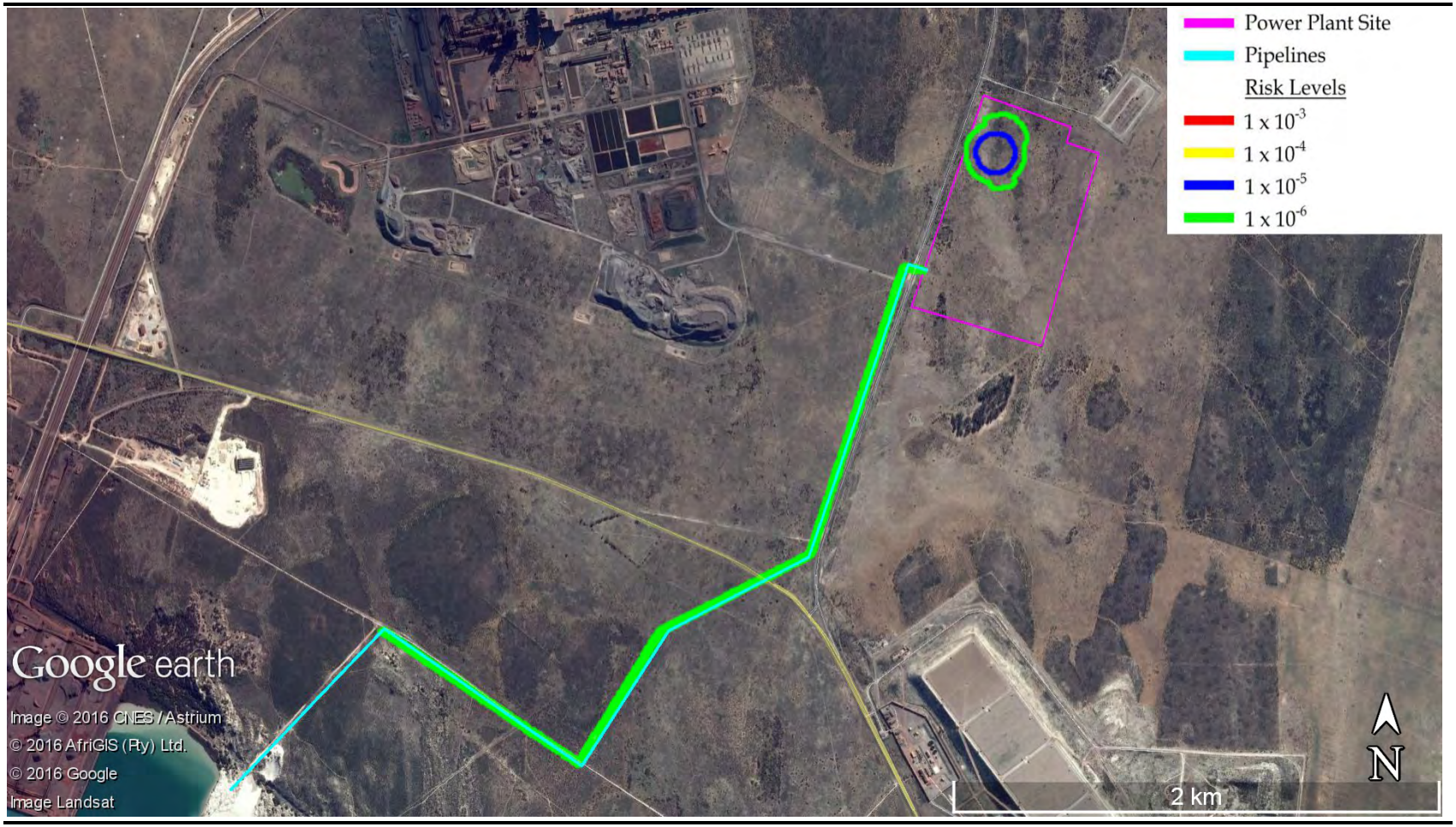


Figure 7.9 ***Risk Contours for Individual Risk of Fatality for Saldanha Steel Natural Gas Pipelines and Propane Developments during Normal Operation – Persons Located Indoors***

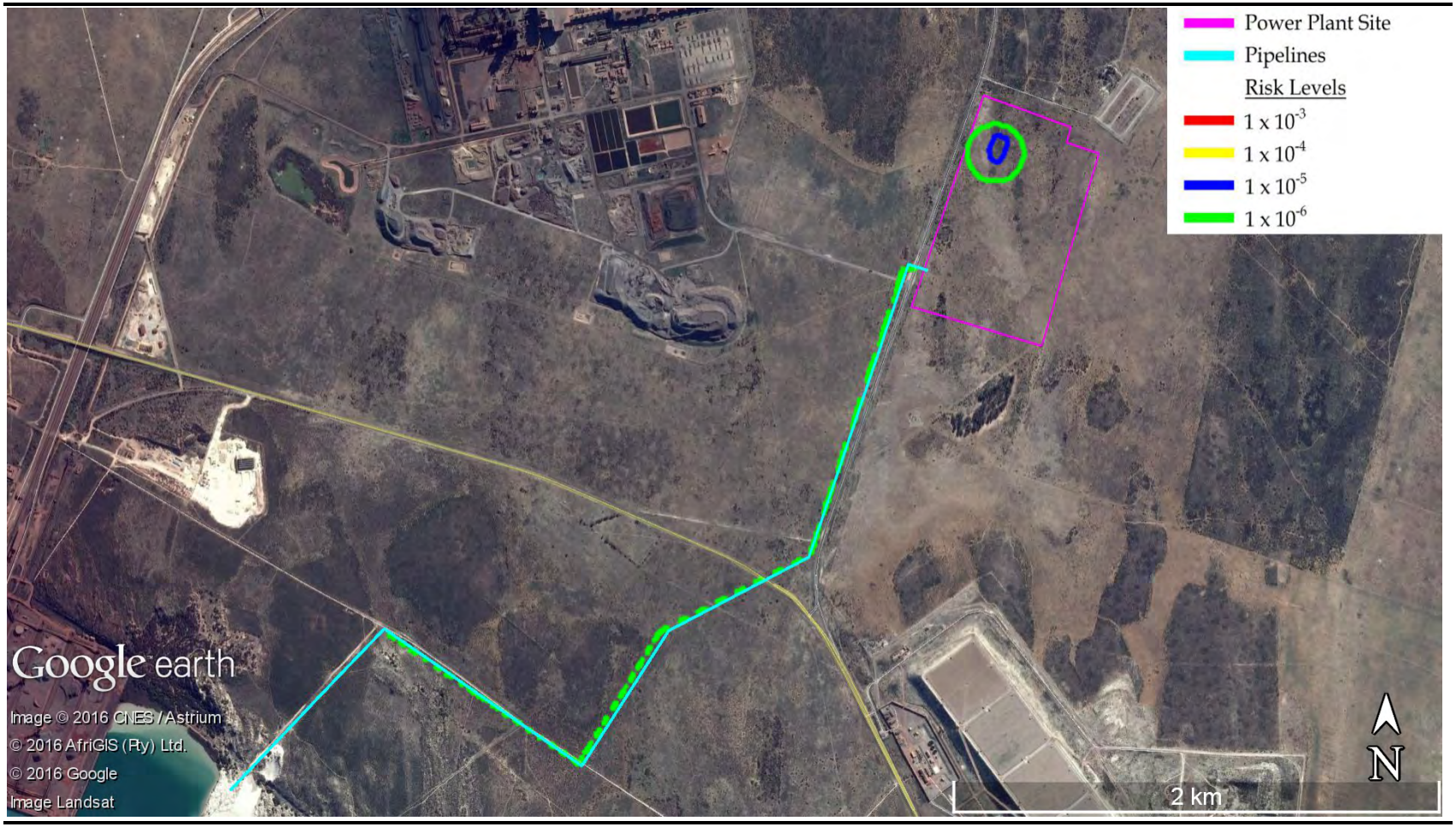


Figure 7.10 Known Developments in the Vicinity of the Proposed Saldanha Steel Development

8 IMPACT ASSESSMENT

The following section presents the Impact Assessment (IA) according to ERM's standard impact assessment methodology.

8.1 QUANTITATIVE RISK ASSESSMENT FOR NATURAL GAS PIPELINES AND PROPANE GENERATOR

ERM conducted a QRA on the proposed Natural Gas pipelines and Propane electricity generator as described in *Section 1.1*. In summary a CCGT power plant is planned to supply electricity to Saldanha Steel to alleviate current and future electrical energy constraints. The CCGT power plant is planned to be fuelled by Natural Gas. The project will support both CNG and LNG as its main fuel supply. CNG and LNG could be supplied by ship to the Port of Saldanha. LNG, which will be regasified and CNG processing will take place within the Port boundary and will be the subject of another environmental authorisation application. The preparation of either of these feedstocks will result in are understood to take place in the port. This will result in pressurised Natural Gas being exported to the plant via two proposed pipelines.

The process hazards are described in *Section 5* and are summarised below. Both Natural Gas and Propane represent flammable hazards and a release of either substance could result in a major accident. The following hazards have been considered in the QRA and are described in *Section 5.1*:

- Jet Fire: If a flammable gas or vapour is released and ignites immediately a jet fire may occur;
- Flash Fire: If a flammable gas or vapour is released and does not ignite immediately the gas or vapour may disperse from the point of origin and form a flammable gas or vapour cloud. In the event of delayed ignition the gas or vapour cloud could result in a flash fire;
- Flammable Gas or Vapour Cloud Explosion: If a flammable gas or vapour is released and does not ignite immediately the gas or vapour may disperse from the point of origin. In the event of delayed ignition where the gas or vapour cloud occurs within a confined or congested area, a gas or vapour cloud explosion may occur. Unconfined vapour cloud explosions are also possible under certain conditions;
- Boiling Liquid Evaporating Vapour Explosion (BLEVE): If a fire impinges on a pressurised flammable container such as a Propane storage pressure vessel, a hot catastrophic failure of such a vessel could occur, resulting in a BLEVE; and

- Fireball: If a pressurised Propane storage pressure vessel undergoes cold catastrophic failure (such as from an external impact) and immediate ignition occurs, a fireball could result.

The largest effects from the hazards described above are shown in *Section 6.2*.

The risks of the hazards were assessed according the UK HSE Land Use Planning (LUP) and Risk Tolerability Location Specific Individual Risk (LSIR) criteria as described in *Section 3.2*.

The LUP assessment showed that the current land uses in the proximity of the Natural Gas pipelines and the Propane generator were tolerable, however future land uses should be restricted according to the results shown in *Section 7.1*.

The Risk Tolerability LSIR assessment showed that the risk levels for individuals not involved in the CCGT and Natural Gas pipelines' construction or operation was not considered intolerable. Similarly the LSIR for workers on site, in this instance workers involved in the CCGT and Natural Gas pipelines' construction or operation was also not intolerable. The LSIR can only be considered tolerable if they can be demonstrated by the site to be As Low As Reasonably Practicable (ALARP).

8.1.1 Summary Assessment

The hazards, as described above, would result in a **direct negative** type of impact on the natural vegetation, structures, employees and people in the immediate area in close proximity of the Natural Gas pipelines as well as the CCGT power plant site.

The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.

The extent for the impact is **local** as the impact of the worst case hazards extends beyond the boundaries of the pipelines' servitude as well as the CCGT power plant site.

The **scale** of the hazard effects to a Dangerous Dose from the Natural Gas pipelines are as follows:

- Jet Fire: 156 m;
- Flash Fire: 676 m; and
- Gas Cloud Explosion: 57 m.

The **scale** of the hazard effects to a Dangerous Dose from the Propane generator installations are as follows:

- Jet Fire: 173 m;
- Flash Fire: 239 m;
- Vapour Cloud Explosion: 13 m; and
- Boiling Liquid Evaporating Vapour Explosion / Fireball: 114 m.

Certain design standards have been assumed for the Natural Gas pipelines and Propane installations. These largely follow prescribed standards, however of particular note is the following:

- Multiple (at least two) safety systems will be implemented for Propane offloading. Such systems include wheel chocks, interlock brakes, interlock barriers, etc. In addition the site will implement an effective pull away mitigation system and inspection and pressure/leak tests to prevent transfer system leaks and bursts.

If facilities and equipment are designed to the prescribed specifications and standards the likelihood of such an events occurring is considered **unlikely**.

The sensitivity of receptors can be differentiated into those associated with the current land use of the area, as addressed by the LUP assessment, and individuals, as addressed by the LSIR assessment.

The area surrounding the Natural Gas pipelines' servitude is currently open land with the exception of Camp road. A portion of this servitude also passes through an area owned by the Port. As these areas are not currently inhabited and future land use within the Port is understood to be categorised as Industrial the land use sensitivity in these areas is categorised as **low**.

The area surrounding the proposed CCGT power plant site is similarly unused with the exception of a small access road. Therefore this land use sensitivity is also categorised as **low**.

Considering individuals, it is understood that the area surrounding the Natural Gas pipelines' servitude is not permanently inhabited as no homes, work places or other gathering areas exist in the vicinity. The general public does however have access to the area surrounding the servitude (with the exception of the Port property). Therefore the sensitivity of the general public in the area surrounding the Natural Gas pipelines' servitude is categorised as **medium**. For workers involved in the construction phase or operational phase of the CCGT power plant project the sensitivity is categorised as **low**. This is due to these individuals being aware of the risks and being more adequately prepared to handle them as a result of emergency planning , PPE, etc.

A similar situation exists for the proposed CCGT power plant site and surrounding area. The general public sensitivity is categorised as **medium** while worker sensitivity is categorised as **low**.

The impact has been assessed for a number of different scenarios which are described below:

- Land Use Planning Impact for the construction phase (represented for the second year of construction) for the Natural Gas pipelines

- Land Use Planning Impact for the construction phase (represented for the second year of construction) for the Propane generator installations
- Location Specific Individual Risk Impact for the construction phase (represented for the second year of construction) for the entire project
-
- Land Use Planning Impact for the operational phase for the Natural Gas pipelines
- Land Use Planning Impact for the operational phase for the Natural Gas pipelines
- Location Specific Individual Risk Impact for the operational phase for the entire project

Box 8.1 Land Use Planning Impact: Construction Phase: Natural Gas Pipelines

Impact Magnitude – Negligible
The Natural Gas pipelines are understood to only become operational during the operations phase of the project. Therefore no hazards exist during the construction phase

Likelihood – Unlikely

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR NATURAL GAS PIPELINES (PRE-MITIGATION) – NEGLIGIBLE – The hazards will not exist for the Natural Gas Pipelines during the construction phase

Box 8.2 Land Use Planning Impact: Construction Phase: Propane Generator Installations

Impact Magnitude – Low
- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest land use restriction extends 140 m to the west and 60 m to the north of the CCGT site boundary, centred on the Propane generator.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely.**

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR PROPANE GENERATOR (PRE-MITIGATION) – NEGLIGIBLE – As the majority of the land surrounding the CCGT power plant is unused and uninhabited the impact from hazards is unlikely to have large offsite effects.

Box 8.3 *Location Specific Individual Risk Impact: Construction Phase: Natural Gas Pipelines and Propane Generator Installations*

Impact Magnitude – High

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest LSIR contours extend 360 m to the west, 320 m to the north and 80 m to the east of the CCGT site boundary, centred on the Propane generator. The area considered intolerable for the general public extends 60 m to the north of the CCGT site boundary. An area centred on the Propane generator is considered intolerable for workers.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely**. As stated, no hazards for the Natural Gas pipelines will be realised during the construction phase.

Receptor Sensitivity – The LSIR receptor sensitivity has been categorised as **medium** for the general public as they can access these areas but do not inhabit them and **low** for workers involved in the construction of the project as they are aware and prepared for the risks.

LSIR IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR NATURAL GAS PIPELINES AND PROPANE GENERATOR (PRE-MITIGATION) – MODERATE – As the general public and workers are not exposed to LSIR that is considered intolerable.

Box 8.4 *Land Use Planning Impact: Operation Phase: Natural Gas Pipelines*

Impact Magnitude – Low

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 676 m. The largest land use restriction extends 140 m from the pipeline due to proposed bends which increase the risk in these areas. Risk transects indicate the normal pipeline area restrictions extend 68 m from the centre of the Natural Gas pipelines' servitude.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely.**

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING OPERATION PHASE FOR NATURAL GAS PIPELINES (PRE-MITIGATION) – NEGLIGIBLE – As the majority of the land surrounding the Natural Gas Pipelines' servitude is unused and uninhabited the impact from hazard is unlikely to have large offsite effects. Areas within the Port are understood to be reserved for industrial land use.

Box 8.5 Land Use Planning Impact: Operation Phase: Propane Generator Installations

Impact Magnitude – Low

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 239 m. The largest land use restriction extends 120 m to the west and 60 m to the north of the CCGT site boundary, centred on the Propane generator.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely.**

Receptor Sensitivity – The LUP receptor sensitivity has been categorised as **low** as there are no inhabited areas.

LUP IMPACT SIGNIFICANCE DURING OPERATION PHASE FOR PROPANE GENERATOR (PRE-MITIGATION) – NEGLIGIBLE – As the majority of the land surrounding the CCGT power plant is unused and uninhabited the impact from hazards is unlikely to have large offsite effects.

Box 8.6 Location Specific Individual Risk Impact: Operation Phase: Natural Gas Pipelines and Propane Generator Installations

Impact Magnitude – High

- **Type:** The type of impact would be described as **direct negative** due to nature of the hazards.
- **Duration**: The duration would be **temporary** as such hazards would be of short duration and only happen occasionally, if at all.
- **Extent**: The extent for the impact is **local** as the impact of the worst case scenario impact would extend beyond the boundaries of the CCGT power plant site.
- **Scale:** The largest hazard effects to Dangerous Dose are 676 m. The largest LSIR contours extend 110 m to the west and 240 m to the north of the CCGT site boundary, centred on the Propane generator.

Likelihood – If facilities and equipment are designed to the prescribed specifications the likelihood of such an event occurring is considered **unlikely**.

Receptor Sensitivity – The LSIR receptor sensitivity has been categorised as **medium** for the general public as they can access these areas but do not inhabit them and **low** for workers involved in the construction of the project as they are aware and prepared for the risks.

LSIR IMPACT SIGNIFICANCE DURING CONSTRUCTION PHASE FOR NATURAL GAS PIPELINES AND PROPANE GENERATOR (PRE-MITIGATION) – MODERATE – As no areas which are considered intolerable for the general public or workers exists.

Mitigation

Mitigation objective

To avoid or minimise the risk of an incident (i.e. fire or explosion) occurring from a loss of containment of Natural Gas or Propane from pipelines, facilities or ancillary equipment at the proposed Natural Gas pipelines or Propane electricity generator.

Mitigation measure(s) for the proposed Natural Gas Pipelines

The following proposed engineering design features that reduce risks should be implemented:

- The pipelines should be designed to an international standard such as:
    - BS EN 14161: Petroleum and natural gas industries – Pipeline transportation systems;
    - ASME B31.8 Gas Transmission and Distribution Piping Systems; or
    - Other internationally recognised standards.

- The pipelines' wall thickness should be designed to accommodate the maximum operating pressure of 90 barg with a suitable safety factor;

- Isolation valves should be located at least at either end of the pipelines but ideally at intervals such that in the event of a leak only small amounts of Natural Gas would be released;

- Leak prevention systems such as cathodic protection and pipeline coatings suitable for the ground conditions should be implemented;

- The pipelines should include an emergency shutdown system that will shut emergency isolation valves and depressurise the pipelines safely;
- Areas of road crossing shall include specific protection measures to account for the weight from road traffic;

- A Leak detection system should be considered for the pipelines;

- The installation of non-return valves on the pipelines should be considered;

- Depth of burial of the pipelines along their length should be equal to, or greater than the minimum depth of burial specified;

- Potential other risk reduction measures include concrete sheathing, tiles above pipelines, marker tape above pipelines, route marker posts etc; and

- Emergency response plan for the pipeline must be compiled with the user of the pipelines and the Local Authority together.

The following protective measures should be put in place to reduce the risks:

- Third party interference protection measures should be included. These should differentiate between accidental interference (which can be protected against with safety marker tape, regular aboveground pipeline markers, etc) and deliberate interference (which can be protected against with regular pipeline surveys, ground disturbance early warning systems, etc);

- All Natural Gas processing areas should be equipped with gas detectors with appropriate logic that can initiate emergency shutdown of Natural Gas operations and even the pipelines if necessary;

- All of the automatic safety systems shall be designed so that they can also be manually activated;

Specific mitigation measures identified by the specialist include:

- Ensuring compliance with all statutory requirements (i.e. pipeline designs);

- Ensuring compliance with applicable South African National Standards (i.e. SANS 10087, etc.);

- Incorporating applicable guidelines or equivalent international recognised codes of good design and practice into the designs;

- Completing recognised processes of hazard analysis processes (HAZOP, FMEA, SIL, LOPA etc.) for the proposed CCGT power plant prior to construction to ensure design and operational hazards have been identified and adequate mitigation has been considered;
- Ensure any amendments to the current design specifications are captured in amendments to the EIA and relevant specialist studies; and

- Ensuring a Major Hazard Installation (MHI) risk assessment is carried out for the facility after detailed designs have been completed for the pipelines and CCGT power plant in accordance with the Major Hazard Installation regulations;

<u>Mitigation measure(s) for the proposed Propane generator installations on the CCGT power plant site</u>

The following proposed engineering design features that reduce risks should be implemented:

- The installation must comply with all the requirements of SANS 10087-3:2015 *The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial, and industrial installations Part 3:*

Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 L;

- The Propane storage vessel shall be fitted with pressure relief valves, which would only lift when the vessel has reached its maximum operating pressure or level;

- All piping shall be rated to accommodate the required operating pressure of the system and allow for pressure relief to a safe area;

- All pressure relief systems should vent away from the generator air intake system;

- The Propane vessel shall be filled with sparge pipes in the vapour space to limit reverse flow to the off-loading point as well as preventing vessel stresses due to uneven temperature;

- All instrumentation and electrical equipment shall be specified in accordance to the Hazardous Area classification as per SANS 10108;

- Off-loading of Propane shall be done on a fully-automated system to prevent overfilling;

- Pull away prevention systems such as wheel chocks should be utilised during Propane offloading;

- Off-loading safety systems such as earthling of the road tanker are required;

- Off-loading of Propane shall be done using hoses with breakaway couplings;

- Emergency shutdown (ESD) shall be provided that would automatically shut down systems such as feed or off-loading pumps and emergency shut off valves in the event of an emergency;

- Emergency shutdown should be initiated by local operators, CCGT control room operators as well as by gas detectors where appropriate;

- Multiple pull away prevention measures must be implemented for the Propane road tanker offloading operations. These include wheel chocks, interlock brakes, interlock barriers, etc.; and

- Pull away mitigation measures that stop flow in the event of a pull away must be put in place for the Propane road tanker offloading operations. These include dry break couplings, automatic shutoff valves, etc.

The following protective measures should be put in place to reduce the risks:

- Active or passive fire protection on the Propane storage bullet in line with SANS 10087-3:2015;

- Propane road tanker offloading deluge system to cool equipment in the event of a fire if required by SANS 10087-3:2015;

- Gas detectors with appropriate logic which can initiate emergency shutdown;

- All of the automatic safety systems shall be designed so that they can also be manually activated;

- Procedures should ensure at least one person be present during Propane offloading;

Specific mitigation measures identified by the specialist include:

- Ensuring compliance with applicable South African National Standards (i.e. SANS 10087-3:2015, etc.);

- Incorporating applicable guidelines or equivalent international recognised codes of good design and practice into the designs;

- Completing recognised processes of hazard analysis processes (HAZOP, FMEA, SIL and LOPA etc.) for the proposed CCGT power plant prior to construction to ensure design and operational hazards have been identified and adequate mitigation has been considered;
- Ensure any amendments to the current design specifications are captured in amendments to the EIA and relevant specialist studies; and

- Ensuring a Major Hazard Installation (MHI) risk assessment is carried out for the facility after detailed designs have been completed for the pipelines and CCGT power plant in accordance with the MHI regulations.

Residual

If mitigation measures as described above are implemented, the residual impact significance will change to for the construction phase as described in *Table 8.1* as the only receptors will be workers involved in the construction and operation of the CCGT power plant and their sensitivity is classed as **low.** The residual risk from the operation phase will remain the same.

Table 8.1 Pre- and Post- Mitigation Significance: Quantitative Risk Assessment

Phase and Assessment	**Pre- and Post- Mitigation Significance:**	**Residual Significance (Post-mitigation)**
Construction Phase, Natural Gas Pipelines, LUP Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Construction Phase, Propane Generator, LUP Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Construction Phase, Natural Gas Pipelines and Propane Generator, LSIR Assessment	**MODERATE**	**MODERATE**
Operation Phase, Natural Gas Pipelines, LUP Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Operation Phase, Propane Generator, LSIR Assessment	**NEGLIGIBLE**	**NEGLIGIBLE**
Operation Phase, Natural Gas Pipelines and Propane Generator, LSIR Assessment	**MODERATE**	**MODERATE**

8.1.2 Impact Statement

The findings of the Quantified Risk Assessment for the Saldanha Steel Independent Gas-fired Power Plant indicate that the Project will have negative impacts on the immediate areas around the developments by increasing the risk of a major accident. However the risk levels from the developments are not considered intolerable according to the criteria utilised for this assessment. In addition these risks can be managed through the implementation of the mitigation measures outlined in this QRA, the EIR and other specialist reports

It is, therefore, recommended that the Project be supported subject to the implementation of the mitigation measures outlined in this ***QRA***, the EIR and other specialist reports.

9 CONCLUSIONS

A (QRA) was carried out for the proposed construction of the Saldanha Steel Combined Cycle Gas Turbine (CCGT) power plant. This project includes the construction of two Natural Gas pipelines and a Propane backup electricity generator. The study has shown that the operations have the potential to adversely affect the health and safety of the general public as well as workers within the Saldanha Port area and those workers involved in the construction and operation of the CCGT power plant.

The potential hazards from the proposed project include jet fires, flash fires, vapour cloud and gas cloud explosions, boiling liquid evaporating vapour explosions and fireballs. The risk from these hazards was assessed according to the location specific individual risks (LSIR) of fatality as well as Land Use Planning (LUP) methodologies. An impact assessment was also carried out according to ERM's impact assessment methodology.

The current land uses are considered tolerable from a risk perspective for the proposed development. Future land use around the pipelines' servitude and power plant site should adhere to the restrictions set about by the UK HSE. As the Propane consumption at the power plant site is understood to be highest in the second year of construction, the surrounding land use during this period will be the most restricted.

The location specific individual risk of fatality for persons located indoors and outdoors has also been calculated for the proposed pipelines as well as the proposed Propane generator. During the construction and operational phases of the CCGT power plant project the risks are not considered intolerable. Due to the LSIR level on the CCGT power plant site as well as the area surrounding the site and along the pipelines' servitude, the risk can only be considered tolerable if it can be demonstrated by the site that the risks are As Low As Reasonably Practicable (ALARP).

As the detailed design of the CCGT power plant is not complete at this stage of the project, a risk assessment of the gas receiving station was not completed. However in the event of a release from this equipment a flammable gas cloud explosion was considered possible. This was modelled and found to extend 57m from the centre of the gas receiving area to a dangerous dose overpressure end point. This does not extend beyond the proposed power plant site boundary.

The impact assessment concluded that the pre-mitigation impact significance from a land use planning perspective was **negligible** for the Natural Gas Pipelines and the Propane Generator during both the construction phase and operation phase. The location specific individual risk was **moderate** for the construction phase and **moderate** for the operation phase. The impact significance of the construction and operation phases remained **moderate**

post-mitigation as the impact magnitude remains **high** during both construction and operation.

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19 July 2016

Dear Madam,

RE: REVIEW OF THE QUANTITATIVE RISK ASSESSMENT OF JULY 2016 COMPILED BY ERM CONSULTANTS FOR THE SUPPLY OF NATURAL GAS TO A CCGT AND PROPANE TO A POWER GENERATOR FOR SALDANHA STEEL

1. INTRODUCTION

ISHECON have been approached to review the QRA conducted by ERM on the natural gas supply to a CCGT and the propane supply to a propane power generator to be located in Saldanha Bay providing power to Saldanha Steel. ERM is conducting the EIA for the CCGT project and the authorities have requested an external review of all specialist studies conducted internally by ERM. A quantitative risk assessment has been compiled by ERM for the natural gas supply pipelines from the port and for the offloading, storage and vapourization of propane for the alternative power generation systems.

The review has been specifically asked to address the following questions:

1. Is the ToR acceptable for this specialist study within the context of the proposed project and site location?
2. Is the methodology clearly explained and acceptable?
3. Are the findings acceptable, and scientifically defensible (review data evidence)?
4. Are the mitigation measures and recommendation measures appropriate?
5. Is the literature referenced in the report appropriate?
6. Is the article well-written and easy to understand?
7. Are there any shortcoming to this study? If yes, please describe.

These questions are addressed in detail in the table in ATTACHMENT B and the conclusions of the review are summarized below.

ISHECON is an Approved Inspection Authorities for Major Hazard Installations (See ATTAHCMENT A) and Explosives and we are therefore familiar with QRAs and are competent to review these types of studies.

2. CONCLUSIONS OF THE QRA REVIEW

ISHECON is of the opinion that (refer to ATTAHCMENT B for details):

Ref No	Requirements Against the Risk Assessment	Evaluation - Overall Suitability of Technical Analysis
1	Is the ToR acceptable for this specialist study within the context of the proposed project and site location?	**GAS PIPELINES** The risks posed by the pipeline are in the tolerable range. This means that all reasonably practicable risk reduction measures should be implemented. There is an extensive list of mitigation measures suggested and these could be considered adequate. **Totally adequate.** **PROPANE STORAGE INSTALLATION** The risk results are in the intolerable range within the "restrict access mitigation measure" suggested by ERM. ISHECON would suggest reviewing the risk calculations to ensure ERM have not been overly conservative resulting in the 10 e-4 going off site etc. Also see item 4 below. **Requires additional input**.
2	Is the methodology clearly explained and acceptable?	The methodology follows conventional QRA methodologies. **Totally adequate.**
		Possible domino effects from one gas pipeline to the other should be addressed in some manner. **Requires additional input**.
		Internal ERM Impact assessment cannot be judged. **Requires additional input**.
3	Are the findings acceptable, and scientifically defensible (review data evidence)?	The findings are all defensible. **Totally adequate.**
4	Are the mitigation measures and recommendation measures appropriate?	**GAS PIPELINES** Mitigation measures suggested are extensive and they could be considered adequate. **Totally adequate.** **PROPANE STORAGE FACILITY** It is the opinion of this reviewer that the mitigation measure "to prevent or reduce access to these areas" is not an acceptable solution to a high risk problem. More technical options should be offered or systematically eliminated if not possible. **Requires additional input**.
5	Is the literature referenced in the report appropriate?	All the literature reference is typical for this type of QRA. **Totally adequate.**
6	Is the article well-written and easy to understand?	The report is well written and well presented. **Totally adequate.**
		The internal ERM risk matrix used to derive the assessment evaluation of High, Moderate etc. is not included in the report and hence this section is technically not understandable. **Requires additional input**.
7	Are there any shortcoming to this study? If yes, please describe.	The current assessment excludes the on-site CCGT and propane power generation systems. However, when information become available, the installations need to be included in the QRA to ensure employees risk levels are within the Location Specific Individual Risk criteria. **Requires additional input when design information becomes available**.

ISHECON trusts that this letter provides a clear review of the QRA.

Yours sincerely.

Debra Mitchell Pr.Eng
ISHECON Risk Assessor (See AIA certificate ATTACHMENT A)

ATTACHMENT A – AIA Certificate

CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

ISHECON CC
Co. Reg. No.: 1999/029022/23
MODDERFONTEIN

Facility Accreditation Number: **MHI0008**

is a South African National Accreditation System accredited Inspection Body to undertake **TYPE A** inspection provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation, Annexure "A", bearing the above accreditation number for

THE ASSESSMENT OF RISK ON MAJOR HAZARD INSTALLATIONS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17020:1998

The accreditation demonstrates technical competency for a defined scope and the operation of a quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant SANAS accreditation symbol to issue facility reports and/or certificates

Mr R Josias
Chief Executive Officer

Effective Date: 13 June 2013
Certificate Expires: 12 June 2017

This certificate does not, on its own confer authority to act as an Approved Inspection Authority as contemplated in the Major Hazard Installation Regulations. Approval to inspect within the regulatory domain is granted by the Department of Labour.

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: MHI0008

TYPE A

Permanent Address: ISHECON CC H4 Pinelands Ardeer Road Modderfontein 1645 Tel: (011) 997-7945 Fax: (011) 608-2000 E-mail: rademeyerd@ishecon.co.za	**Postal Address:** P O Box 320 Modderfontein 1645 Issue No.: 06 Date of Issue: 03 April 2014 Expiry Date: 12 June 2017	
Nominated Representative: Mr DJE Rademeyer	**Quality Manager:** Ms DC Mitchell **Technical Manager:** Mr DJE Rademeyer	**Technical Signatories:** Mr DJE Rademeyer Ms DC Mitchell Mr NN Coni

Field of Inspection	Service Rendered	Codes and Regulations
Regulatory: The supply of services as an inspection authority for Major Hazard Risk Installation as defined in the Major Hazard Risk Installation Regulations, Government Notice No. R692 of 30 July 2001	1) Explosive chemicals 2) Gases: i) Flammable Gases ii) Non-flammable, non-toxic gases (asphyxiants) iii) Toxic gases 3) Flammable liquids 4) Flammable solids, substances liable to spontaneous combustion, substances that on contact with water release flammable gases 5) Oxidizing substances and organic peroxides 6) Toxic liquids and solids	MHI regulation par. 5 (5) (b) i) Frequency/Probability Analysis ii) Consequence Modelling iii) Hazard Identification and Analysis iv) Emergency planning reviews Risk Analysis in the Process Industries, IChemE 1985 Guidelines for Chemical Process Quantitative Risk Analysis, Second Ed. 2000 Guidelines for Quantitative Risk Assessment "Purple Book" CPR 18E, First Ed. 1999 A Guide for the Control of Major Accident Hazard Regulations 1999, UK HSE

Original Date of Accreditation: 15 June 2005

Page 1 of 1

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Field Manager

ATTACHMENT B – Tabular Evaluation

Table Evaluating the Report against the Requirement of the Review

Ref No	Requirements Against the Risk Assessment	Evaluation - Overall Suitability of Technical Analysis
1	Is the ToR acceptable for this specialist study within the context of the proposed project and site location?	**GAS PIPELINES** When compared to QRA results from ISHECON studies of similar high pressure natural gas systems, the risk results are comparable, i.e. 10 e-6 extending a few tens of meters on either side and the 10 e-7 extending about 100 – 150 m. The risk results therefore seem overall technically correct. The risks posed by the pipeline are in the tolerable range. This means that all reasonably practicable risk reduction measures should be implemented. There is an extensive list of mitigation measures suggested and these could be considered adequate. **Totally adequate.** **PROPANE STORAGE INSTALLATION** When compared to QRA results from ISHECON studies of similar LPG gas offloading and storage systems, the results are comparable. The impact zone of 150m or so for jet fires/fire balls is comparable, as is the flash fire range of about 500m. The risk results generated by ERM are, if anything, conservative with the 10 e-6 risk contour extending 500m. ISHECON would likely have found lower risks with the 10 e -6 extending 200m at most. However, ISHECON would have insisted on excess flow valves, ROSOVS etc. in the design and taken credit for these in the risk calculation by adjusting both the magnitude and frequency of events. This is possibly the reason for the more conservative ERM results. With high turnovers of gas and no specific hose isolation features, a 10 e -3 risk contour on site is expected and ISHECON would have generate comparable results. Conservative results at this stage are no concern to the project except that it means the risk results come out as intolerably high and mitigation needs to be specified. See item 4 below for further discussion. ISHECON would suggest reviewing the risk calculations to ensure ERM have not been overly conservative resulting in the 10 e-4 going off site etc. **Requires additional input**.

Ref No	Requirements Against the Risk Assessment	Evaluation - Overall Suitability of Technical Analysis
2	Is the methodology clearly explained and acceptable?	The methodology for determining Location Specific Individual Risk and for assessing Land Use Planning implications are well explained and follow conventional QRA methodologies. **Totally adequate.**
		There is no mention of possible domino effects from one gas pipeline to the other. It would appear that the plan is that they will never be in use at the same time. However, this should be stated as a limitation of the application of the QRA, or domino effects should be included in the frequency analysis and possibly the consequence analysis. **Requires additional input**.
		The section on the Internal ERM Impact assessment does follow a typical risk matrix type approach but in the absence of the original matrix criteria cannot be judged. See item 6 below. **Requires additional input**.
3	Are the findings acceptable, and scientifically defensible (review data evidence)?	The findings are all defensible, as the methodology used for the calculations is internationally accepted good practice and the criteria used to judge the calculations are also internationally accepted good practice. **Totally adequate.**
4	Are the mitigation measures and recommendation measures appropriate?	**GAS PIPELINES** Mitigation measures suggested are extensive, and given that the risks in the ALARP range, they could be considered adequate. **Totally adequate.** **PROPANE STORAGE FACILITY** The list of technical and management systems mitigation measures is extensive and they should be applied as most of them are standard requirements for any propane installation. However, the ERM calculation of location specific individual risks results in the conclusion that both on site and off site risks are in tolerably high. ERM then concludes that a suitable further mitigation measure is to prevent or reduce access to these areas. It is the opinion of this reviewer that this mitigation measure is not an acceptable solution to a high risk problem. The risk assessment should at least indicate the technical reasons for the high risks and home in on specific equipment. Probably it is due either the hose failure frequency due to high delivery rate, or possibly the vaporizer with its high failure

Ref No	Requirements Against the Risk Assessment	Evaluation - Overall Suitability of Technical Analysis
		rate. If it is the hose failure rate, then one cannot suggest reducing access when one simultaneously suggests there must be someone present during offloading. If it is not technically possible to reduce the risks with for example higher than normal integrity hoses, excess flow valves, ROSOVS, ASOVS, larger tank and road tanker with lower deliver frequency, electric heater instead of shell and tube vapourizer etc. then the QRA should state that no additional risk reduction measures could be developed and therefore the assessor concludes that the only option is to try and limit access and in that manner all reasonably practicable measures have been implemented. **Requires additional input**.
5	Is the literature referenced in the report appropriate?	All the literature referenced is typical for this type of QRA. Given the absence of South African standards, the UK HSE systems are applied throughout South Africa, reference to the UK failure data, pipeline guidelines, risk assessment and land use planning methods is therefore entirely appropriate. **Totally adequate.**
6	Is the article well-written and easy to understand?	The report is well written and well presented. QRA is a highly technical subject and therefore not easy to convey in "layman's" terms. However, at least the summary should be easily understandable. The Summary and its conclusions section are easy to understand. The technical sections of the report are easily understandable to the reviewer. **Totally adequate.**
		The Summary section titled impact assessment is not easy to follow (see comment below). The internal ERM risk matrix used to derive the assessment evaluation of High, Moderate etc. is not included in the report and hence this section is technically not understandable. Suggestion – include the matrix with a brief description to allow this QRA document to stand on its own, or at least refer to another EIA document where it is included. **Requires additional input**.
7	Are there any shortcoming to this study? If yes, please describe.	The current assessment excludes the on-site CCGT and propane power generation systems. The expected worst case explosion scenario for each of these facilities has been modelled and the report indicates that these explosions will not extend offsite. The implication of this is that these installations are unlikely to pose intolerable public risks and that the exclusion of them at this stage is unlikely to become a major offsite risk concern at a later stage. This seems reasonable to the reviewer. However, when information become available, the installations need to be included in the QRA to ensure employees risk

Ref No	Requirements Against the Risk Assessment	Evaluation - Overall Suitability of Technical Analysis
		levels are within the Location Specific Individual Risk criteria. **Requires additional input when design information becomes available**.

.....The End.....

Memo

ERM Johannesburg
Telephone +27 11 798 4300

Ref/Project number	0315829 – EIA for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay
Subject	ERM's response to comments from the Independent Peer Review conducted on the quantitative risk assessment (QRA) specialist study
Date	19 July 2016

ERM Southern Africa (Pty) Ltd appointed ISHECON CC to conduct an independent peer review of the Quantitative Risk Assessment (QRA) for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay, as part of the Environmental Impact Assessment (EIA) being conducted for ERM's client (ArcelorMittal).

A limited peer review was provided by ISHECON, in which several points were raised which required additional input within the QRA report (shown below, with the particular peer review question in bold). This memo contains ERM's response to the specific requirements for additional input contained within the peer review report.

1. Is the ToR acceptable for this specialist study within the context of the proposed project and site location?

When compared to QRA results from ISHECON studies of similar LPG gas offloading and storage systems, the results are comparable.

The impact zone of 150m or so for jet fires/fire balls is comparable, as is the flash fire range of about 500m.

The risk results generated by ERM are, if anything, conservative with the 10 e-6 risk contour extending 500m. ISHECON would likely have found lower risks with the 10 e-6 extending 200m at most. However, ISHECON would have insisted on excess flow valves, ROSOVS etc. in the design and taken credit for these in the risk calculation by adjusting both the magnitude and frequency of events. This is possibly the reason for the more conservative ERM results. With high turnovers of gas and no specific hose isolation features, a 10 e-3 risk contour on site is expected and ISHECON would have generate comparable results.

Conservative results at this stage are no concern to the project except that it means the risk results come out as intolerably high and mitigation needs to be specified. ISHECON would suggest reviewing the risk calculations to ensure ERM have not been overly conservative resulting in the 10 e-4 going off site etc.

ERM Response:

ERM have reviewed the Propane offloading hose failure scenarios and incorporated failure data which ensures multiple pullaway prevention and mitigation measures. These measures have also been included in the assumptions as well as the recommendations sections, as the revised risk levels are only relevant when such measures are incorporated.

The resulting risk levels showed a large reduction in the risk contours during the construction phase. As such the LSIR for individuals not involved in the construction and operation of the CCGT power plant was not found to be intolerable. Similarly the LSIR for workers was also not found to be intolerable. These revised results have been incorporated into the risk assessment.

2. Is the methodology clearly explained and acceptable?

There is no mention of possible domino effects from one gas pipeline to the other. It would appear that the plan is that they will never be in use at the same time. However, this should be stated as a limitation of the application of the QRA, or domino effects should be included in the frequency analysis and possibly the consequence analysis.

ERM Response:

ERM have included a section of the report to cater for escalation / domino effects. This section deals with the Natural Gas pipelines and Propane installations separately.

ERM has concluded that for the natural gas pipelines, the escalation effects are unlikely to result in a more severe consequence than the initiating event. For the Propane installations, a prolonged fire could result in a Propane vessel or Propane road tanker boiling liquid evaporating vapour explosion (BLEVE). It is understood the failure data used for the risk assessment includes the consideration of typical equipment found in the vicinity of pressurised flammable vapour vessels. Furthermore recommendations in the report require an operator to be present, as well as require adequate fire detection equipment such that appropriate action can be taken in order to prevent sustained flame impingement on the Propane vessel or road tanker.

3. Is the methodology clearly explained and acceptable?

The section on the Internal ERM Impact assessment does follow a typical risk matrix type approach but in the absence of the original matrix criteria cannot be judged.

ERM Response:

The ERM Risk Matrix appears in the Environmental Impact Assessment report and was distributed to the specialists.

4. Are the mitigation measures and recommendation measures appropriate?

The list of technical and management systems mitigation measures is extensive and they should be applied as most of them are standard requirements for any propane installation.

However, the ERM calculation of location specific individual risks results in the conclusion that both on site and off site risks are in tolerably high. ERM then concludes that a suitable further mitigation measure is to prevent or reduce access to these areas.

It is the opinion of this reviewer that this mitigation measure is not an acceptable solution to a high risk problem.

The risk assessment should at least indicate the technical reasons for the high risks and home in on specific equipment. Probably it is due either the hose failure frequency due to high delivery rate, or possibly the vaporizer with its high failure rate. If it is the hose failure rate, then one cannot suggest reducing access when one simultaneously suggests there must be someone present during offloading.

If it is not technically possible to reduce the risks with for example higher than normal integrity hoses, excess flow valves, ROSOVS, ASOVS, larger tank and road tanker with lower deliver frequency, electric heater instead of shell and tube vapourizer etc. then the QRA should state that no additional risk reduction measures could be developed and therefore the assessor concludes that the only option is to try and limit access and in that manner all reasonably practicable measures have been implemented.

ERM Response

The evaluation of the failure data used in the Propane installation risk assessment and subsequent recommendation for more stringent Propane road tanker offloading pullaway prevention, as stated in Point 1, has the effect of reducing the risk from the Propane installation. The resulting risk is not intolerable to individuals offsite or to workers onsite.

The provision for Propane road tanker offloading pullaway prevention and mitigation measures has been included as a recommendation.

5. Is the article well-written and easy to understand?

The Summary section titled impact assessment is not easy to follow (see comment below).

The internal ERM risk matrix used to derive the assessment valuation of High, Moderate etc. is not included in the report and hence this section is technically not understandable. Suggestion – include the matrix with a brief description to allow this QRA document to stand on its own, or at least refer to another EIA document where it is included.

ERM Response

The ERM Risk Matrix appears in the Environmental Impact Assessment report and was distributed to the specialists.

6. Are there any shortcoming to this study? If yes, please describe.

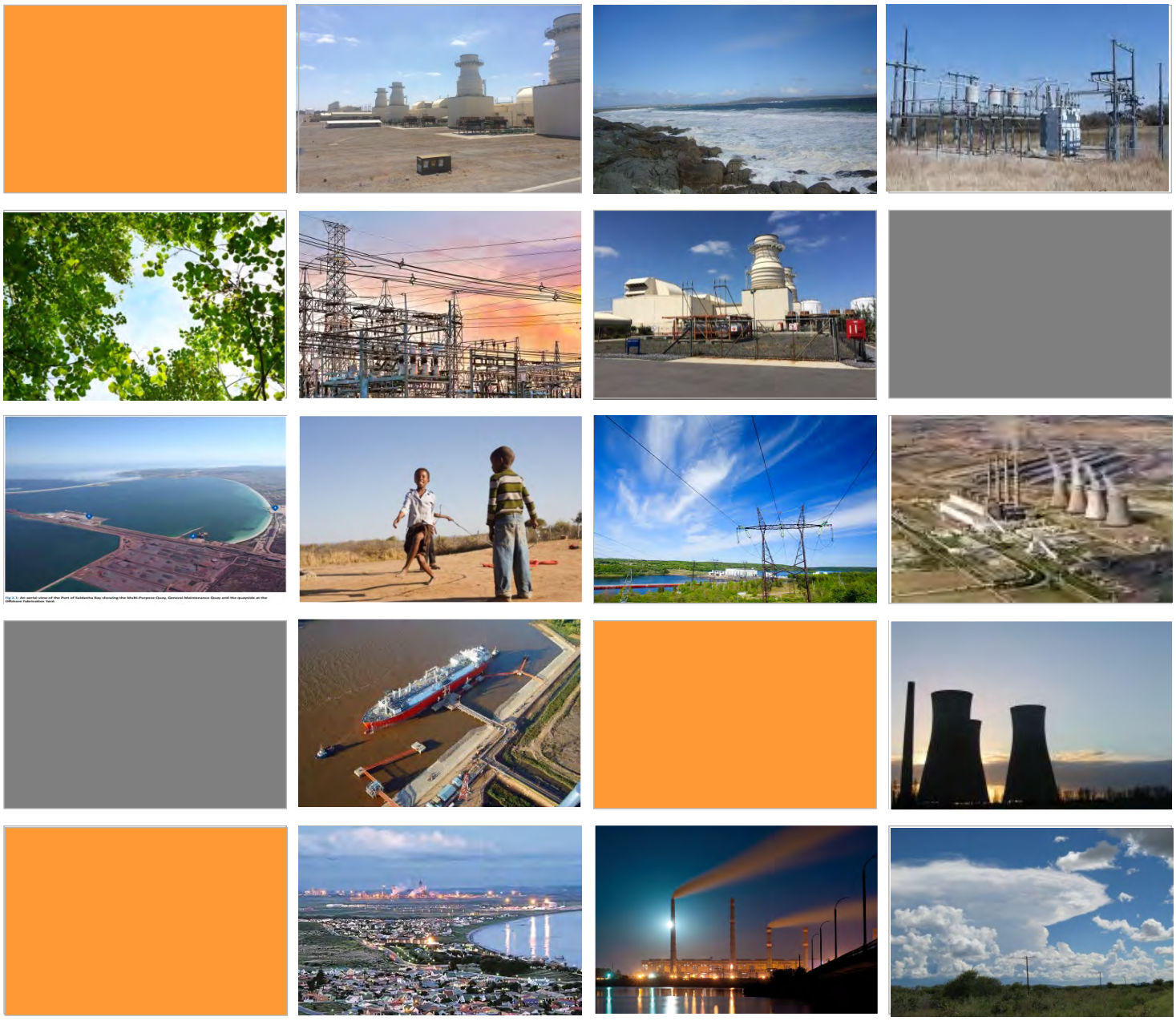
The current assessment excludes the on-site CCGT and propane power generation systems.

The expected worst case explosion scenario for each of these facilities has been modelled and the report indicates that these explosions will not extend offsite. The implication of this is that these installations are unlikely to pose intolerable public risks and that the exclusion of them at this stage is unlikely to become a major offsite risk concern at a later stage. This seems reasonable to the reviewer.

However, when information become available, the installations need to be included in the QRA to ensure employees risk levels are within the Location Specific Individual Risk criteria.

ERM Response

ERM have recommended that a further quantitative risk assessment be carried out after detailed design has been completed. These considerations can be more readily accommodated after these details are available.



ArcelorMittal

Social Impact Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Draft Report

ArcelorMittal

September 2016

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The business of sustainability

Socio-economic Study for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Environmental Resources Management

Draft Report

Client: ArcelorMittal	Project No: 0315829
Summary and version history: V2 Compiled by: Lindsey Bungartz Reviewed by: Belinda Ridley Peer Reviewed by: Kerryn McKune-Desai	
1	Draft Socio-economic Study

Distribution: For inclusion in the EIA for the Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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List of Abbreviations and Terms

BAR	Basic Assessment Report
BFS	Bankable Feasibility Study
CBA	Critical Biodiversity Area
CCGT	Combined Cycle Gas Turbine
CFR	Cape Floristic Region
CNG	Compressed Natural Gas
CWDM	Cape Winelands District Municipality
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DOE	Department of Energy
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EPC	Engineering Procurement Construction
ERA	Electricity Regulations Act
ERM	Environmental Resources Management
GDPR	Regional Gross Development Product
GJ	Giga Joules
GNR	Government Notice Regulation
GUMP	Gas Utilisation Master Plan
HP	High Pressure
HFO	Heavy Fuel Oil
HRSG	Heat Recovery Steam Generator
HV	High Voltage
IDZ	Industrial Development Zone
HWC	Heritage Western Cape
IPCSA	International Power Consortium South Africa
IPPPP	Independent Power Producers Procurement Programme
IRP	Integrated Regional Plan
LNG	Liquefied Natural Gas
LP	Low Pressure
NCDM	Northern Cape District Municipality
NDP	National Development Plan
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMWA	National Environmental Management: Waste Act
NEMAQA	National Environmental Management: Air Quality Act
NEMICMA	National Environmental Management: Integrated Coastal Management Act
NERSA	National Energy Regulator of South Africa
NID	Notice of Intent to Develop
OCGT	Open Cycle Gas Turbine
PCS Africa	Power & Combustion Services Africa
SAHRA	South African Heritage Resources Agency
SDFP	Spatial Development Framework Plan
S&EIR	Scoping and Environmental Impact Report

TNPA	Transnet National Ports Authority
WCDM	West Coast District Municipality
WML	Waste Management Licence

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The International Power Consortium South Africa (IPCSA), have developed a solution to Saldanha Steel's requirement for stable, economical electricity over the long term. This solution consists of a 1507 MW Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the completion of the Bankable Feasibility Study (BFS).

The project will support both Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) as its main fuel supply and will consume about -76 million Giga Joules (GJ) of natural gas per year. CNG and LNG could be supplied by ship to the Port of Saldanha, where it will be offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha. Initial discussions have been held with Transnet National Ports Authority (TNPA) in Saldanha in this regard.

The project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160 MW of base load energy, peaking up to 250 MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

1.2 TERMS OF REFERENCE

The approach to this Socio-economic Study has been guided by the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). The terms of reference for the Socio-economic Study are:

- Undertake site visit to confirm the Area of Influence, extent of engagement around baseline data gathering.
- Legal review, including local regulatory requirements, IFC Performance Standards and other relevant local and international regulations, including permit requirements.
- Attend key stakeholder meetings to understand key social and health issues/ concerns.
- Compile a scoping socio-economic and health baseline, based on secondary data, gathered from publically available sources.

- Gather relevant primary socio-economic data through key informant interviews, focus groups discussions and stakeholder engagement.
- Update socio-economic and health baseline with primary data gathered from primary data gathering.
- Identify and assess potential social and health impacts using the ERM Standard.
- Assess cumulative impact of development with current and planned developments in the area.
- Draft mitigation measures will be drafted and incorporated into the Environmental and Social Management Plan.

1.3 CONTENTS OF THE SPECIALIST REPORT CHECKLIST

The contents of this report has been prepared in terms of Regulation GNR 982 of 2014, Appendix 6, as shown in *Table 1.1.*

Table 1.1 Specialist Report Checklist

Contents of this report in terms of Regulation GNR 982 of 2014, Appendix 6	**Cross-reference in this report**
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.7 and Annex A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.7
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.2
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not applicable
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 1.4
(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 5
(g) an identification of any areas to be avoided, including buffers;	None
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Not Applicable
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.6
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 6
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 9
(p) any other information requested by the competent authority.	Not Applicable

1.4 STUDY APPROACH AND METHODOLOGY

The Socio-economic Impact Assessment (SIA) will serve to investigate, evaluate and understand the potential socio-economic impacts associated with the proposed Project. The SIA was undertaken in accordance with the requirements of the National Environmental Management Act and

associated guidelines, as well as the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007).

The Social Study was divided into the following three Phases:

- Phase 1: Desktop Study;
- Phase 2: Fieldwork; and
- Phase 3: Update Socio-economic Baseline and Impact Assessment.

Phase 1: Desktop Study

The desktop component of the study has drawn on the use of secondary data sourced from previous project reports, as well as other Internet-based sources including:

- District and Local Municipality Integrated Development Plans;
- District and Local Municipality Spatial Development Frameworks;
- Statistics South Africa 2010 Census;
- Other similar EIAs undertaken in the Saldanha Bay Area; and
- Other EIAs undertaken for gas-fired power plants in South Africa.

The information collected through desktop research included: demographic (including human settlements on affected properties), economic, health and education information as well as the availability of physical infrastructure and services. The purpose of collecting this information was to provide a basis upon which the impact assessment can be conducted, and to enable the measurement and monitoring of the impacts.

Through a review of the existing documentation, gaps in information were identified to be addressed through primary data collection, as outlined in Phase 2 and via drawing on any additional sources of secondary data that were identified during the course of the study.

Phase 2: Fieldwork and Primary Data Collection

In order to gather clear and current information for the baseline and impact assessment, a field visit was undertaken. The field visit was undertaken at the same time as the first public meeting (February 2016). This afforded the social consultants the opportunity to engage with the relevant community members and authorities, as well as get a general sense of the stakeholder issues.

Where the relevant stakeholders were not available at the time of the site visit, telephonic interviews were conducted.

Phase 3: Update Socio-economic Baseline and undertake Impact Assessment

The socio-economic baseline from the Scoping Report was updated using the secondary and primary data collected in Phase 2. The findings of the public consultation process were also incorporated into the baseline in order to ensure that it accurately describes the current situation and needs of the local communities.

Additional specialist studies used to inform this SIA include:

- Air Quality Study uMoya - NILU Consulting (Pty) Ltd, 2016.
- Noise Impact Assessment - Enviro Acoustic Research cc, 2016.
- Traffic Impact Assessment – Kantey and Templer, 2016.
- Cultural and Heritage Report - ACO and Associates, 2016.

The Social Specialist has identified potential positive and negative – direct, indirect, induced and cumulative – impacts associated with the Project. The identification of impacts was informed by the baseline study and the public consultation process. The findings of other specialist impact assessment studies have been reviewed and used to inform the impact assessment component of the SIA where appropriate.

Feedback from stakeholders, primarily received during the Scoping Phase was used to inform the impact assessment.

The identified impacts will be assessed using the methodology provided by ERM, as outlined in *Section 1.5*, below

1.5 IMPACT ASSESSMENT METHODOLOGY

This *Section* provides an overview of the assessment methodology used to assess the environmental and social impacts associated with the construction, operation and decommissioning phases of the Project.

The identified impacts presented within this *section* have been assessed according to this methodology which includes a description of the impact, subsequent assessment, mitigation measures and finally the residual impact after the application of these mitigation measures.

Impact identification and assessment starts with scoping. Interactions with the potential for significant effects were subjected to a detailed impact assessment. The principal ESIA steps are summarised in *Figure 1.1* and comprise the following.

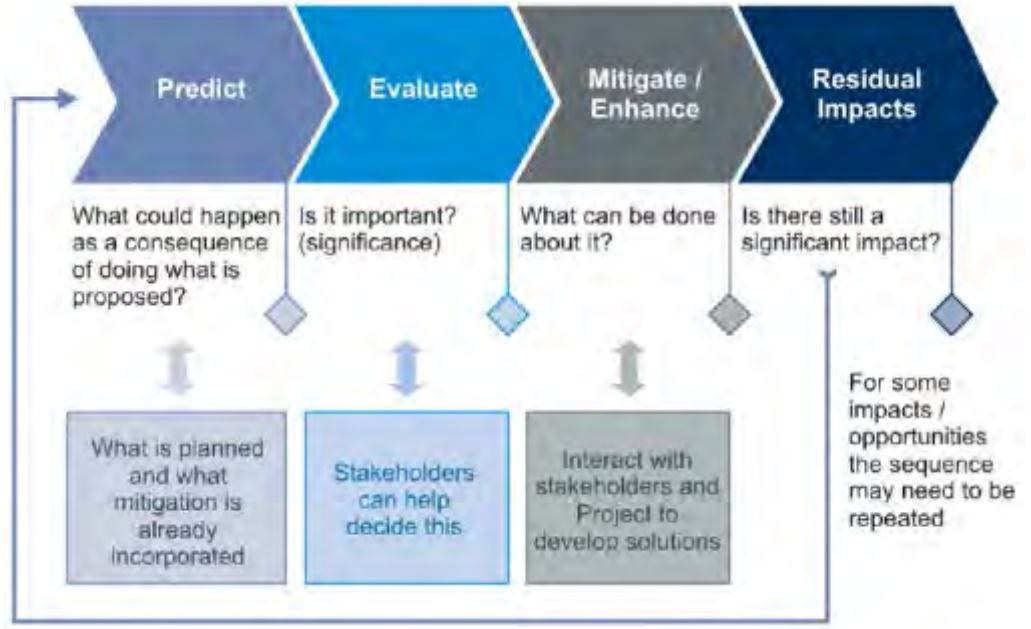
- **Impact prediction:** to determine what could potentially happen to resources or receptors as a consequence of the Project and its associated activities.

- **Impact evaluation:** to evaluate the significance of the predicted impacts by considering the magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource or receptor.

- **Mitigation and enhancement:** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.

- **Residual impact evaluation:** to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

Figure 1.1 Environmental Impact Assessment Process



1.5.1 Impact Prediction

Prediction of impacts is an objective process to determine what is likely to happen to the environment as a consequence of the Project and associated activities. From the potentially significant interactions identified in scoping, the impacts to the various resources/receptors are elaborated and evaluated. The diverse range of potential impacts considered in the IA process typically results in a wide range of prediction methods being used, including quantitative, semi-quantitative and qualitative techniques.

1.5.2 Impact Evaluation

Environmental impacts arise as a result of Project activities either interacting with environmental receptors directly or causing changes to the existing environment such that an indirect effect occurs. Impacts may be described and quantified in a number of ways.

Nature of Impact

The nature of an impact is defined as the type of change from baseline conditions or the introduction of a new desirable or undesirable factor. The nature of an impact is described as being either **positive** or **negative**.

Type of Impact

Impact type indicates the relationship of the impact to the Project activity in terms of cause and effect, as either:

- **Direct impact** resulting from the direct interaction between a project activity and the receiving environment.
- **Indirect impact** between the proposed activity and the environment as a result of subsequent interactions within the environment.
- **Induced impact** resulting from other non-project activities that happen as a consequence of the Project activities.
- **Cumulative impacts** that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

Extent of Impact

Impact extent relates to the geographic reach of the impact and is described in *Table 1.2*

Table 1.2 Determining Extent

Designation	Description
Local	**Impact would affect local resources or receptors and would be restricted to a single community (ie impacts in the footprint of project activities and the immediate adjacent area).**
Regional	Impact would affect regional resources or receptors and would be experienced at a regional scale for example at a Provincial level.
National	Impact would affect resources or receptors throughout the country.
International	International impact would affect internationally important resources or receptors outside of the country.
Trans-boundary	Impact would be those that are experienced in one country as a result of activities in another country.

Duration of Impact

Impact duration refers to the time period over which a resource or receptor will be affected described in *Table 1.3.*

Table 1.3 Determining Duration

Designation	Description
Temporary	Impacts would last for a short duration, are reversible and intermittent or occasional in nature. The resource or receptor would return to the previous state when the effect ceases or after a short period of recovery, typically less than one year.
Short-term	Impacts would last for the life of the proposed short term activity activities and a limited short period thereafter, typically one to four years. The impact would cease when the effect ceases following a short period of recovery.
Long-term	Impacts would continue for an extended period of time after the Project activity, for example between five and 15 years.
Permanent	Impacts would occur during the development of the Project and cause a permanent change in the affected receptor or resource that endures substantially beyond the Project lifetime.

Scale of Impact

Impact scale relates to the size of the impact, in a social context it typically relates to the degree of change experienced by receptors, either at an individual or household level.

Table 1.4 Determining Scale

Designation	Description
Small	Impact would result in a subtle change in baseline conditions.
Medium	Impact would result in some change to baseline conditions within a community, but would not dominate over baseline conditions.
Large	Impact would result in a fundamental change in the way of life of receptors, or to the nature of relationships within a community, or to the livelihood patterns within a community.

Frequency of Impact

Impact frequency relates to the constancy or periodicity of the impact. This could be a once off occurrence or continuous. The designations used in the this Impact Assessment are as follows:

- **Constant** a permanent occurrence
- **Often** occurs at least once a month
- **Occasional** occurs at least once every six months
- **Rare** occurs about once a year
- **One-off** could occur, but reasonably expected to occur only once.

Magnitude of Impact

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent;
- Duration;
- Scale; and
- Frequency.

Additionally, for unplanned events only, magnitude incorporates the *likelihood* factor. An unplanned event is defined as 'a reasonably foreseeable event that is not planned to occur as part of the Project, but which may conceivably occur as a result of Project activities (eg accidents), even with a low probability'. These differ from planned events which are activities which are expected to occur as part of the normal Project development and operation. The *likelihood* of an unplanned event occurring is designated using a qualitative scale:

- **Unlikely** events are unlikely but may occur at some time during normal operating conditions.

- **Likely** events are likely to occur at some time during normal operating conditions.

- **Definite** events will occur during normal operating conditions (ie, it is essentially inevitable).

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. Magnitude designations themselves are universally consistent, but the descriptions for these designations vary on a resource/receptor-by-resource/receptor basis. The magnitude designations are described in *Table 1.5*.

Table 1.5 Describing Magnitude

Designation	Description
Positive	In the case of positive impacts, no intensity is assigned unless there is ample data to support a more robust characterisation. It is sufficient to indicate that the Project will result in a positive impact, without characterising the exact degree of positive change likely to occur.
Negligible	A difference from baseline conditions is marginally perceptible.
Small	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of households and is of a short duration.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of medium duration. Frequency may be occasional and impact may be regional in scale.

Designation	Description
Large	Change dominates over baseline conditions. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.

Vulnerability

The vulnerability of receptors is underpinned by a low existing level of livelihoods assets (such as health or education) or inadequate access to structures and processes to protect or improve livelihoods. It is important to understand the vulnerability context as it will affect the ability of social receptors to adapt to socio-economic/cultural or bio-physical changes. A higher level of vulnerability can result in increased susceptibility to negative impacts or a limited ability to take advantage of positive impacts. A project may also exacerbate existing vulnerabilities if the status of individuals and communities and their coping mechanisms are not adequately understood or considered. The vulnerability designations are described in *Table 1.6*.

Table 1.6 Describing Vulnerability

Receptor Vulnerability	Description
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.
Medium	Some, but few areas of vulnerability; still retaining an ability to at least in part adapt to change brought by the Project and opportunities associated with it.
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project and opportunities associated with it.

Evaluation of Significance

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance can be assigned for each impact.

For the purposes of this ESIA, the following definition of significance has been adopted:

> *An impact is significant if, in isolation or in combination with other impacts, it should, in the judgement of the EIA team, be taken into account in the decision-making process, including the identification of mitigation measures and consenting conditions.*

In assessing whether an impact is significant, reference has been made, where appropriate, to criteria on which the evaluation is based. These may include legal standards, policy guidance or accepted practice and past experience.

The significance of impacts is then devised from a combination of the vulnerability of the receptor and the magnitude of impact. A convenient way of representing the overall significance is through a matrix of magnitude versus sensitivity or vulnerability/value as shown in *Table 1.7*.

Table 1.7 Overall Significance Criteria for Environmental Impacts in the ESIA

Evaluation of Significance		**Sensitivity/Vulnerability/Importance of Resource/Receptor**		
		Low	**Medium**	**High**
Magnitude of Impact	**Small**	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major
	Positive Impacts			
	Positive	Minor	Moderate	Major

For this assessment, five impact significance categories have been applied:

- Positive impact;
- *Negligible* impact;
- *Minor* significance;
- *Moderate* significance; and
- *Major* significance.

These general definitions of Categories of Impact Significance have been applied to the assessment of social and environmental impacts for the Project as shown in *Box 1.1*

Box 1.1 Categories of Impact Significance

Positive Positive impacts provide resources or receptors, most often people, with positive benefits. It is noted that concepts of equity need to be considered in assessing the overall positive nature of some impacts such as economic benefits, or opportunities for employment.
Negligible Negligible impacts are where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor An impact of minor significance ('Minor impact') is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate An impact of moderate significance ('Moderate impact') is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP. This does not necessarily mean that 'Moderate' impacts have to be reduced to 'Minor' impacts, but that moderate impacts are being managed effectively and efficiently.
Major An impact of major significance ('Major impact') is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of EIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (ie ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones such as employment, in coming to a decision on the Project.

Mitigation and Enhancement

Mitigation and/or enhancement measures are identified for significant impacts identified during the impact evaluation stage. These measures represent a feature, procedure or other action that the Project commits to implement to avoid or reduce the magnitude of an adverse impact, or to enhance the magnitude of a positive impact. As such, these should avoid unnecessary damage to the environment; safeguard valued or finite resources, natural areas, habitats and ecosystems; and protect humans and their associated social environments.

Residual Impact Evaluation

The residual impacts are described in terms of their significance and the nature of the impact is qualified, where appropriate, on the basis of the descriptors, within each of the impact assessment sections presented within this *Chapter*. The criteria take into account the degree to which impacts can be quantified and compared with accepted limits and standards or a combination

of the magnitude of change caused by the Project in combination with the value/sensitivity of the receptor/resource that is impacted.

Dealing with Uncertainty in the Assessment of Impacts

The impact assessment process deals with the future and there is inevitably uncertainty that arises between the predictions made and what will actually happen during the course of the Project. However, the sources of impacts for LCO and gas fired power plants are well-understood and the areas of interaction with the receiving environment have been well-characterised by past projects.

Impact predictions have, wherever practicable, been made using available data, but where significant uncertainty remains, this is outlined in the text. Where the vulnerability of a resource and impact magnitude is not supported by quantitative data, this is reported accordingly and qualitative information, professional experience and a conservative approach is used instead to judge whether a significant impact is likely to occur or not.

1.6 ASSUMPTIONS AND LIMITATIONS

Demographic data has been primarily gathered from official sources such as the South African Census 2011 and Provincial Reports. It must be noted that the Census was conducted six years ago, and at the time this report was draft, the 2016 Community Survey results were not available. Where possible, therefore, secondary data has been verified with primary data.

It is assumed the Project information provided is accurate and design is compliant with building regulations.

It is assumed that the feasibility of the Project has been assessed by the proponent.

It is assumed all stipulated mitigation measures will be implemented to avoid and reduce the respective negative impacts and enhance positive impacts.

1.7 SPECIALIST DETAILS

Lindsey Bungartz is a Senior Consultant within ERM's Impact Assessment and Planning Team based in South Africa's Cape Town office. Lindsey has nine years of experience in the Environmental Consulting field, five of which have been focused on Social Impact Assessment where she has been responsible for primary and secondary information gathering, baseline compilation, impact identification/ assessment, and formulation of mitigation and management measures. Lindsey has extensive experience in the power sector (renewable energy, hydropower, transmission), and has experience in the mining, oil and gas sectors. Through her experience in the power

sector, Lindsey has developed a deep understanding of the impacts (both adverse and beneficial) energy projects can have on surrounding communities. She is familiar with the requirements and implementation of both the IFC Performance Standards and the Equator Principles (including IFC PS 2012). Lindsey has worked on project with complex social impacts, with highly sensitive affected communities.

She has worked on projects which have required multiple stakeholder (including multiple localities and individuals) engagement and collection of primary data, where she has been instrumental in designing and implementing socio-economic primary data collection tools including household surveys, focus group discussion and one-to-one interview questionnaires. She has worked extensively in South Africa and in various African including Malawi, Ghana, Zambia and Zimbabwe. In addition, Lindsey has undertaken several Environmental Impact Assessments (EIAs) at existing facilities and green field sites in South Africa. Her responsibilities included project management, integration of specialist studies and public participation activities.

1.7.1 Declaration of Independence

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for environmental authorisation National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

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E-mail:	stephan.vandenberg@erm.com		

4.2 The specialist appointed in terms of the Regulations_

I _____ Lindsey Bungartz, declare that -

- General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

ERM
Name of company (if applicable):

13 July 2016
Date:

2 PROJECT DESCRIPTION

The description of the Project that follows is focus on aspects of the project description relevant to the assessment of socio-economic impacts. A detailed project description can be found in Chapter 3 of the EIR.

2.1 PROJECT BACKGROUND

The IPCSA, have developed a solution to Saldanha Steel's requirement for stable, economical electricity over the long term. This solution consists of a 1507 MW (net capacity) Combined Cycle Gas Turbine (CCGT) power plant to be erected adjacent to the ArcelorMittal's Saldanha Steel site.

ArcelorMittal and IPCSA have signed a Power Generation and Natural Gas Project Development and Pre-Off Take Agreement that binds both parties to certain deliverables in developing the project up to the Bankable Feasibility Study (BFS) completion.

The project is primarily a power supply project to the Saldanha Steel Plant. Additionally, the proposed power plant will tie into the Department of Energy's (DoE) Gas to Power (G2P) programme (1). The project will support Liquefied Natural Gas (LNG) as its main fuel. LNG will be supplied by ship to the Port of Saldanha, where it will be regasified and then offloaded via a submersible pipeline either from a mooring area located off shore or a berthing location in the Port in Saldanha. Initial discussions have been held with Transnet National Ports Authority (TNPA) in Saldanha in this regard.

The project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160 MW of base load energy, peaking up to 250 MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape Province.

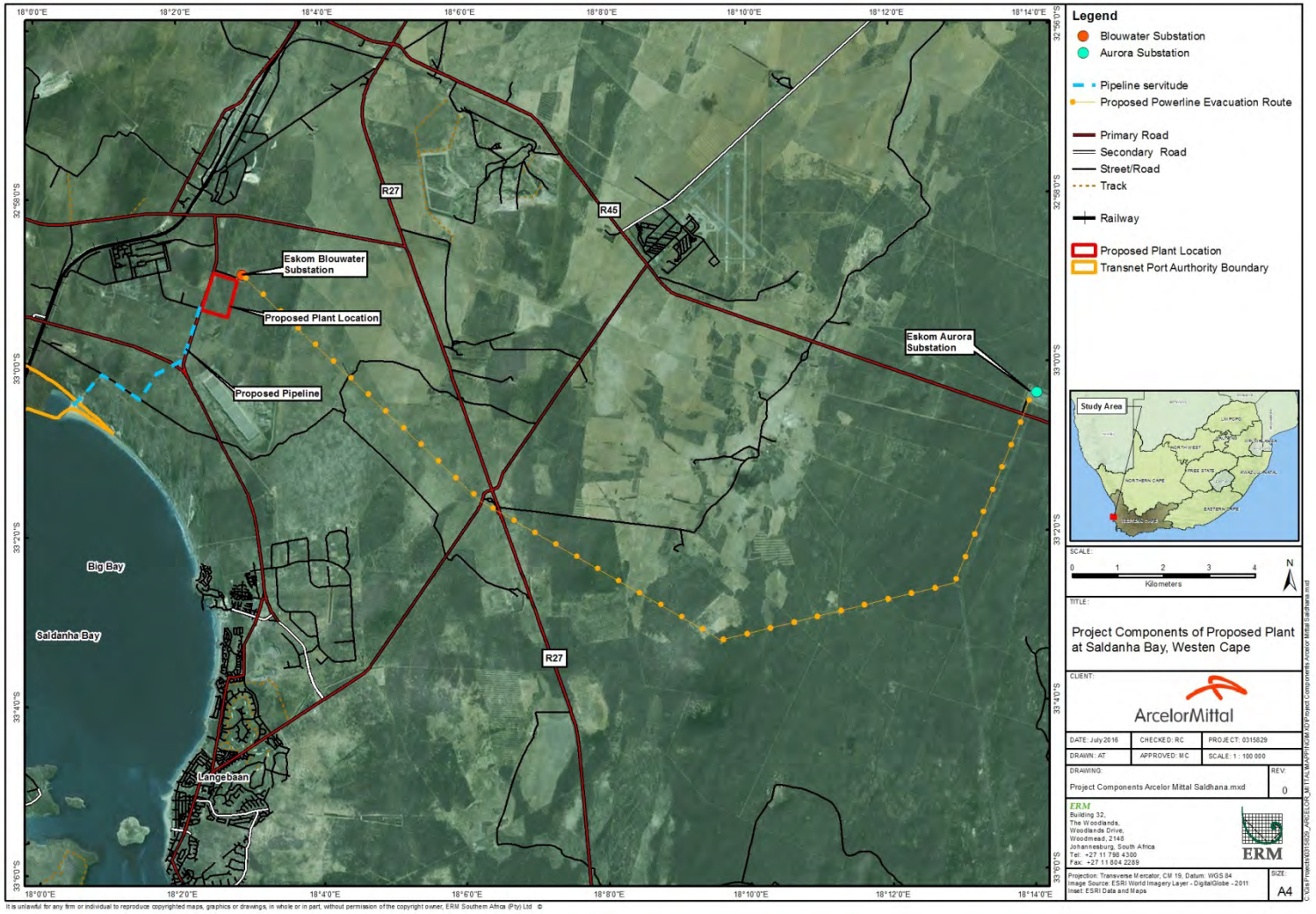
2.1.1 Project Location

The Project is to be developed on a green field site owned by ArcelorMittal, approximately 5 km northeast of the Port of Saldanha (*Figure 2.1*). The site is located less than 1 km to the east of the existing ArcelorMittal Steelworks, immediately adjacent to the Blouwater substation. The site is located within an

(1) In 2012, the Minister directed in her Determinations that new generation capacity should be procured from hydro, coal and gas sources to support the South Africa's base load energy mix and generation from gas and cogeneration as part of the medium-term risk mitigation project programme. The Determinations require that 3126MW of baseload and/or mid-merit energy generation capacity is needed from gas-fired power generation to contribute towards energy security. The gas required for such power generation will be from both imported and domestic gas resources. (https://www.ipp-gas.co.za/)

area identified for industrial development according the Saldanha Bay Municipal Spatial Development Framework (2011).

*Figure 2.1 Project location and key components**



*Note: 400kV transmission line is shown only for illustration purposes and is not included in the scope of this EIA.

2.1.2 *Land Ownership and Acquisition*

The two properties on which the proposed power plant site is located are detailed in *Table 2.1.*

Table 2.1 Properties which are intersected by the power plant footprint

Farm Name	Portion Number	Parcel Number	SG Code
Yzervarkensrug	129	Remaining Extent	W014C04600000000012900000
Jackels kloof	195	2	W014C04600000000019500002

The proposed pipeline corridor intersects with the properties as listed in *Table* 2.2.

Table 2.2 Properties which are intersected by the pipeline corridor

Farm Name	Portion Number	Parcel Number	SG Code
None	0	1185	W014C04600000000001185000000
STATE LAND 196	0	196	W014C04600000000000196000000
HOPEFIELD 195	195	0	W014C04600000000000195000001
HOPEFIELD 195	7	195	W014C04600000000000195000070
HOPEFIELD 195	1	195	W014C04600000000000195000010
HOPEFIELD 195	2	195	W014C04600000000000195000020
None	0	1132	W014C04600000000001132000000
YZERVARKENSRUG 129	0	129	W014C04600000000000129000001

2.2 *PROJECT COMPONENTS*

The key project components considered in this EIA are as follows:

- Pipeline;
- Power plant; and
- Power evacuation and connection to the grid (1).

These are discussed in detail in the sections below. The general surface areas for the project components are listed in *Table 2.3* below.

Table 2.3 Project components general surface areas and lengths

Project Component	Area / Length
Power Plant total surface area	45.83 ha
Length of pipeline	4.6km
Pipeline construction (temporary) RoW (36m width)	30.49 ha
Pipeline permanent easement (6m width)	2.76 ha
132kV feeder transmission line to ArcelorMittal length	2.4km

(1) Note: The transmission connection for Phase 1, i.e. the 132 kV connection to Saldanha Steel, is included in this EIA. The transmission connection for Phase 2, i.e. the 400 KV connection to Eskom's Aurora substation, will be considered in a separate EIA application. See Section 3.4 for details about the phases referred to here.

Project Component	Area / Length
132kV feeder transmission line to ArcelorMittal RoW (30m width)	7.22 ha
Proximity to grid connection	150m

It is envisaged that LNG will be supplied by ship to the Port of Saldanha where it will likely be offloaded to a Floating Storage Regasification Unit (FSRU). The FSRU will regasify the LNG and pump it via a pipeline to the power plant. The supply of fuel and import facilities have not been considered in this EIA. The Department of Energy initiated a project in 2015 to permit the construction of an LNG import terminal at the Port of Saldanha, it was understood that individual developers were not required to undertake the EIA for this component. Should this information change, a separate EIA for the import of gas will be undertaken.

2.2.1 Power Plant

Figure 2.2 shows the proposed plant layout. Current plans include

- six Trent 60 DLE (low NOx) 50 MW turbines in open cycle; and
- three identical but independent 435 MW SCC5 4000F single shaft generating trains in combined cycle.

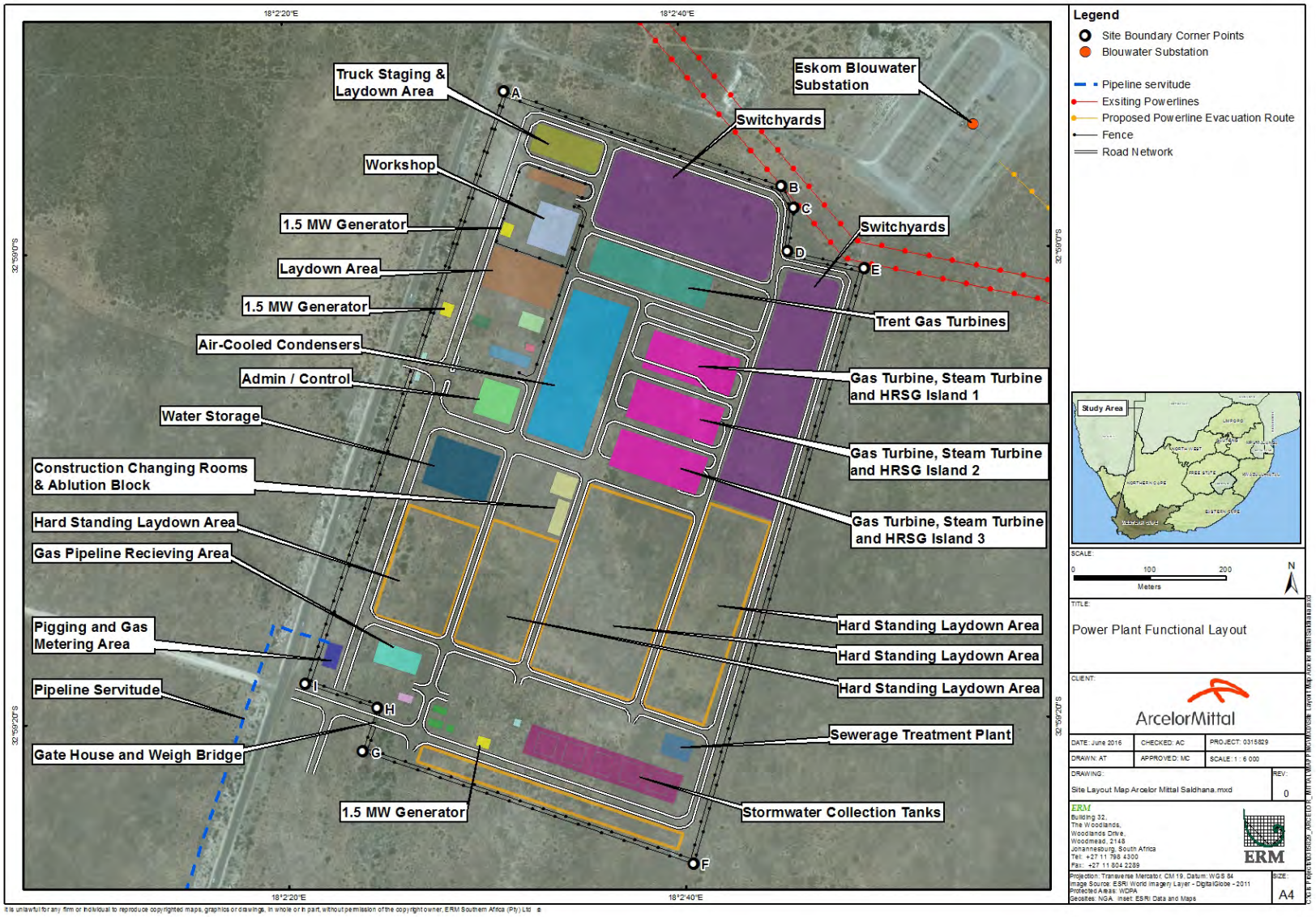
Other infrastructure on site is reflect in *Table 2.4.*

Table 2.4 Power Plant components and their respective footprint areas / lengths

Project Component	Area
1.5 MW Generator	0.09 ha
132KV Switchyard	2.4 ha
440KV Switchyard	2.48 ha
Admin, Control, Laboratory	0.25 ha
Air-Cooled Condensers	1.56 ha
Canteen, Changing Rooms, Ablutions	0.09 ha
Clinic	0.01 ha
Construction Changing Rooms & Ablution Block	0.18 ha
Emergency Assembly Point	0.04 ha
Gas Pipeline Receiving Area	0.18 ha
Gas Turbine, Steam Turbine and HRSG Island 1	1.89 ha
Hard Standing Laydown Area	9.64 ha

Project Component	Area
Laydown Area	0.69 ha
Other miscellaneous infrastructure	0.03 ha
Pigging and Gas Metering Area	0.07 ha
Reverse Osmosis, MSFD, Salt Residue	0.05 ha
Sewerage Treatment Plant	0.12 ha
Stormwater Collection Tanks	1.2 ha
Trent Gas Turbines	0.73 ha
Truck Staging & Laydown Area	0.36 ha
Visitors and Training Centre	0.07 ha
Water Filtration	0.02 ha
Water Treatment, Raw Water Storage, Fire Fighting Water	0.59 ha
Workshop Warehouse and Spares	0.33 ha
Road surface area (total)	6.9ha
Propane storage vessels	3
Propane storage volume on site (total)	30 m^2
Height of stacks	60m (max)
Capacity of on-site substation	132 KV substation for phase 1 400 KV substation for Phase 2
Type of perimeter fencing	ClearVu Reinforced
Perimeter fence length	2.8km
Perimeter fence height	3 m

Figure 2.2 *Power plant functional layout.*



Access routes and roads

The Project has accounted for certain road works, described below, deemed necessary for safety and compliance with regional legislative requirements. Permissions have not yet been sought for the proposed road works, the costs of which will be borne by the project and executed according to local Council and/or Department of Roads and Traffic and/or Committee of Transport Officials (COTO) regulations, requirements and guidelines; in particular Road Infrastructure Strategic Framework for South Africa (RISFSA) of the South African Department of Transport (DOT, 2006)

All of the approximately 6,900 m of road access on the 45.83 ha site will be concrete- paved. The total area of roads is 5.59 ha which represents approximately 12.4 percent of the fenced-in site area. Most roads are 8m width and others 12m. The 12m concrete-paved roads will be constructed early after commencement of construction works and will serve to carry heavy load traffic (mobile cranes, multi axle heavy equipment trailers, cement delivery trucks, etc.) during the early stages of construction.

All concreted roads will play an important role for rainwater harvesting, in addition to the concreted lay-down areas. The site's natural slope is towards the south where the raw water storage tanks will be situated. The east-west thoroughfares ('streets') will channel rainwater into the rain-water drains of the north-south thoroughfares ('avenues'). Rainwater will run southwards to the bulk water storage tanks.

Approach to the Power Plant

For road safety considerations and in light of the increased traffic (particularly during construction phase) the provincial road leading past the two power plant entrances will be widened from 11 m to a 20 m wide over-taking 4- lane section.

For the office and administration gate a wide entrance (12 m) and a 12 m radius bend into the power plant site and offices from the access road to the gate house is planned.

2.2.2 *Pipeline*

General

The pipeline transport system from the point of arrival on-shore to the power plant site will consist of the following:

- A gas and sea-water forwarding station at the start of the land-based pipeline system;
- A dual, parallel gas pipeline for security of gas supply;
- A sea water pipeline to provide the power plant with sea water for desalination;

- A power cable to provide motive power for a projected air compressor and actuated isolation valves and instrumentation along the pipeline route; and
- A gas and sea-water receiving station at the power plant.

The LNG pipeline (regasified gas) and sea-water supply servitude will run from the pipeline entry point connecting to the power plant boundary. The gas pipeline will be buried to a depth of 3 to 4 m, cover a servitude width of approximately 15 – 20 m and be approximately 4600 m in length.

The gas and sea-water supply pipelines commence from the routing point #1, where the regasified LNG arrives on shore and enters the land-based servitude section of the supply line to the 1507 MW power plant.

The pipeline will run along the indicated servitude approximately 4600 m to the gas receiving station within the power plant boundary. Over the 4600 m the pipeline will not intersect with any water courses.

The proposed pipeline system will be buried underground with the pipeline servitude extending 6m on either side of the pipeline trench.

Where the pipeline passes through sensitive areas the temporary RoW will be kept to between 20-25m in order to minimise impacts.

The pipeline arrangement will consist of the following elements:

- Two steel gas pipelines with a clearance of 0.3m (as per EN 1594:2000);
- One steel water pipeline; and
- One electrical conduit (plastic compound).

2.2.3 Power Evacuation and Connection to the Grid

132 kV Feeder line to ArcelorMittal Steel Works

The feeder power line for the initial 160 MW base load (peaking to 250 MW) from the power plant to the ArcelorMittal Steel Works will be the first priority. This 132 kV feeder line will be sized for a capacity of 400 MW. The proposed routing of the transmission line is illustrated in *Figure 2.3*.

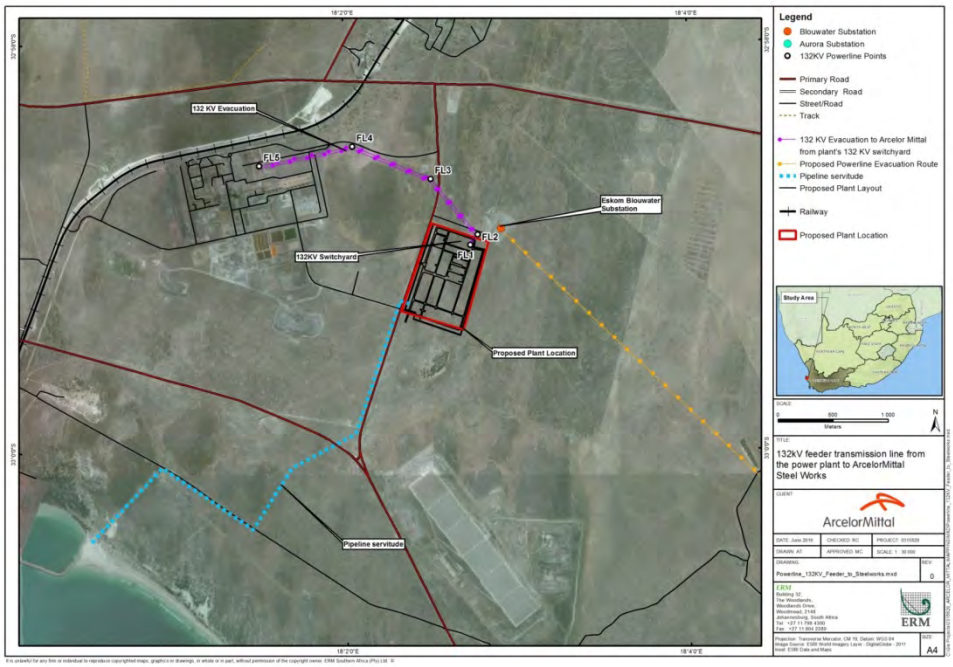
The Project plans on utilising the existing 132 KV lines; towers and conductors. The 132 KV plant substation would join directly on to these existing lines. It is noted that there are currently no observed bird deterrent measures on the exisiting lines. This may need to be introduced, however this would need to be determined between IPCSA and Eskom.

400 kV Transmission line to Aurora Substation

The additional 1103 MW (1400 MVA) of power generated at the plant will be evacuated through the construction of a new 22 km High Voltage (HV) 400 kilo Volt (kV) line from the power plants own switch yard to the existing

Aurora 400 kV substation, following the existing Aurora to Blouwater 132 kV feeder servitude. This transmission line in not considered as part of this EIA process and will be considered in a separate EIA process in coordination with Eskom.

Figure 2.3 ***132kV feeder transmission line from the power plant to ArcelorMittal Steel Works***



2.3 PROJECT PHASING AND SCHEDULE

2.3.1 *Construction Phase*

The proposed project will be implemented in two phases. Phase 1 and 2 combined will produce approximately 1500 MW net out-put.

Phase 1 and 2 will consist of six Siemens Trent60 50 MW nominal (Installed Gross capacity) gas turbines in open cycle (labelled T1 through to T6) and three Siemens SCC5-4000F 435 MW (Installed Gross capacity) nominal combined cycle plants, labelled UNIT 1, UNIT 2 and UNIT 3 respectively and will be erected on three self-contained power 'islands' each approximately 150 m long x 60m wide.

Phase 1 of the project will constitute the following components:

- Site entrance with truck staging areas, hard standing areas;
- Offices and control room;
- Warehouse areas and workshops;
- Installation of six open cycle Siemens Industrial Trent 60 gas turbines (T1, T2, T3, T4, T5 and T6), one of which will be a redundant unit to ensure uninterrupted supply;

- Associated step-up transformers for every generating unit;
- 132KV and 400 kV switchyard;
- Site drainage;
- Gas receiving, conditioning and forwarding;
- Waste-Water treatment and water reclamation plant; and
- Storm water collection reservoir (25,000 m^3) and water treatment plant.

Construction period: 15 -18 months
Completion Phase 1: September 2019 commercial operation

Construction of Phase 2 of the project will include the following components:

- Installation of complete UNIT 1, UNIT 2 and UNIT 3 open cycle Siemens SCC5-4000F gas turbine (total approx. 1305 MW nominal (Installed Gross capacity) combined cycle plants);

- Associated step-up transformers, and station switchyard.

Construction period: 18 - 20 months
Completion Phase 2: Mid- 2020 - Early 2021

Employment during the Construction Phase

During peak construction activity, it is expected that up to approximately 450 workers will be directly employed (*Figure 2.4*). Most of this workforce will be employed by the engineering, procurement and construction (EPC) contractor and will consist in semi-skilled to skilled workforce. The breakdown of skills required during the construction phase will be as follows:

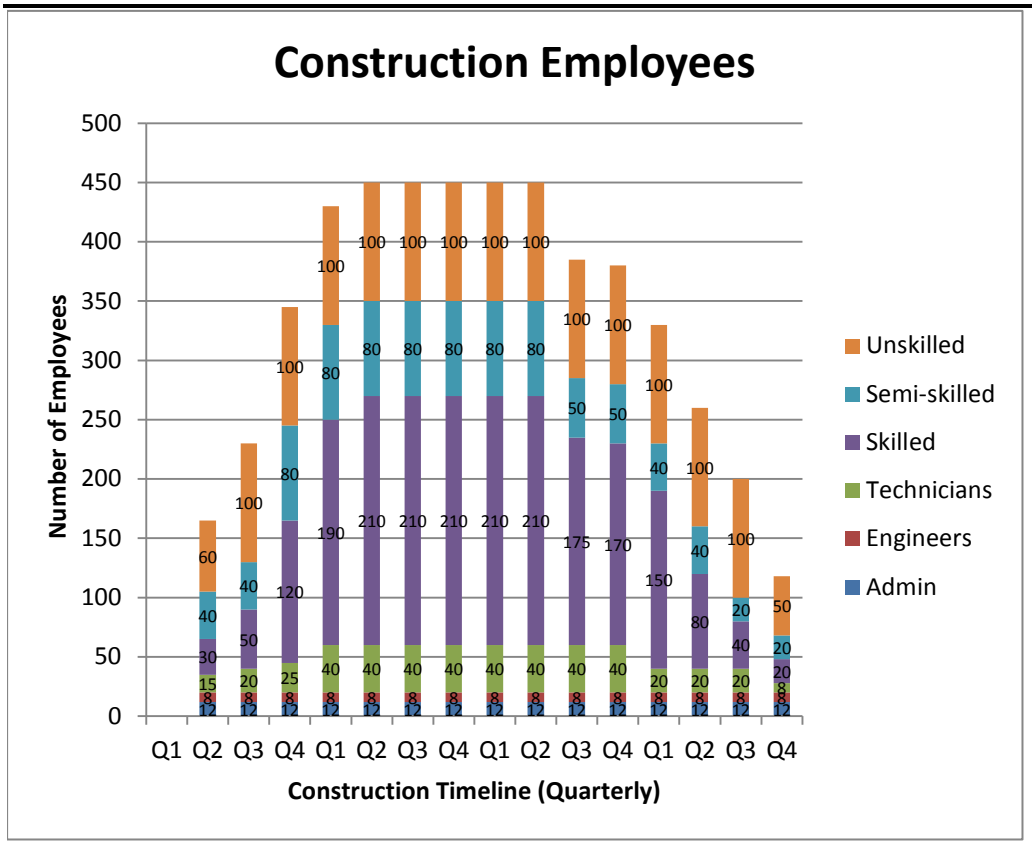
- Skilled labour: 58 percent;
- Semi-skilled labour: 20 percent; and
- Unskilled labour: 22 percent.

A further breakdown of the employment opportunities is provided in *Table 2.5*.

Table 2.5 Estimated Employment Positions Available During Construction

Employment Position	Number of Positions
Admin	12
Engineers	8
Technicians	40
Skilled	210
Semi skilled	80
Unskilled	100
Total	**450**

Figure 2.4 Employment requirements during the construction phase



It is understood that there will be no worker accommodation on site during construction. The unskilled workforce will, as far as possible be employed from the local community, reducing the need to the provision of accommodation. The skilled and semi-skilled workforce from outside the area will be housed within Saldanha Bay Local Municipality.

Traffic Requirements During the Construction Phase

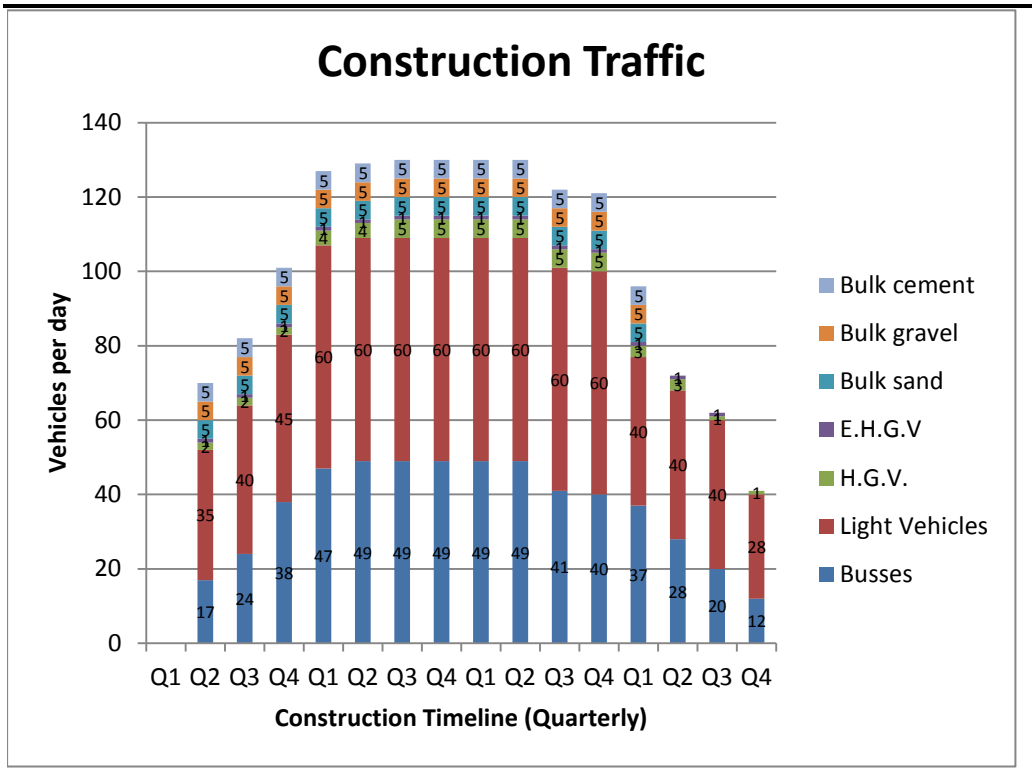
Approximately 35,000 tons of bulk cement and concrete aggregate, 800 tons re-bar steel, and 6,500 tons equipment and structural steel will need to be transported to the construction site.

It is envisaged that construction staff, up to a maximum of 350 persons, would be bussed to site in 8-seater or 10- seater mini busses and pass through this gate; about 40 - 50 busses per day, twice a day. Light vehicle traffic due to construction will start at around 35 vehicles per day and increase rapidly to 60 per day where it will remain for the bulk of the construction period.

There will be an expected 5 vehicles per day of HGV's, bulk gravel, bulk sand, and bulk cement respectively for the duration of the construction phase right up to Q1 of year 4, after which it tails off rapidly.

The gas turbines and other heavy equipment will be delivered via truck. This will involve some abnormal loads being moved on the roads during this time.

Figure 2.5 Predicted traffic loads during the construction phase



Water Requirements During the Construction Phase

During the construction phase the main water requirement will be for the concrete batching plant. It is estimated that 30 000m³ of water will be required for the concrete batching. Additional water will be required for:

- Off-site dust control: Post treatment recycled water will be used for dust control on unsurfaced roads where required during high traffic periods and during construction. Estimated temporary provision of 5,000 m³ per annum in 2017 and 2018.

- Domestic purposes by on site workers: Maximum water usage during peak construction period (600 site personnel) is estimated to be 60 m³/day. This peak requirement is estimated to be needed for approximately 2 years – 2017 and/ 2019.

- Construction and on-site dust control: Water is required for the manufacture of concrete during construction. The power plant will require approximately 80,000 – 90,000 m³ of concrete for foundations, road works, hard standing and other site works. Estimated temporary provision of 5,800 m³ per annum - 2017 and/ 2019.

During the commissioning phase the following water will be required:

- 2,000 – 5,000 m^3 for blow-out of the steam piping (Testing/commissioning);
- 2,000 – 5,000 $m^3$for blow out and chemical clean of the Benson boilers; and
- 23 000m3 (approximately) for pipeline cleaning and hydraulic pressure testing.

Initially water will be trucked in 30 m^3 loads from local farms (ground and surface water sources) (1). It will be transferred to a temporary stainless-steel tank for immediate use in preparing concrete for a small lay-down area and foundations for the first permanent raw-water storage tanks.

2.3.2 Operation Phase

The power plant will be operated on a 24 hour, 7 days a week basis. The position and location of the buried gas pipeline will be indicated above-ground by special marker beacons laid above the pipeline in line-of-sight of each other along the pipeline servitude route (*Figure 2.6*). The markers will be able to collect and transmit essential pipeline information.

Figure 2.6 Example of a marker indicating pipeline below ground

The pipeline is expected to operate continuously, for 8760 hours per year, only the flow rate will vary.

(1) Agreements with land owners are currently in the process of being developed.

Employment during the Operation Phase

The number of workers on site during operations will be about 107 operational employees and up to 70 part-time employees. These will include plant management and maintenance staff, skilled mechanical and electrical technicians, drivers, medical, quality control, and cleaning staff and a number of experienced plant operators who will operate and maintain the plant, and who are expected to be a mix of expatriate and local staff.
As the plant will operate 24 hours a day, three full-time shifts will be created per day, and the breakdown of the skills required will be as follows:

- Skilled labour: 65 - 70 percent;
- Semi-skilled labour: 15 - 20 percent; and
- Unskilled labour: 10 - 15 percent.

A further breakdown of the employment opportunities is provided in *Table* 2.6.

Table 2.6 Estimated Employment Positions Available During Operation

Position	Number of Positions Available
Admin	4
Security	15
Warehouse and Stores	6
Medical	6
Plant Control	15
Engineers	9
Technicians	9
Skilled	9
Unskilled	9
Tuition and Training	4
Quality Control, Water	3
Canteen	6
Total	**95**

It is understood that there will be no worker accommodation on site during operation. The unskilled workforce will, as far as possible be employed from the local community, reducing the need to the provision of accommodation. The skilled and semi-skilled workforce from outside the area will be housed within Saldanha Bay Local Municipality.

Traffic Requirements during the Operation Phase

During commercial operations there will be some traffic bringing supplies and spares to the power plant. This will increase during shutdowns and periods of major maintenance.

Maintenance activities will be undertaken by an Operations and Maintenance (O&M) contractor.

Water Requirements during the Operation Phase

Water during operation will be required for the following activities:

- Motive steam for the combined cycle (1): Estimated annual provision 1500 m^3.

- Annual Cooling water for condensation of steam from steam turbine seals and vacuum plant seals: Estimated annual provision of 500 m^3 (Phase 1 and Phase 2).

- Cooling of lubrication oil for gas turbine, alternators and steam turbine generator, gas compressor air: Estimated annual provision of 500 m^3per year.

- As water/glycol for combustion air inlet cooling: A cooled water closed-loop is used to cool down the inlet combustion air to as close to 15 °C as possible. Estimated annual provision of 1500 m^3 per year.

- Make-up water for treated water replacement in event of any boiler blow-down requirement: Estimated annual provision of 1000 m^3 per year.

- Fire abatement: Estimated storage provision of 3000 m^3.

Water requirements during the operational phase are estimated as follows:

- Combined Cycle circuit, replacement feed water: 1 500 m^3/y
- Potable water: 200 m^3/y
- Water for ablutions during construction 25 m^3/day: 1 250 m^3/y
- Vacuum system and steam seal evaporative water loss: 500 m^3/y
- Sundry cooling system evaporative losses: 250 m^3/y
- Water/glycol cooling circuit losses: 1 500 m^3/y
- Other evaporative losses PV system washing):1,500 m^3/y Water will be produced by at least two methods:
    - Harvesting of rain water climate change dependent: 5 000 m^3/y
    - Desalination of sea water, 20 - 45 m^3/day, potable, up to 14 000 m^3/y. Sea-water to be pumped up to plant along gas servitude. This intended to be a ZLD (zero liquid discharge) process.
    - A third patented process currently being assessed: Recovery by vapour condensation in gas turbine exhaust.

It has been estimated that a provision of 25 000 m^3/year of water would be sufficient for operation of Phase 1 and Phase 2 of the power plant, this water would be sourced as follows:

(1) The Benson boiler does not consume water, in that there is no water discharge to out of battery limits, the quantity indicated here is a provision over and above what may be used for startup

- Trucking from local farms during the construction phase;
- Collection of annual precipitation in 5 x 2000m^3 storage tanks;
- A Reverse Osmosis plant on site using sea water that will be pumped up from the coast along the gas pipeline servitude. The RO process will be a zero discharge process; and
- Water recovery by condensation from the gas turbine exhaust.

Services

The following services will be provided by the project itself, managed by a services department on site or contracted to a third party:

- Electricity;
- Gas;
- Raw water treatment, including filtration RO and demineralisation;
- Water recovery from waste water;
- Sewage treatment;
- Boiler feed water;
- Boiler blow-down recovery;
- Condensate;
- Fire water;
- Cooling water;
- Hydrogen generator cooling system;
- CO2 fire abatement system; and
- Compressed air.

The Project will not relay on the Local Municipality for the provision of services.

3 POLICY AND PLANNING FRAMEWORK

3.1 INTRODUCTION

This section provides an overview of legislation, guidelines and information documents that have informed the scope and content of this report and the approach to the SIA process.

3.1.1 The National Development Plan 2030

The National Development Plan (NDP) identifies the need for South Africa to invest in a strong network of economic infrastructure designed to support the country's medium and long-term economic and social objectives. The Plan sets out steps that aim to ensure that South Africa's energy mix looks different 20 years from now, primarily through a decreased dependency on coal.

The NDP recognises the need for the private sector to contribute to the generation of electricity in South Africa, and further supports the use of gas as an alternative and cleaner source of energy.

3.1.2 The National Energy Act (Act No 34 of 2008)

This Act aims to promote the diversity of supply of energy and energy sources in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation. The Act provides the legal framework which supports the development of power generation facilities.

3.1.3 White Paper on the Energy Policy

The Energy Policy governs development within the energy sector in South Africa, and has five policy objectives:

- Increased access to affordable energy services;
- Improved energy governance;
- Stimulating economic development;
- Managing energy related environmental and health impacts; and
- Securing supply through diversity.

3.1.4 WCDM Spatial Development Framework

The purpose of the WCPSDF is stated as the following:

- Be the spatial expression of the Provincial Growth and Development Strategy (PGDS);
- Guide municipal (district, local and metropolitan) Integrated Developments Plans (IDPs) and Spatial Development Frameworks (SDFs) and provincial and municipal Spatial Development Plans (SDPs);

- Help prioritise and align investments and infrastructure plans of other provincial departments, as well as national departments and parastatals plans and programmes in the Province;
- Provide clear signals to the private sector about desired development directions;
- Increase predictability in the development environment, for example by establishing "no-go", "maybe" and "go" areas for development; and
- Redress the spatial legacy of apartheid.

3.1.5 West Coast District Municipality Integrated Development Plan 2012 – 2016

This is a four year strategic framework to guide the Municipality in fulfilling their developmental mandate. The mission of the WCLM IDP is to ensure outstanding service delivery on the West Coast by pursuing the following objectives:

- Ensuring environmental integrity for the West Coast;
- Pursuing economic growth and facilitation of jobs opportunities;
- Promoting social wellbeing of the community;
- Providing essential bulk services in the region; and
- Ensuring good governance and financial viability.

3.1.6 SBLM Integrated Development Plan 2012 -2017

This is a five year strategic framework to guide the Municipality in fulfilling their developmental mandate. The mission of the SBLM IDP is stated as follows: "We, the community of Saldanha Bay Municipality, want to make Saldanha Bay Municipality the area of choice in which to live, do business and relax." The objectives of the SBLM are to:

- Be a leading municipality;
- Render quality service at an affordable price;
- Be a place in which all have access to developmental opportunities;
- Utilise the riches of land and seas in a sustainable manner; and
- Strive to achieve the three aims of sustainable development, namely human well-being, economic success and ecological responsibility.

The IDP seeks to integrate and balance the economic, ecological and social pillars of sustainability within the Saldanha Bay municipal area without compromising the institutional capacity required to implement and coordinate the efforts needed across sectors and relevant spheres of government.

3.1.7 Summary

The Project will supply the power needs of ArcelorMittal Saldanha Steel (+/- 160 MW of base load energy, peaking up to 250 MW) and excess electricity will be made available to industries within the Saldanha Industrial Development Zone (IDZ) and/or Municipalities within the Western Cape

Province. The Project aims to create a reliable energy source for Saldanha Steel and stimulate economic growth in Saldanha through the provision of electricity. As such, it is aligned with the goals of both the energy related policies and economic development policies discussed above.

3.2 PROJECT MOTIVATION

When considering an application submitted under the EIA Regulations, the relevant competent authority must take a number of factors into consideration, including the need for, and desirability of, the activity.

The need and desirability of this project is discussed below including strategic plans, frameworks and policies applicable to the area and project.

3.2.1 Need and Desirability

Project Background: South Africa's Energy Crisis

Electricity consumption has outpaced power system capacity building in South Africa (Independent Power Producer (IPP) Projects, n.d.). As a result the country has been experiencing severe electricity supply constraints since 2008. To maintain system stability, a schedule of rolling black outs 'load shedding' have been instituted, but with negative implications for the economy (IPP Projects, n.d.).

The National Development Plan (NDP) is a long term (2030) development plan and aims to eliminate poverty and reduce inequality by growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society (RSA, 2012). The NDP requires the development of 10 000 MW additional electricity capacity to be established by 2025 against the 2013 baseline of 44 000 MW (IPP Projects, n.d.). This plan presents the overall national power generation plan.

An Integrated Resource Plan (IRP) (2010) has been developed in addition to the NDP. The IRP outlines the preferred energy mix to meet electricity needs over a 20 year planning horizon to 2030 (IPP Projects, n.d.).

ArcelorMittal's Energy Needs

The current Eskom electricity situation, which affects both the availability as well as the cost of electricity, has resulted in a "perfect storm" scenario for the manufacturing industry in Saldanha. The timing of the energy crisis within South Africa, in combination with the structural changes in the global commodity markets, has the potential to destroy the manufacturing industry and, specifically, the companies focused on the export market (where cost pressures cannot be given through to the customer).

Saldanha Steel has tried to negate the effect of rising electricity cost through actively engaging in energy efficiency programs run by the Department of Trade and Industry (DTI), United Nations Industrial Development Organization (UNIDO), National Cleaner Production of South Africa (NCPC) and Department of Energy (DoE). The plant made significant improvements and has been used as a case study to illustrate what is possible in an industrial environment with energy efficiency (1). However, there is little opportunity for further improvement without significant capital investment in technology.

Electricity prices started to rise steeply from 2007 and have increased by 328% up to 2015 / 16. The price escalation going forward is expected to be higher than the Consumer Price Index (CPI) for the next 5 years. This price path is unaffordable to AMSA (ArcelorMittal South Africa) and in particular AMSS (ArcelorMittal Saldanha Steel). AMSS is competing mainly on the export market and upward electricity cost pressure with high price competiveness in the international market pushes AMSS to actively take control of its cost drivers. From this viewpoint AMSS has partnered with an Independent Power Producer (IPP) to supply electricity at a particular price affordable to AMSS and with a definite fixed forward price curve.

IPCSA are investigating the option of developing the power plant as a solution to Saldanha Steel's urgent requirement for stable, economical electricity for the long term future. The proposed 1507 MW CCGT plant is to be erected on the ArcelorMittal Saldanha Steel site. Excess electricity will be made available to industries within the IDZ and/or Municipalities within the Western Cape Province.

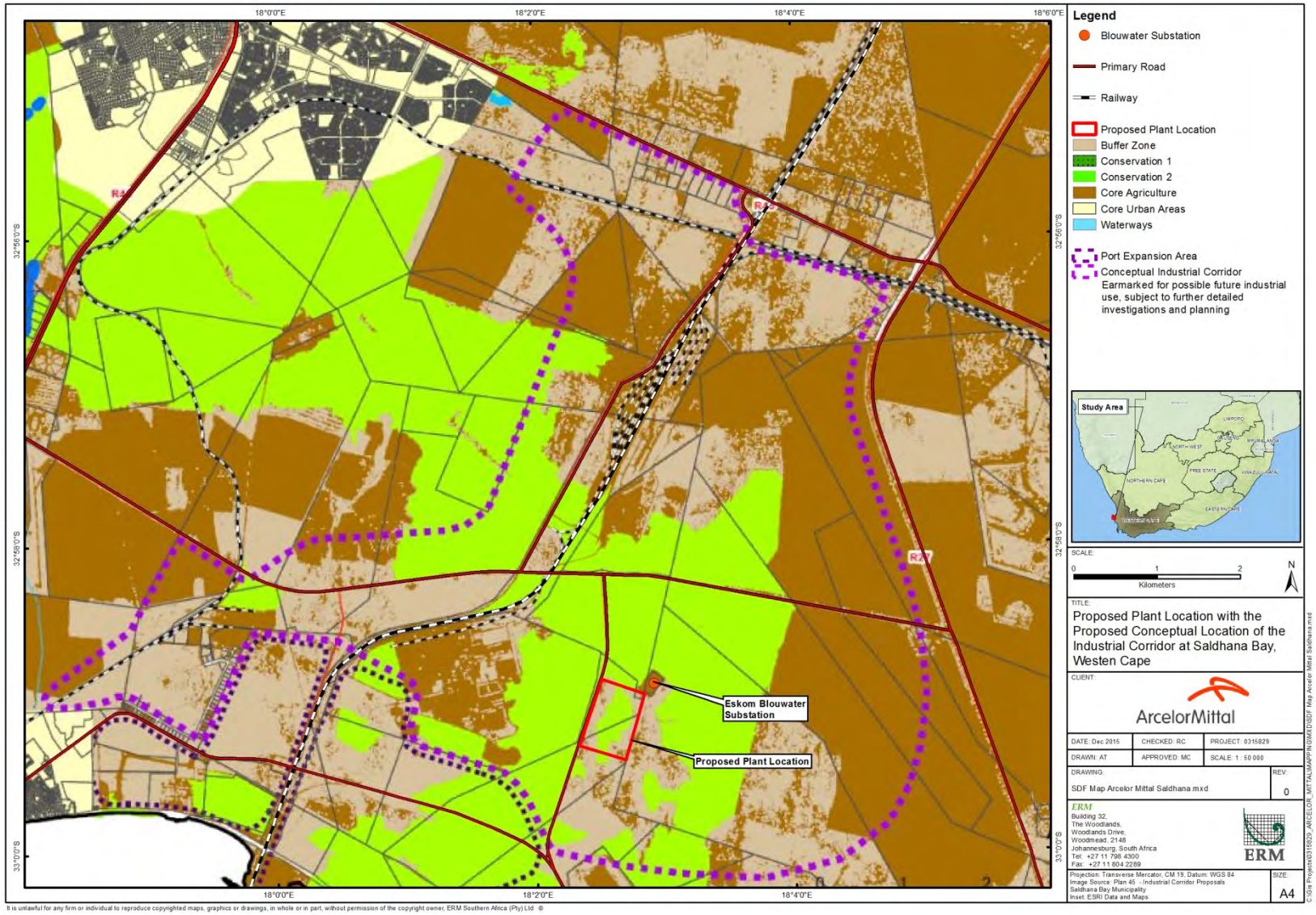
Spatial Development Frameworks

The proposed site for the development of the power plant is in close proximity to both the Port of Saldanha and Vredenberg, within an area referred to by the West Coast District Municipality Spatial Development Framework (SDF) (2014) as the 'growth engine' of the municipality. The SDF also states that the Port of Saldanha is the key economic catalyst within the district and its utilisation and potential should be optimised, through promotion of initiatives such as the IDZ, better use of the back of port areas and promotion of oil and gas industries. One of the development focus areas identified by the SDF is the Vredenberg-Saldanha area which is viewed as a major regional development or growth centre.

The Saldanha Bay Local Municipality's SDF (2011) indicates that the proposed power plant site falls within what is referred to in the SDF as a 'planned industrial corridor' (see *Figure 3.1*). The location of the proposed facility therefore is in accordance with the current district and local municipal plans for development.

(1) ArcelorMittal implemented 15 energy projects which saw the plant reduce their LPR consumption by 40%. They were awarded an Eskom *eta* Award in 2013.

Figure 3.1 Saldanha Bay Municipality Conceptual Industrial Corridor



Source: Saldanha Bay Municipality SDF (2011)

4 SOCIO-ECONOMIC BASELINE

This section describes the socio-economic environment in which the Project is situated. The description provided in this section is based on publicly available and secondary information, as well as primary data collected for the Project.

4.1 AREA OF INFLUENCE (AOI)

The socio-economic baseline description is focused on local level, i.e. within the Saldanha Bay Local Municipality, situated in the West Coast District Municipality. This is because it is expected that although the proposed Project will result in macro-economic benefits at a national level, the primary socio-economic impacts of the Project will be experienced at a district and local level.

The socio-economic area of influence has been divided into the Direct Area of Influence and the Indirect Area of Influence, these are described below.

4.1.1 *Area of Direct Influence*

The Area of Direct Influence, ADI, includes the Project footprint and related facilities as well as the associated effects of the Project on the receiving environment. This encompasses:

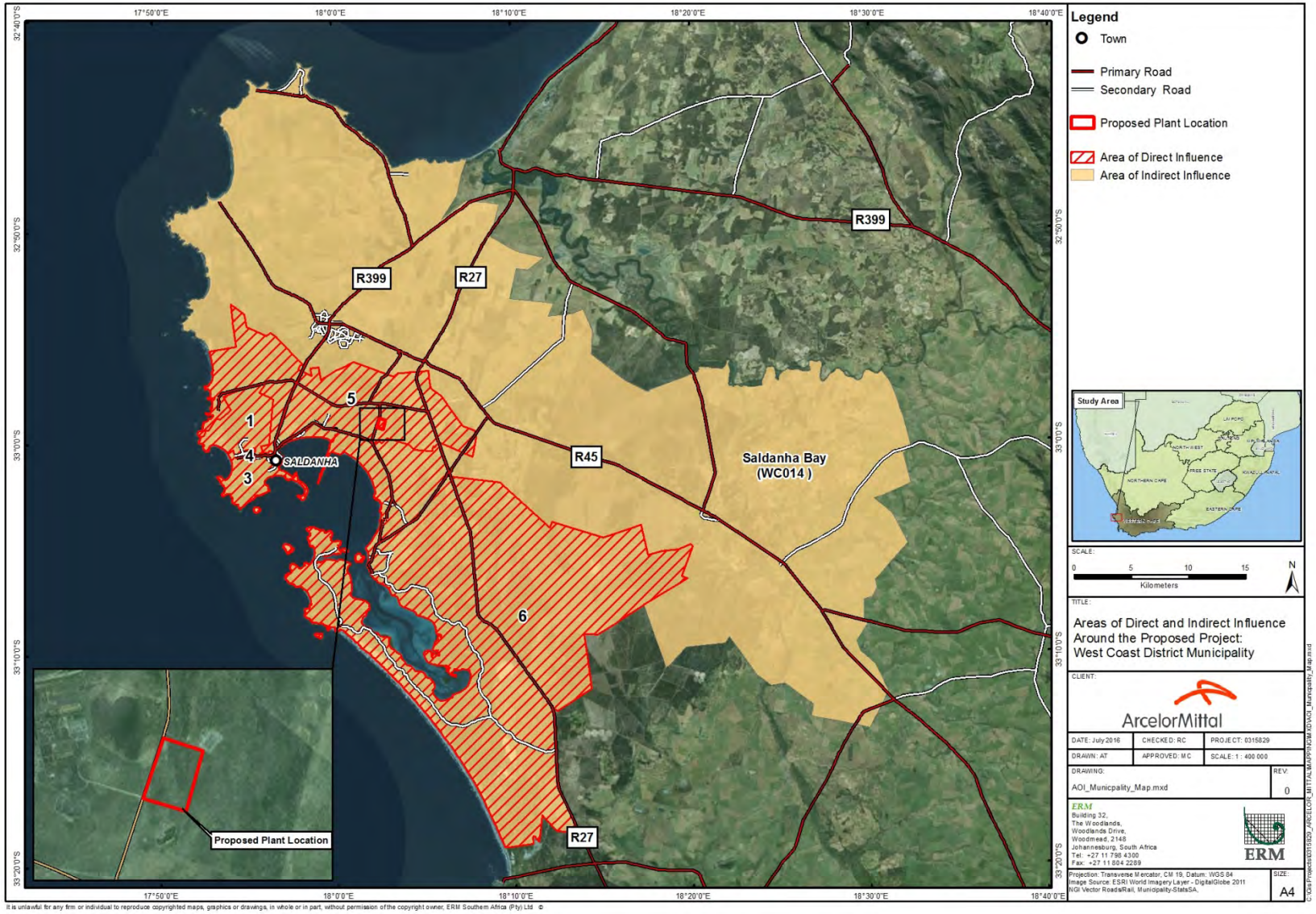
- The 45 ha CCGT Power Plant site;
- the 5 km pipeline route;
- the transmission line to Saldanha Steel.

In the context of this study, the ADI further includes areas around the site likely to be affected by the Project activities during the pre-construction, construction and operation phases. The effects can be positive or negative, short or long term or permanent, as well as direct and in-direct. These areas include the settlements located within close proximity to the Project Site, namely, the greater Saldanha Bay area, in particular Ward 1, Ward 3, Ward 4, Ward 5 and Ward 6 (refer to *Figure 4.1*).

4.1.2 *Indirect Area of Influence*

The Area of Indirect Influence, AII, includes areas within a wider radius of the Project Site, which may be affected by the Project, this includes, although to a lesser extent, the remainder of the Saldanha Bay Local Municipality, particularly the town of Vredenburg, Ward 2, Ward 9, Ward 10 and Ward 13 (refer to *Figure 4.1*).

Figure 4.1 Project Area of Influence



4.2 *ADMINISTRATIVE STRUCTURE*

The Project is in the Western Cape Province and the West Coast District Municipality (WCDM). The WCDM borders the Northern Cape District Municipality (NDCM) in the north and the Cape Metro District Municipality (CMDM) and Cape Winelands District Municipality (CWDM) in the south and south-east, respectively. The District Municipality has five local municipalities; namely Swartland, Bergrivier, Matzikama, Cederberg, and Saldanha Bay, and the Project site is located in the Saldanha Bay Local Municipality (SBLM) (see *Figure 4.2).* There are 13 Wards within the SBLM and the Project footprint falls within Ward 5.

The Provincial government is responsible for providing the strategic vision and framework for the Province. They are responsible for ensuring cooperation and collaboration between municipalities and that each municipality performs their respective functions. In turn, each of the District Municipalities is responsible for the preparation of Integrated Development Plans and for the overall provision of services and infrastructure within their District. *Figure 4.3* shows the administrative structure of the respective levels of government.

Figure 4.2 West Coast District Municipality Boundaries

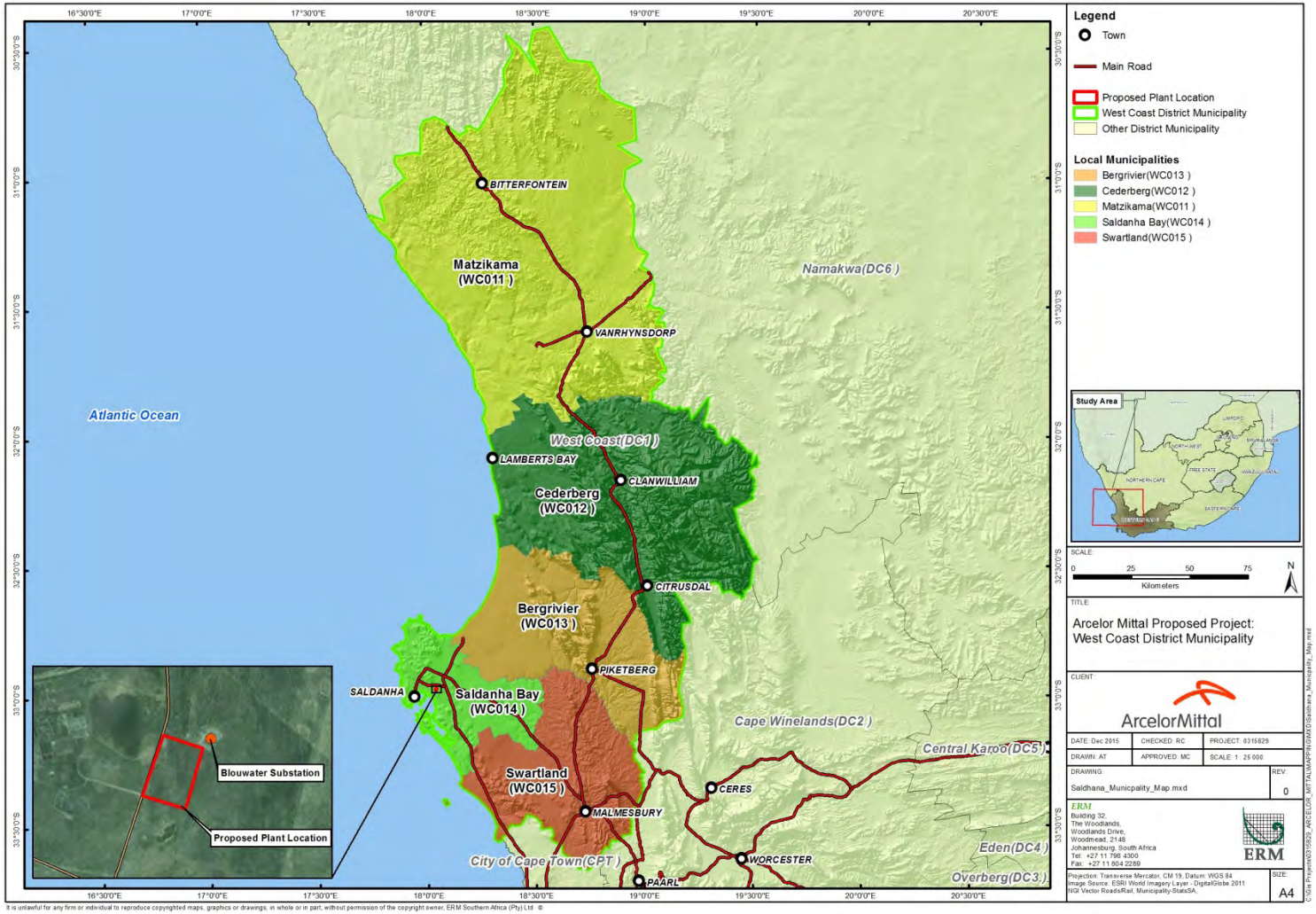
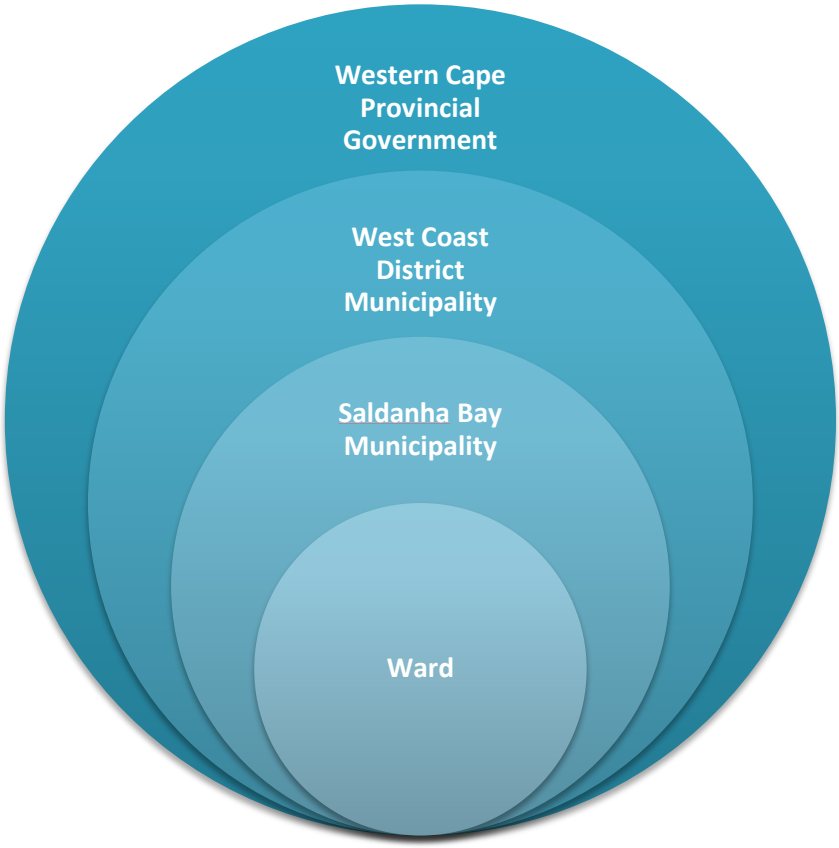


Figure 4.3 *Administrative Structure*



4.3 SITE SETTING AND LANDUSE

4.3.1 *Land-use of the Project Site*

The Project site is located on land currently owned by ArcelorMittal, less than 1 km to the east of the existing Saldanha Steelworks, immediately adjacent to the Blouwater substation. The site is vacant and is currently managed by Saldanha Steel for grazing. The site is not leased out to other farmers. The site is located within an area identified for industrial development according the Saldanha Bay Municipal Spatial Development Framework (2011).

The pipeline will traverse across land owned by ArcelorMittal until the Port boundary (where the Scope of this EIA ends).

The site is served by the existing road infrastructure. The access to the development is via TR 85/1 coming from the east off the R27 (TR 77/1). Provincial Road OP7644 abuts the site to the west and links TR85/1 to MR559. OP7644 is a two lane undivided rural roadway from which access to the site is provided opposite the Saldanha Steel entrance.

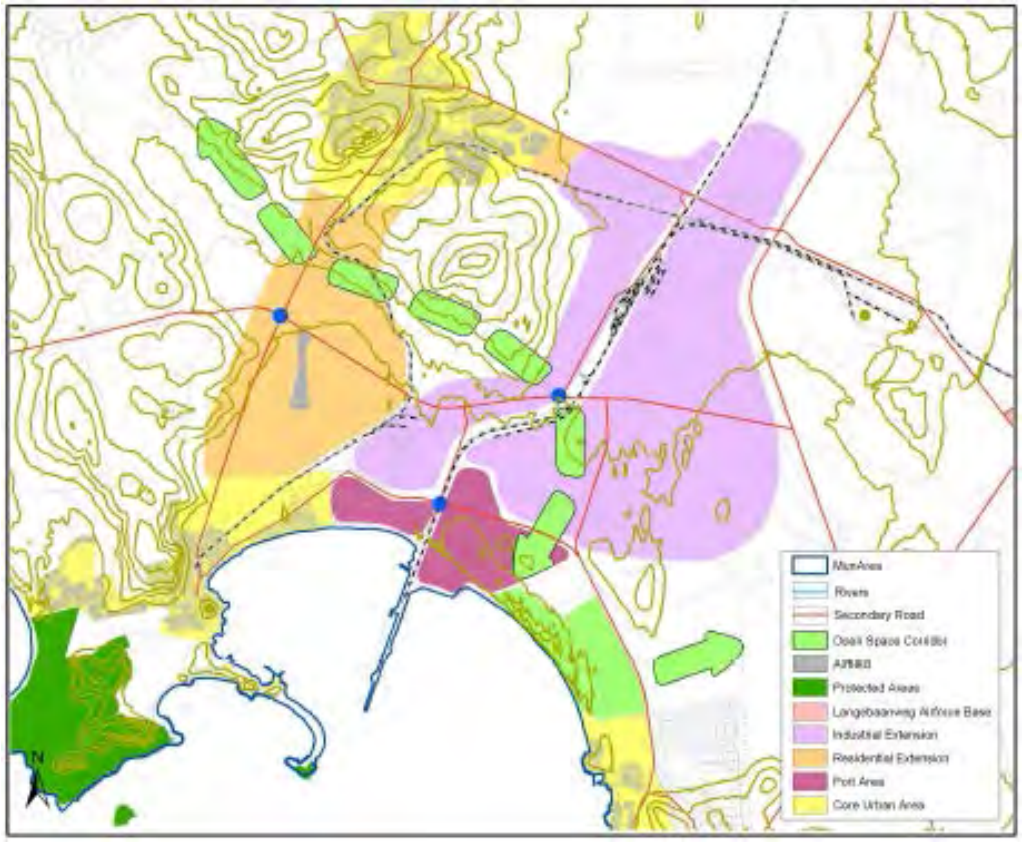
Figure 4.4 View of the Site

4.3.2 *Surrounding Land-use*

The Project site is located in an industrial area within Saldanha Bay. The land immediately surrounding the site it utilised for industrial purposes, grazing or is vacant land. Within the broader area, much of the surrounding land to the north and east is utilised for agriculture. The residential areas of Langebaan and Saldanha Bay are located approximately 7 km south and west of the site respectively, while Vredenburg is located approximately 8 km north-west of the site.

Surrounding industries include Saldanha Steel, a number of engineering companies with an oil and gas focus located in the IDZ, and the Port of Saldanha with associated infrastructure and terminals. The West Coast National Park is located approximately 15 km south of the site, and the SAS Saldanha Contractual Nature Reserve is located 12 km south west of the site. *Figure 4.5* shows the planned land-use zoning within Saldanha Bay.

Figure 4.5 Planned Land Use within Saldanha Bay Area



Source: Saldanha Bay Municipal Spatial Development Framework, 2011

The Saldanha Bay residential area is divided in to a number of sub-places, namely, Saldanha, Diazville (including Middlepos), White City and the Military Area. Diazville and White City are densely populated areas, with low cost, single unit dwellings on small stands. The population in these areas are predominantly lower income families. The population of Saldanha are predominately of middle to high income. The residential area of Langebaan and the surrounding sub-places consist largely of single unit residential homes and housing estates, many of which are second homes or rented out to accommodate tourists.

This pattern is replicated in Vredenburg, which is divided into Vredenburg, Louwville, Witteklip and Ongegund. Louwville, Witteklip and Ongegund are densely populated, with a population of a lower income bracket, while Vredenburg is comprised of middle to high income families.

4.3.3 The Port of Saldanha

The Port of Saldanha Bay is South Africa's largest natural anchorage. The Port developed into a modern harbour when it became necessary to facilitate the export of iron ore from the Northern Cape via an 800 km railway line from the mines at Sishen in the Northern Cape. The Port accepts vessels of up to 20.5 m draught. The Port entrance channel is dredged to a depth of -23 m Chart Depth and a width of 400 m.

The total area occupied by the Port (land and water areas) is 18,300 ha and it has a 990 m long jetty containing two iron ore berths linked to the shore along a 3.1 km long breakwater. There is also an 874 m long multipurpose quay for the handling of breakbulk cargo. Between 2011 and 2012 the Port of Saldanha Bay handled a total of 528 ships with a total gross tonnage of 34,503,749-gt. In 2011/12 cargo handled by the port totalled 58,263,030 tonnes, of primarily iron ore but also oil.

Figure 4.6 ***Ariel View of the Port of Saldanha***

4.4 *DEMOGRAPHIC PROFILE*

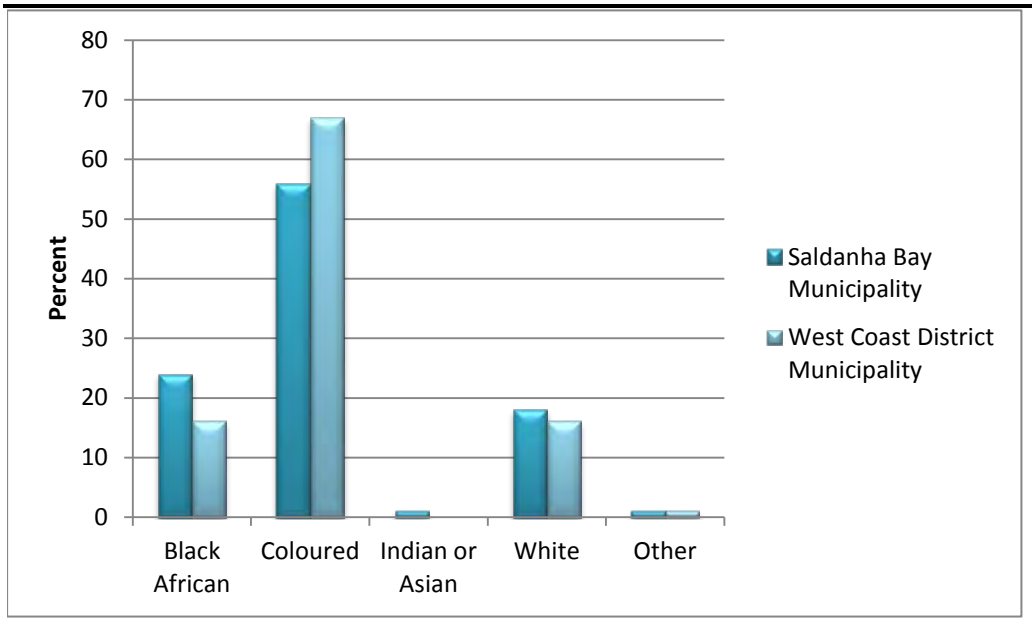
The 2011 Community Survey notes that the population of the WCDM is estimated to be 391 758. The District occupies 19 percent of the total land area of the Western Cape Province and is sparsely populated with a population density of 13 people per square kilometre. Approximately 72 percent of the population lives in urban areas with the remaining 28 percent living in rural areas. The District is relatively urbanised and the rural areas are sparsely populated.

The SBLM has the second largest population (99,193 people) in the District area with the Swartland Municipality having the highest population (113 763). The population of the SBLM increased by 3.4 percent between 2001 and 2011 (StatsSA, 2011), greater than the predicted 2.2 percent growth expected in the Saldanha Bay Local Municipality, IDP, 2007/2008. Some 95 percent of SBLM households are concentrated in urban areas with the remaining 5 percent living in rural areas (DEA&DP, 2012). This is the highest proportion of people living in urban areas as compared to the other Local Municipalities in the WCDM and well above the District average of 72 percent (StatsSA, 2011). The

population density in SBLM is 49 persons per square kilometer which is significantly higher than that of the District Municipality (13 people per square kilometer).

The WCDM's population is composed of three ethnic groups, namely; Coloured, Black Africans and White Communities. The most dominant of these is the Coloured community (67 percent) while both White and Black African groups account from 16 percent of the population, as shown in *Figure* 4.7. Within the SBLM, the Coloured community account for 56 percent of the population, while Black Africans account for 24 percent and White people account of 18 percent of the population (StatsSA, 2011).

Figure 4.7 Ethnic Composition in the WCDM and the SBDM



Source: StatsSA (2011)

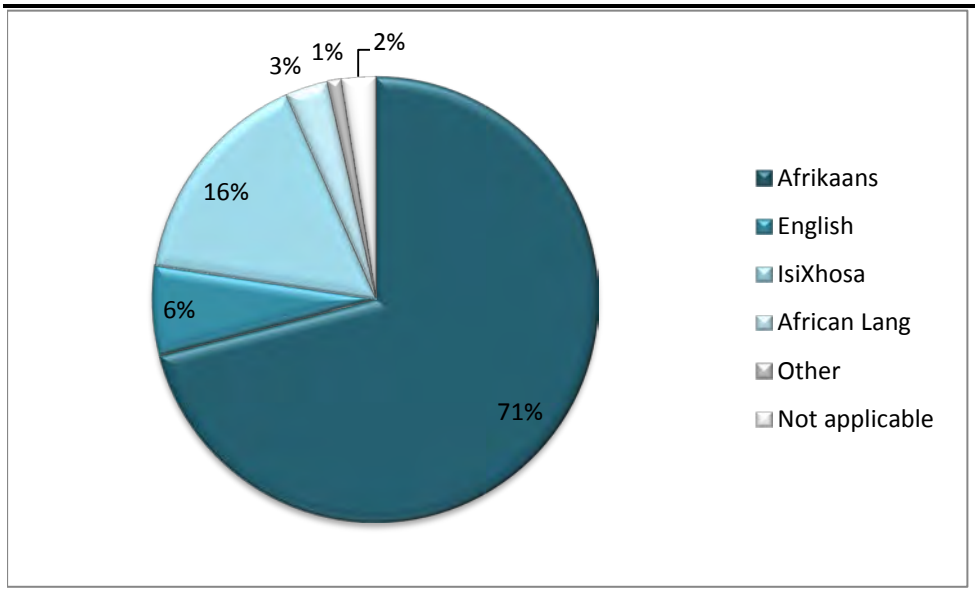
The total population within the ADI is 37,866, and a breakdown thereof is provided in *Table 4.1* below. *W*hile the population is fairly evenly spread between the five wards, Ward 3 and 4 are significantly smaller than the other wards, indicating that the population density is highest within these two wards.

Table 4.1 Population with the ADI

Ward	Black African	Coloured	Indian or Asian	White	Other	Total Population
1	4 647	3 519	120	9	105	8 400
3	2 115	3 237	96	717	42	6 207
4	1 191	7 254	84	6	57	8 592
5	492	1 818	96	3 744	51	6 201
6	630	2 931	39	4 749	117	8 466
Total Population						37 866

Afrikaans is the dominant language spoken in the SBLM, with an estimated 71 percent of the population being native speakers, isiXhosa is the second most commonly spoken language at 16 percent and English at 6 percent this is illustrated in *Figure 4.7.*

Figure 4.8 Language Spoken in the SBLM



Source: StatsSA (2011)

4.5 MIGRATION

The primary driver of migration is the search for employment and income, and the urban centres of the Western Cape attract many migrants as they provide a hub of economic activity. The agriculture sector dominates much of the WCDM, with populations highly dependent on agriculture for employment. The contraction of the agriculture sector in the WCDM resulted in notable job losses and although the agricultural sector remains a large employer (25 492 workers), the sector shed 19 786 between 2000 and 2013 (Western Cape Government, 2013). As a result, many people seeking alternative employment will gravitate towards larger urban centres, where there is perceived to be a greater prospect of employment opportunities.

The population of the SBLM increased by 3.4 percent between 2001 and 2011 (StatsSA, 2011), greater than the predicted 2.2 percent growth expected in the Saldanha Bay Local Municipality, IDP, 2007/2008, and this is likely due to an in-migration of job seekers. Saldanha Bay and Vredenburg, the major urban centres in the SBLM, will attract many of the migrants entering the SBLM as they seek access to employment opportunities as well as social infrastructure and services.

4.6 LIVELIHOODS AND ECONOMY

The WCDM contributed about 4.3 percent to the Western Cape's total GDPR (Regional Gross Domestic Product) in 2011 (Western Cape Government, 2013). The WCDM has experienced slow economic growth in the past five years. This can be attributed to the contraction in agriculture in some of the municipal areas, namely Bergrivier LM, Matzikama LM and Cederberg LM, as well as a struggling manufacturing sector, particularly in the SBLM, which was affected by the economic downturn. While jobs have been lost in the agricultural and manufacturing sectors, positive net employment was recorded in the services sector, with SBLM recording the highest number of new jobs in the service sector (Western Cape Government, 2013).

The agricultural, forestry and fishing sectors were the sectors that performed the best; contributing 16.8 percent to the GDPR of the WCDM. Sectors such as wholesale, retail trade catering and accommodation, and finance, insurance, real estate and business services had the lowest contribution to the GDPR of the West Coast Region at 3.7 percent and 3.4 percent respectively (Western Cape Government, 2013).

It is important to note that the SBLM differs significantly from the WCDM in terms of economic activity. The SBLM, being host to a large port, supports a more lively manufacturing and processing sector, and has developed the economic hub of the WCDM, supporting more business and commerce than the surround rural municipalities.

The SBLM contributed 33.9 percent towards the GDP of the WCDM. The key economic sectors for the SBLM are shown in *Table 4.2* Collectively, these sectors contributed towards approximately 90 percent to the Local Municipality's economic output in 2011 (Western Cape Government, 2014).

These sectors are discussed further below.

Table 4.2 Contribution to the SBLM Economic Output 2014

Economic Sector	Percent Contribution to Economic Output
Finance, insurance, real estate and business services	32
General government	18
Manufacturing	13
Wholesale and retail, trade, catering and accommodation	10
Transport, storage and communication	9
Agriculture, forestry and fishing	8

Source: Western Cape Government (2014)

4.6.1 Manufacturing and Processing

The main contributors to the SBLM manufacturing sector are metal processing and food processing. The two sectors contributed 54.2 percent and

37.1 percent, respectively in 2009 (Demacon, 2009), and account for over 80 percent of the SBLM manufacturing sector. The high metals contribution is due to the exporting of metals from the Northern Cape mines for steel-manufacturing plants near the port of Saldanha. The contribution of the food processing is largely driven by the processing of products from the fishing industry. While the manufacturing sector enjoyed steady growth in the past (2,6 and 3,9 percent from 1995 to 2004), the sector has shown slow and negative growth since 2009, largely linked to the slump in the metals industry (Western Cape Government, 2014).

4.6.2 *Wholesale and Retail Trade, Catering and Accommodation*

This sector contributed 10 percent towards the SBLM's total GDPR, largely driven by the wholesale and retail trade sector. This sector has also been bolstered by positive growth in the tourism industry which is discussed in more detail below.

Tourism

Tourism is one of the fastest growing sectors of South Africa's economy with its contribution to the country's gross domestic product (GDP) reaching almost 12 percent in 2010. The tourism industry in the Western Cape contributes 14 percent to the total (GDP) of the Province and makes a significant contribution to economic development and jobs, thus being the most important growth sector in the Province.

The contribution made by tourism to the economy of the SBLM is included in the Wholesale and Retail Trade, Catering and Accommodation sector, which contributed 10 percent towards the SBLM's total GDPR. Tourism is recognized as sector of economic growth by the SBLM, and is seen to offer economic development potential to a large part of the local community, with the potential of a year round flow of tourists, and consequently, economic activity. Further, eco-tourism and agri-tourism are recognized as ways of supplementing the income of farmers.

The natural environmental is the primary attraction for tourists visiting the SBLM. There are numerous protected areas such as the SAS Saldanha Nature Reserve, West Coast National Park, and the West Coast National Fossil Park located in the SBLM (http://capewestcoastpeninsula.co.za, accessed November 2015). Within these protected areas people can take part in activities such as gaming, whale and bird watching, and seeing wild flowers blooming in the winter and spring.

WCDM IDP cites a lack of funding as a major challenge for the development and marketing of the tourism sector in the District.

4.6.3 *Transport and Communication*

Transport and communication was the second-largest sector in the Saldanha Bay Municipality, contributing 9 percent to the total GDPR in 2011. The industry showed growth between 1996 and 2001, but has subsequently started to slow, if not retract (Demacon, 2009). This could be linked to the general slow-down in economic growth experienced by the SBLM since 2009. Transport activities included bus and tour-bus services, taxis, school buses, travel agents, the hiring of transport equipment and telephone and radio-communication services.

4.6.4 *Agriculture, Forestry and Fishing*

Between 1994 and 2004 the agriculture, forestry and fishing sectors combined contribution to GDPR increased from 10 percent to 11.9 percent, (Western Cape Government, 2006). However, this combined contribution decreased to 8 percent in 2011, supporting the notion that there has been a general retraction in the agricultural sector within the WCDM (Western Cape Government, 2014). Agriculture is the primary economic contributor in the rural municipalities of the WCDM, such as Bergrivier, Matzikama and Cederberg. The rural areas of the SBLM, north Vredenburg, rely on agriculture, where as agriculture is not a key economic activity with the ADI.

The SBLM IDP recognizes that the agricultural sector faces challenges, and noted that to improve economic viability and sustainability of agriculture within the municipal area, it is important that the development and implementation of integrated approaches to natural resource management are adopted, and that farmers should consider alternative income generating activities, such as agro-tourism, conservancies and value add services.

In SBLM, mariculture industry and the fishing industry are important activities and are therefore, discussed further below.

Aquaculture

The aquiculture industry in Saldanha Bay consists of mussel and oyster (bivalve) growers, located predominantly in Small Bay with just one operator with an allocation in Big Bay. Farmers lease space from the Transnet Ports Authority and must obtain a permit to operate from the Department of Agriculture, Forestry and Fisheries (DAFF).

The bivalve industry currently employs approximately 130 people, of which 85 to 90 percent are factory workers or boat crew. Lack of a formal education is not a barrier to entry within the aquaculture sector, and according Olivier et al, 75 percent of the workforce employed by the bivalve sector in Saldanha is educated to Grade 9 level or less, and a further 21 percent of factory employees had passed matric (Grade12), (Olivier et al, 2013). The bivalve industry has provided employment for many people that have lost their jobs due to the decline in the fishing industry in Saldanha.

There are a number of emerging farmers operating in Small Bay who have branched off from the bigger operators. They have received support from bigger companies such as start-up capital. The emerging farmers are typically limited to Small Bay as they do not have the boats and skills to operate in the rougher sea of Big Bay.

Figure 4.9 Mussels seed themselves onto ropes suspended beneath rafts

Mussel Rafts | Cane hoisting a rope with mussels attached

Source: Dr Sue Jackson

Fishing

There are well known national fishing companies that operate from Saldanha Bay, such as Sea Harvest and Southern Seas Fishing. While the fishing industry is well established in Saldanha, it showed slow growth between 2001 and 2009, (only 2.2 percent) (SBLM IDP) and continues to contract.

Figure 4.10 Fishing Boats Docked in the Port of Saldanha

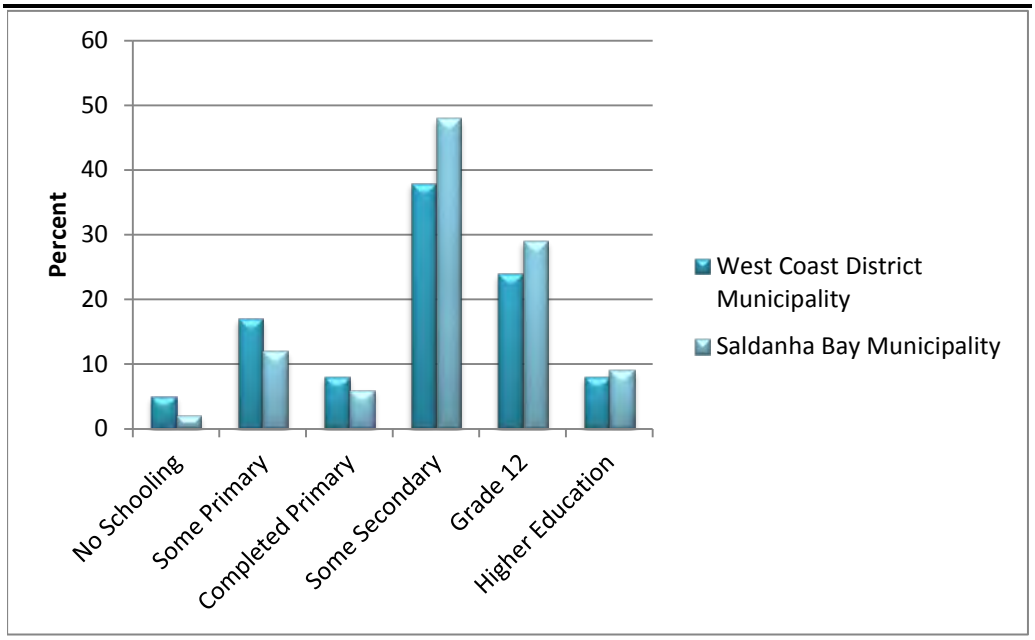
4.7 EDUCATION

The WCDM has a total of 130 schools (primary and secondary schools). The literacy rate (1) in the WCDM is 79.1 percent (Western Cape Government, 2014), which falls short of the Provincial literacy rate of 87.2 percent. The teacher student ratio is 28 students per teacher.

SBLM has a total of 19 schools and the literacy rate is 86.7 percent. Similar to the WCDM, the levels of illiteracy are highest amongst those above the age of 14 years. The learner-educator ratio is 1:28.5, in line with that of the WCDM, (Western Cape Government, 2014). *Figure 4.11* below shows that overall the level of education is slightly higher in the SBLM than in the WCDM, with a slightly higher percent of people having obtained a Grade 12 or some level of higher education in the SBLM. The figure also shows that in both Municipalities a greater proportion of learners have completed some secondary schooling, while fewer that have completed Grade 12. Overall, the population within both municipalities is poorly educated, with just a small portion of the population having received higher education.

(1) The Department of Social Development defines people aged 14 years and older as literate if they have successfully completed 7 years formal education (passed Grade 7/Standard 5).

Figure 4.11 Levels of Education in the Local Municipality

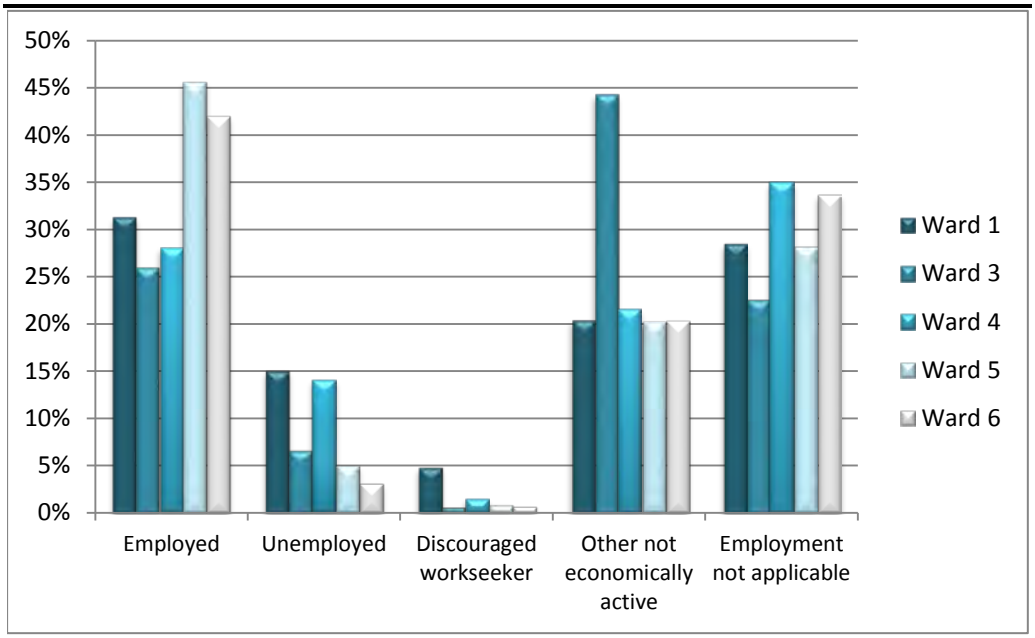


Source: Statssa, Census 2011

4.8 EMPLOYMENT AND SKILLS

The unemployment rate in the WCDM was 14.6 percent in 2011. This is comprised of people who are unemployed but seeking employment, as well as those who are not seeking employment. The unemployment rate in the SBLM was higher than that of the District at 23.4 percent (Western Cape Government, 2014). *Figure 4.12* shows a breakdown of the employment status within the ADI. Wards 5 and 6 have the highest employment rates, while Wards 1 and 4 have the highest unemployment rates. Across all wards, the percentage of people who have stated either that they are not economically active or "that employment does not apply", is high. This indicates that a large portion of the population are not economically active and are either dependent on social grants, or others people for an income (such as students or the elderly).

Figure 4.12 Employment Status within the ADI



Source: StatsSA (2011)

Sectoral–employment data (2011) showed the following sectors as being the biggest employers in Saldanha Bay Local Table 4.3. Manufacturing is key employer in the SBLM, which is in contrast to the WCDM where agriculture, forestry and fishing are the major employment sector.

Table 4.3 Formal Employment by Sector in the SBLM 2014

Sector	Percent Employed
Manufacturing	24.2
Community, personal, and social services	20.4
Wholesale and retail trade; and catering and accommodation	15.1
Agriculture, forestry and fishing	14.2
Finance and business services	11.4

Source: CCA (2014)

The major employers in the fishing industry include companies such as Sea Harvest, Oceana, Southern Seas and West Point Processors. Within the Steel and mineral-processing companies (Manufacturing sector), the Saldanha Steel Project (ArcelorMittal SA), Namakwa Sands is the major employer.

4.8.1 Skills Levels

The population of SBLM is typically engaged in occupations requiring a higher level of skills than that of the WCDM (West Coast District Municipality IDP, 2012 – 2016). According to the IDP, almost half the population of the SBLM has some skills, which implies that they have received some training in the past. Table 4.4provides a comparison of the skills levels within the two populations.

Table 4.4 Comparison of Skills Levels between District and Local Municipality in 2012

Area	Highly Skilled %	Skilled%	Low Skilled%	Not Specified%
West Coast District Municipality	21.3	41.9	27.9	8.9
Saldanha Bay Local Municipality	28.5	49.3	12.1	10

Source: West Coast District Municipality (2012)

4.8.2 Income Levels and Poverty

Within both the WCDM and the SBLM, household income falls predominantly into the middle to low income categories. However, the SBLM does have a larger number of households in the higher income brackets which is likely linked to employment opportunities in skilled positions, as shown in *Table 4.5*.

Within the ADI, Ward 1 and 4 have a larger number of households in the lower income brackets, while Wards 5 and 6 have a larger number of households in the higher income brackets.

Table 4.5 Percentage of population per Average Household Income Bracket in 2011

	No income	R 1 - R 4800	R 4801 - R 9600	R 9601 - R 19 600	R 19 601 - R 38 200	R 38 201 - R 76 400	R 76 401 - R 153 800	R 153 801 - R 307 600	R 307 601 - R 614 400	R 614 001 - R 1 228 800	R 1 228 801 - R 2 457 600	R 2 457 601 or more
WCDM	11%	2%	3%	14%	22%	19%	13%	9%	5%	1%	0%	0%
SBLM	14%	2%	4%	11%	17%	17%	15%	11%	6%	2%	0%	0%
Ward 1	22%	4%	6%	15%	22%	14%	10%	5%	2%	0%	0%	0%
Ward 3	7%	1%	3%	9%	16%	19%	20%	17%	6%	1%	0%	0%
Ward 4	8%	2%	5%	14%	24%	25%	17%	4%	1%	0%	0%	0%
Ward 5	8%	1%	1%	4%	7%	11%	18%	25%	17%	5%	1%	1%
Ward 6	18%	1%	1%	4%	8%	13%	18%	17%	14%	5%	1%	0%

Source: StatsSA (2011)

The SBLM has an estimated poverty rate of 23.9 percent. This is lower than the surrounding municipalities and that of the WCDM, which has a poverty rate of 30.4 percent.

4.9 HEALTH

The WCDM has 76 medical facilities (26 clinics, 24 satellite clinics, 19 mobile clinics and seven district hospitals) (Western Cape Government, 2014). Some of the challenges encountered by the Health Department in the WCDM are the

poor/insufficient physical infrastructure, overcrowded primary healthcare facilities and insufficient numbers of skilled health workers in the region.

The most common illnesses affecting communities are infectious diseases such as HIV/Aids and TB, as well as chickenpox and measles amongst children. The SBLM has the lowest number of antiretroviral treatment (ART) clinics/treatment sites in the WCDM, which is of concern considering it has the heaviest ART patient load in the WCDM (1,779 patients in March 2014, up from 1,435 patients in 2013) (Western Cape Government, 2014).

There has been a general increase in the numbers of teenage pregnancies recorded in the region; the increase in teenage pregnancies is potentially linked to poverty in the area. Violence and substance abuse are also common in the District leading to increased pressure on the local health services (West Coast District Municipality, 2009).

SBLM has 14 medical facilities (8 clinics, 3 satellite clinics, 2 mobile clinics and 1 district hospital) (Saldanha Bay Municipality, 2012). According to the IDP, nine doctors and 59 professional nurses have been employed by the Department of Health to render health services to patients attending the health facilities in Saldanha Bay [(1)].This indicates that there is high number of patients compared to the nursing staff available to service the patients' medical needs.

The most common illnesses are HIV/Aids and TB; this is similar to the District level. The HIV/Aids prevalence in the District was 4.3 percent in 2005 and it was expected to increase to 5.5 percent by 2010 (West Coast District Municipality, 2006). There is a relationship between the high prevalence of TB and HIV/Aids.

(1) Note that these totals exclude health professionals employed within the private sector.

Figure 4.13 Saldanha Health Clinic

4.10 SOCIAL INFRASTRUCTURE AND SERVICES

4.10.1 Water

In the SBLM, 99.2 percent of the population has access to piped water; households that have access to water inside their homes, from outside taps on their properties and from communal taps (Western Cape Government, Socio-economic Profile Saldanha Bay Municipality, 2014).

The WCDM provides bulk potable water to the Saldanha Bay Municipality through the Misverstand Scheme which is part of the Berg River – Saldanha supply system (EMF, 2015). Water is obtained from both surface water (Berg River) and groundwater (Langebaan Road Aquifer) for the Misverstand Scheme. This scheme supplies the Saldanha Bay municipality and some of the towns in the Berg River municipality (EMF, 2015).

Water demand in the SBLM increased significantly with the establishment of a number of industries over the past 30 years (EMF, 2015). This is attributed to the development of the Port and associated infrastructure. According to the IDP Review, industrial water users account for approximately 50 percent of potable water use within the Saldanha Bay municipal area (EMF, 2015).

There are plans to construct a desalination plant in Saldanha Bay to supply additional water to the local area (WCDM IDP, 2012).

4.10.2 *Sanitation*

The WCDM has provided 92 percent of households with adequate sanitation. Compared with the District Municipality, the SBLM has provided 96.2 percent of its households with adequate sanitation facilities (Western Cape Government, 2014).

Table 4.6 below illustrates the existing wastewater treatment plants operated by the Saldanha Bay Local Municipality. In addition, it is important to note that a regional Waste Water Treatment Works (WWTW) is proposed for the SBLM, which will service the proposed industrial areas within Saldanha.

Table 4.6 Wastewater Treatment Plants in the Saldanha Bay Municipality

Responsible Municipality/ Organization	Name Of WWTW	Water Disposal Method	Technology Being Used
Saldanha Bay LM	Sandy Point (Shelly Point	Irrigation, 100 % Re-use	Package plant, Activated sludge
Saldanha Bay LM	Paternoster	Irrigation	Oxidation pond (lined)
Saldanha Bay LM	Laingville (St Helena Bay)	Irrigation, 30 % Re-use	Activated sludge, Maturation ponds, Disinfection
Saldanha Bay LM	Hopefield	Irrigation, 100 % Re-use	Activated sludge, Maturation ponds
Saldanha Bay LM	Langebaan	Irrigation, 100 % Re-use	Oxidation pond (lined), Activated sludge, Maturation ponds, Disinfection
Saldanha Bay LM	Saldanha	Irrigation, 100 % Re-use	Oxidation pond (unlined), Activated sludge, Maturation ponds, Disinfection
Saldanha Bay LM	Vredenburg	Watercourse, 50 % Re-use	Oxidation pond (lined), Activated sludge, Maturation ponds, Disinfection

Source: DWA (2009)

4.10.3 *Waste*

SBLM dispose of all waste at the licensed Vredenburg landfill and a number of drop-off facilities are provided at various communities (WCDM, 2014). There is also a Materials Recovery Facility at the Vredenburg landfill. In addition, any hazardous material can be discarded at the Visserhoek Disposal facility. Finally, it is important to note that a regional waste disposal facility has been planned to be constructed in Vredendal (WCDM, 2012).

4.10.4 *Housing*

There is a wide variety of housing in the SBLM, from low cost housing to luxurious holiday homes. Wards 5 and 6 typical have larger houses, while Wards 3 and 4 consist of low cost housing.

There has been a slow delivery of housing in the WCDM and SBLM. Although 2,535 households gained access to housing for the first time since 2007, the number of households on the waiting list for housing is currently estimated at 8,179 and the number of households affected by the housing backlog is 6,730 (Saldanha Bay Local Municipality IDP, 2012). The housing backlog has been increasing steadily since 2001, when it was 2,836.

According to the 2006 West Coast Socio-Economic Profile, the slow pace of housing delivery was attributed to the constantly changing settlement patterns resulting from in-migration.

4.10.5 Energy

Within the SBLM the proportion of households using electricity for lighting has increased in the Municipality from 91.6 percent during the 2001 Census to 97 percent in 2011 (StatsSA, 2011). Even though an increase was seen in the number of households having access to electricity, 92 percent of households use electricity for cooking purposes, and the other 8 percent use gas or paraffin (StatsSA, 2011).

4.10.6 Roads

The WCDM has approximately 10 097 km of road, (West Coast District Municipality, 2012). The roads are maintained by the WCDM on behalf of the Western Cape Provincial Department Transport and Public Works.

The SBLM has 410 km of tarred Municipal roads and 48, 24 km of gravel roads (excluding private farm roads), and the roads are generally of poor quality. There is a backlog in the SBLM relating to road maintenance, and it is noted in the IDP that 548 households did not have access to a road from their dwelling (Saldanha Bay Local Municipality, 2012)

4.10.7 Policing and Crime

There are 26 police stations in the WCDM. These are evenly distributed across the local municipalities, with five in each local municipality. This distribution does not account for the geographic extent or the population size of each local municipality. There are police stations in all the major towns within the SBLM which service the town and the rural surroundings (Saldanha Bay Local Municipality, 2012). The most prolific crimes committed in the SBLM are "burglaries at residential premises" and 'drug-related crimes" with 995 and 828 incidents being reported in 2013/14 respectively. Crime statistics across all categories increased from 2010 to 2013, but have subsequently started to decrease again (refer to *Table 4.7*). At this stage the reason for this is unclear.

Table 4.7 Crime in the SBLM between 2009 and 2014

Type of Crime	2009/10	2010/11	2011/12	2012/13	2013/14
Burglary at residential premises	792	787	1 018	1 225	955
Driving under the influence of alcohol or drugs	262	194	161	148	137
Drug-related crime	1 138	1 071	1 006	1 013	828
Murder	35	33	21	29	25
Total Sexual Crimes	154	132	134	147	123

Source: Western Cape Government (2014)

5 IMPACT ASSESSMENT

This section presents the potential socio-economic impacts associated with the Project. The potential impacts have been assessed using the impact assessment methodology provided in *Section 1.5*.

The following potential impacts are discussed further below:

- Employment creation, skills enhancement and local business opportunities.
- Impacts on community health and safety, including:
    - Impacts associated with the presence of the workforce and jobseekers;
    - Impacts associated with pressure on social infrastructure;
    - Impact on human health due to air emissions and dust generation;
    - Nuisance due to noise, dust and traffic on sense of place;
- Worker health and safety and rights; and
- Cumulative impacts.

5.1 EMPLOYMENT CREATION, SKILLS ENHANCEMENT AND LOCAL BUSINESS OPPORTUNITIES

The Project is expected to generate positive impacts on the local economy and livelihoods in terms of:

- employment and skills enhancement; and
- local business opportunities through the procurement of goods and services.

Positive impacts will be primarily associated with the construction phase and therefore temporary in nature. The termination of construction contracts will occur once construction activities are completed. Workers who have relocated to the area for the Project are likely to leave the area in search of other opportunities, especially if they are permanent employees of contractors and subcontractors.

Those who have worked on the Project will have an advantage when seeking alternative jobs on similar projects due to the experience and any training received through this Project. The area is characterised by a number of new industrial developments and is earmarked for other gas power projects which may offer alternative employment opportunities. This is considered within the cumulative impacts *Section 7.17*.

5.1.1 *Construction and Decommissioning: Employment, Skills Enhancement and Local Business Opportunities*

Impact Description

The construction phase will last approximately 48 months in duration (Phase One 15 -18 months; Phase Two 18 - 20 months) and it is expected that approximately 450 direct employment opportunities will be available during the peak of construction. The breakdown of skills required during the construction phase will be as follows:

- Skilled labour: 58 percent;
- Semi-skilled labour: 20 percent; and
- Unskilled labour: 22 percent.

It is assumed that the majority of skilled workforce will come from outside the ADI and AII, but that many of them will be South African. Given that almost half the population in the SBLM have some level of skills training, it is anticipated that many semi-skilled positions will be available to the local workforce, and that unskilled positions will also be available to the local workforce.

Indirect employment through the construction supply chain will be limited as the major components of the power plant are highly specialised and will be manufactured outside of South Africa. However, much of the balance of plant of plant infrastructure for the Project will be procured within South Africa and where possible, from within the Local Municipality. Local procurement is going to benefit the hospitality and service industries primarily, such as accommodation, catering, cleaning, transport and security services. Local businesses will benefit during the construction phase as there will be increased spending within the area by the wage labour who will have improved buying power while employed by the Project.

Those who are able to secure employment on the Project will have the opportunity to improve their skills and experience through on-the-job training, and will thereby improve their opportunities for future employment. Given that Saldanha Bay is ear-marked for further industrial development, with a focus on the oil and gas sector, the upskilling of the local workforce will put the local workforce in a favourable position to secure future employment.

Employment numbers during decommissioning are not known at this stage, but it is expected that the make-up of the workforce will be similar to the construction phase.

Impact Assessment

The creation of local employment opportunities, skills enhancement and local business opportunities will be a direct, indirect and induced impact. The duration will be short-term, for the duration of the construction phase and

work contracts will vary in length, based on the type of work being performed. Employment will be created for South Africans at a local and regional level depending on skills and capacity availability, as such the extent will be regional. For those who are able to secure employment on the Project the scale will be medium, as they secure an income for the duration of their contract. The frequency of the impact will be constant for the duration of the construction phase. The magnitude of the impact will be positive.

Given the capacity of the local workforce to fill unskilled and semi-skilled employment positions, together with the opportunity to increase skills and work experience, the vulnerability is medium.

The significance of the impact is rated as **Moderate (+ve)**.

Proposed mitigation/ enhancement

The objective of mitigation is to optimise opportunities for employment of local people, wherever possible, or alternatively that employment of South Africans is prioritised over foreigners.

The following measures will be implemented to ensure that employment of local people is maximised:

- The Project will establish a recruitment policy which prioritises the employment of South African and local residents (originating from the Local Municipality) over foreigners. Criteria will be set for prioritising local residents and then other South Africans as part of the recruitment process.

- All contractors will be required to recruit in terms of the Project's recruitment policy, where practical.

- The Project will meet with the Local Municipality to access any available skills/employment-seekers database for the area. This database is to be updated and made available to the appointed contractors.

- The Project will advertise job opportunities and criteria for skills and experience needed through local media, at least three months ahead of recruitment. This information should also be provided to all relevant authorities, community representatives and organisations on the interested and affected party database.

- The recruitment policy and procedure should promote the employment of women as a means of ensuring that gender equality is attained.

- On-the-job performance and training will be monitored through performance reviews. Training needs will be identified and provided by the Project.

- No employment will take place at the entrance to the site. Only formal channels for employment will be used.

A local procurement policy will be implemented to ensure that local procurement is maximised, the policy will include:

- Reasonable targets for using local suppliers.
- A clause of none discrimination on any grounds of gender, ethnicity, religion.
- Criteria for monitoring local procurement and reporting on supplier performance management.
- Clearly communicate the criteria and tendering process prior to the commencement of construction activities; and
- The procurement policy and tendering requirements must be easily accessible to potential suppliers.

The following management measures will be implemented to enhance skills development and on-the-job training:

- Develop internal training 'certification' or reference letter provisions to those who receive internal training.
- Training plans will be developed according to each permanent employee' work agreement and relevant to their job description.

Residual impacts

A summary for the impact the construction and decommissioning phases of the Project is present below.

Table 5.1 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Employment Creation, Skills Enhancement and Local Business Opportunities	Construction and Decommissioning	Moderate (+ve)	Moderate (+ve)

Table 5.2 ***Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities during Construction***

Nature and Type: Direct, indirect and induced positive impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Positive

- **Extent:** Regional
- **Duration:** Short Term
- **Scale:** Large
- **Frequency:** Constant
- **Reversibility:** N/A
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE POSITIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measure will ensure the impact remains **MODERATE POSITIVE.**

5.1.2 Operation: Employment, Skills Enhancement and Local Business Opportunities

Impact Description

The power plant will be operated on a 24 hour, 7 days a week basis for the duration of the operation phase. It is anticipated that there will be approximately 95 employment positions available during this phase. As the plant will operate 24 hours a day, three full-time shifts will be created per day, and the breakdown of the skills required will be as follows:

- Skilled labour: 65 - 70 percent;
- Semi-skilled labour: 15 - 20 percent; and
- Unskilled labour: 10 - 15 percent.

A further breakdown of the employment opportunities is provided in *Table* 5.3.

Table 5.3 ***Estimated Employment Positions Available During Operation***

Position	Number of Positions Available
Admin	4
Security	15
Warehouse and Stores	6
Medical	6
Plant Control	15
Engineers	9
Technicians	9
Skilled	9
Unskilled	9
Tuition and Training	4
Quality Control, Water	3
Canteen	6

Position	Number of Positions Available
Total	95

Similar to the construction phase, local workers are expected to be qualified to fill unskilled and semi-skilled positions at first, whilst a limited number of people may be sufficiently qualified for skilled positions. Semi-skilled and skilled positions will initially be recruited from elsewhere in the region and South Africa. Over time, however, local workers will be able to fill more of the semi-skilled and skilled positions as training will be provided by the Project to the local workforce, will improve skills levels relevant to the Project.

During the operation phase the contracts that were in place during the construction phase will be terminated and procurement opportunities will be centred around maintenance activities, and providing goods and services to the Project. For those companies that meet eligibility criteria, become approved suppliers and enter the supply chain, there will be long-lasting and sustained benefits to the businesses and their employees through increased experience, capacity and training. As such, during the operation phase there will be opportunity for local business growth and development

Impact Assessment

The creation of local employment opportunities, skills enhancement and local business opportunities will be a direct, indirect and induced impact. The duration will be long-term, for the duration of the operation phase. Employment will be created for South Africans at a local and regional level depending on skills and capacity availability, as such the extent will be regional. For those who are able to secure employment or procurement contracts with the Project the scale will be large, as they secure long-term, stable income. The frequency will be constant for the duration of the operation phase. The magnitude of the impact will be Positive.

Given the limited employment and procurement opportunities during the operation phase, together with the lack of appropriate skills in the ADI, the vulnerability is low.

The significance of the impact is rated as **Minor (+ve)**.

Proposed mitigation/ enhancement

The mitigation/ enhancement measure provided for the construction phase, will apply to the operation phase.

Residual impacts

A summary for the impact during the operation phases of the project is presented below.

Table 5.4 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Employment Creation, Skills Enhancement and Local Business Opportunities	Operation	Minor (+ve)	Minor (+ve)

Table 5.5 Pre- and Post- Mitigation Significance for Employment Creation, Skills Enhancement and Local Business Opportunities during Operation

Nature and Type: Direct, indirect and induced positive impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Positive

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Large
- **Frequency:** Constant
- **Reversibility:** N/A
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR POSITIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measures will ensure the impact remains **MINOR POSITIVE.**

5.2 *IMPACTS ON COMMUNITY HEALTH AND SAFETY*

The presence of the Project could affect the health, safety and security of the communities in the area of influence as a result of worker-community interactions, in-migration to the area, increased incomes in the local community that may be used for drugs, alcohol and prostitution, the risk of injury associated with construction and decommissioning activities, increased pressure on health care resources and changes to the environment. Any community concerns or perceptions with regard to reduced health and physical safety and security by the community need to be addressed.

There are numerous ways in which the development of the Project could impact on community and individual levels of health. The term "health" is used broadly to include physical and mental health and well-being. The expected impacts on community health, safety and security as a result of construction, operation and decommissioning of the Project are:

- Impacts associated with the presence of the Project workforce.
- Impacts associated with an influx of jobseekers.
- Impact on human health due to air emissions.

5.2.1 *Construction, Operation and Decommissioning: Impacts Associated with the Presence of the Workforce and Jobseekers*

Impact Description

An increase in disposable income within the Project Area (among Project workers, both local and external) has been observed to result in a change in spending habits and behaviour resulting in increase in alcohol and drug abuse, increased incidences of prostitution and casual sexual relations, which poses a threat to community health and safety. Anticipated impacts associated with the presence of the workforce are:

- Increased incidence of alcohol and drug use;
- Increase in the spread of HIV/ Aids and other STIs;
- Increased incidence of teenage or unwanted pregnancies; and
- Increase in prostitution.

It is estimated that there will be approximately 450 people employed during the peak construction phase. The Project will seek to maximise the employment of local people, thereby reducing the size of the external workforce in the ADI, however an external workforce will be required. The external workforce (largely comprised of semi-skilled and skilled workers) will be housed with the ADI, as onsite worker accommodation is not feasible for health and safety reasons given the Project Site's close proximity to Saldanha Steel.

Experience from large infrastructure projects elsewhere in South Africa has shown that increased disposable income within the local workforce may result in increased incidences of illegal activities or antisocial behaviours such as prostitution and casual sexual relations as well as increased levels of substance abuse. Abuse of alcohol (and drugs, should this occur) often correlates with increased levels of criminal behaviour and violence (e.g. domestic violence) while under the influence of the substance. Such behaviour increases the number of people indirectly affected by, or vulnerable to, alcohol and drug abuse; and casual sexual relations could lead to an increased incidence of HIV/AIDS.

Further, it has been shown that members of an external workforce are likely to father children with local women while they are living in the Project Area. Given the temporary nature of the work, it is possible that both the women and children will be abandoned when the construction phase ends and the contractors move on, leaving single female-headed households.

A further impact associated with an influx of jobseekers is the potential for social tension, and increased competition for employment. The distribution of employment opportunities between locals and in-migrants often leads to tension and conflict, especially when locals perceive the migrants to be taking

their jobs. Competition for jobs has been raised as a concern by some stakeholders.

Impact Assessment

The impacts related to the presence of the workforce and jobseekers in the Project Area will be indirect and negative as the presence of a mostly male workforce, with an increased disposable income may adversely impact on health, safety and security of the local community through a likely increase in illegal or antisocial behaviour., The impact will be experienced at a local level, within the ADI. While the workforce will be in the Project Area for a limited time during the construction phase, jobseekers may stay in the area. Those affected by antisocial behaviour, such as the victims of abuse, women with unwanted pregnancies and people living with HIV/ AIDS, the duration of the impact will be long-term. The scale of the impact will be large for those affected as it will lead to a fundamental change in their life, and/ or health status, particularly for those affected by violence, unwanted pregnancies or HIV/ AIDS. For those affected, the impact will be largely irreversible. The frequency of the impacts will not be uniform, but may be felt often. Given the above, the magnitude of the impact is considered medium.

The external workforce will be housed within the Saldanha Bay area, and will interact with the local community. The local workforce will come from residential areas within the ADI such as Diazville, White City and Saldanha.

Teenage pregnancies are already of concern in region, and according to the WCDM, there has been a general increase in the numbers of recorded teenage pregnancies. The WCDM further notes that violence and substance abuse are also common in the District and that the HIV/ AIDS is increasing (see *Section 4.9*). In light of this, the vulnerability of receptors is considered medium, however, teenage girls are considered to be highly sensitive to this impact.

The significance of the impact is rated as **Moderate negative** overall, but the significance will be of **high** negative to those affected by unwanted pregnancies and HIV/ AIDS.

During the operation phase, there will be limited employment opportunities and the external construction workforce will likely leave the area. The number of local people with disposable income will decrease, as will the impacts associated with this. This impact will not be felt during the operation phase.

Proposed mitigation/ enhancement

The Project will develop an induction programme, including a Code of Conduct, for all workers directly related to the project. A copy of the Code of

Conduct is to be presented to all workers and signed by each person. The Code of Conduct must address the following aspects:

- respect for local residents and customs;
- zero tolerance of bribery or corruption;
- zero tolerance of illegal activities by construction personnel including: unlicensed prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting;
- no alcohol and drugs policy during working time or at times that will affect ability to work;
- description of disciplinary measures for infringement of the Code and company rules. If workers are found to be in contravention of the Code of Conduct, which they signed at the commencement of their contract, they will face disciplinary procedures that could result in dismissal.

The Project will implement a grievance procedure that is easily accessible to the local community, through which complaints related to contractor or employee behaviour can be lodged and responded to. The Project will respond in a serious manner to any such complaints. Key steps include:

- Circulation of contact details of 'grievance officer' or other key Project contact;
- Awareness raising among the local community regarding the grievance procedure and how it works; and
- Establishment of a grievance register to be updated and maintained by the Project.

The Project will develop and implement an HIV/AIDS policy and information document for all workers directly related to the Project. The information document will address factual health issues as well as behaviour change issues around the transmission and infection of HIV/AIDS.

Residual impacts

The implementation of the above mitigation measures would ensure that the construction phase significance is reduced to **Minor-Moderate** significance. A summary for the impact the construction phase of the Project is present below.

Table 5.6 Pre- and Post- Mitigation Significance for Impacts Associated with the Presence of the Workforce and Jobseekers

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts Associated with the Presence of a Workforce	Construction and Decommissioning	Moderate (-ve)	Minor - Moderate (-ve)

Table 5.7 Pre- and Post- Mitigation Significance for Impacts Associated with the Presence of a Workforce and Jobseekers

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Permanent
- **Scale:** Large
- **Frequency:** Constant
- **Reversibility:** Irreversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR - MODERATE NEGATIVE

5.2.2 Construction, Operation and Decommissioning: Pressure on Social Infrastructure and Services

Impact Description

It is generally accepted that large-scale infrastructure projects attract job-seekers into the Project Area. The Project is expected to stimulate in-migration as job-seekers enter the area with the intention of securing employment on the Project. In-migration of people will be further stimulated by possibility of business opportunities linked to the provision of goods and services to the Project, and by real or perceived opportunities arising from the general increase in economic activity in the area.

It is likely that a number of people will continue to stay in the area irrespective of whether they are able to secure employment and these people may move their families to the area. There is the possibility that people will return to their place of origin or move on to seek employment elsewhere if there are no employment opportunities for them, or when the construction phase is complete.

The expected impacts associated with an influx of jobseekers are:

- Pressure on existing social infrastructure – particularly housing, education and health facilities

The presence of the Project is likely to increase the rate of in-migration into the area, as people are attracted to the area in the hope of securing employment. The increase in population is expected to add pressure on existing infrastructure and services; specifically on housing services. Housing delivery has been slow in the SBLM and the housing backlog has been steadily increasing since 2001. The number of households on the waiting list for housing is currently estimated at 8,179 and the number of households affected

by the housing backlog is 6,730 (Saldanha Bay Local Municipality IDP, 2012). In-migrants will likely seek housing in Wards 3 and 4, where the SBLM is struggling to keep up with the local housing demand. This could be further exacerbated if job seekers decide to relocate their families to the area.

An influx of jobseekers and their families would place pressure on health and education facilities. SBLM has 14 medical facilities, but there are only two clinics located in the Saldanha Bay area (one in Ward 4 and the other in Ward 3). These already understaffed clinics would be placed under pressure to cope with the increase in population within their catchment.

Impact Assessment

The impacts related to pressure on social infrastructure and services will be an indirect impact. The impacts will be negative as they will place pressure on infrastructure and services and the local government, who will have to provide the services should the influx occur.

The impact will be experienced at a local level, within the ADI. The impacts will be long-term despite the fact that the period of influx may be limited to the construction phase, the associated impacts will continue to occur into the future. The scale of the impact will be medium, as the Project is not expected to attract large volumes of in-migration and the degree of change for local population will therefore be notable but will not dominate over existing conditions. The frequency of the impacts will not be uniform, but will felt often until in-migration stabilises and upgrades to infrastructure are undertaken. The impact is revisable as social infrastructure and services can be improved to address the impact. Given the information presented above, the impact will be medium in magnitude.

The population within the SBLM has been increasing at a rate greater than expected which has been attributed to the in-migration of people seeking economic opportunities. There is an existing housing backlog in the SBLM, and health services are under pressure. Therefore, the vulnerability of receptors is considered medium.

Therefore, the significance of the impact is rated as **Moderate negative,** the level of in-migration, and movement of job-seekers cannot be accurately predicted.

During the operational phase, there will limited employment opportunities and the Project is unlikely to attract further job seekers.

Proposed Mitigation Measures

The Project will implement a grievance procedure that is easily accessible to the local community, through which complaints related to contractor or

employee behaviour can be lodged and responded to. The Project will respond in a serious manner to any such complaints. Key steps include:

- Circulation of contact details of 'grievance officer' or other key Project contact.
- Awareness raising among the local community regarding the grievance procedure and how it works.
- Establishment of a grievance register to be updated and maintained by the Project.

Implement management measures associated with the prioritization of local labour, as outlined in *Section 5.1.1*

Residual impacts

The implementation of the above mitigation measures would ensure that the construction phase significance remains of Moderate significance.
A summary for the impact the construction phase of the Project is present below.

Table 5.8 Pre- and Post- Mitigation Significance for Impacts Associated with Pressure on Social Infrastructure and Services

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts Associated with Pressure on Social Infrastructure and Services	Construction	Moderate (-ve)	Moderate (-ve)

Table 5.9 Pre- and Post- Mitigation Significance for Impacts Associated Pressure on Social Infrastructure and Services

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Medium
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE

5.2.3 *Construction and Decommissioning Phase: Impact on Human Health due to Air Emissions and Dust Generation*

Impact Description

Most construction and decommissioning activities generate dust, which settles on surrounding properties and land, and is often more of a nuisance than a health issue. The dust is generally coarse, but may include fine respirable particles (PM_{10}) and these are known to be a risk to human health. Exhaust emissions from construction vehicles and equipment typically include particulates (including PM_{10}), carbon monoxide (CO), nitrogen oxides (NO_X), sulphur dioxide (SO_2) and volatile organic compounds (VOCs) including benzene. The creation of dust associated with vehicle traffic will be limited as most of the roads in the ADI are paved.

Impact Assessment

The impacts on human health due to air emissions and dust generation will be a direct, negative impact. The duration will be short-term, for the duration of the construction phase. The extent of the impact will local, as the pollutants will be limited in dispersion and will occur onsite and around the main transport routes. Based on the outcomes of the Air Quality Specialist Report, *Section 10.3 of the EIR, and Annex D,* air emissions generated as a result of construction phase activities not expected to have an adverse effect on health, therefore the degree of change experienced by individuals will be negligible and the scale of the impact will be small. The impact is considered reversible. The frequency of the impact will vary depending on construction activities, but it will be often for the duration of the construction phase. Given the above factors, the magnitude of the impact is considered small.

The vulnerability of receptors is considered low as the Project Site located in an industrial area with no sensitive receptors located adjacent to the site. People living along transport routes have access to health care and would be able to seek medical attention if their health was adversely affect by air emissions.

Therefore it is anticipated that the significance of the impact will be **negligible.**

Mitigation

All of the mitigation measures outlined in *Section 10.3 of the EIR, and Air Quality Specialist Report, Annex D* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will ensure that the impact remains of negligible significance.

Table 5.10 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on Human Health due to Air Emissions and Dust Generation	Construction	Negligible	Negligible

Table 5.11 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Low

- **Extent:** Local
- **Duration:** Short-term
- **Scale:** Small
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): NEGLIGABLE
IMPACT SIGNIFICANCE (POST-MITIGATION): NEGLIGABLE

5.2.4 Operations Phase: Impact on Human Health due to Air Emissions

Impact Description

The operation of the power plant will result in emissions due to the operation of combustion sources mainly the turbines and generators, which could result in decreases in air quality. Emissions of air pollutants from the ArcelorMittal CCGT power plant will result during operations through the combustion of LNG or CNG resulting in NO_X, CO and CO_2 emissions and some methane (CH_4). Increased emissions of any of these pollutants can result in negative implications for human health. Respiratory diseases and cardiovascular diseases are most likely to result. In order to protect human health, air quality standards have been established and emissions below these standards are considered to have a negligible impact on the health of communities.

Exhaust emissions from Project associated vehicles and equipment typically include particulates (including PM_{10}), carbon monoxide (CO), nitrogen oxides

(NO_X), sulphur dioxide (SO_2) and volatile organic compounds (VOCs) including benzene.

Impact Assessment

The impacts on human health due to air emissions and dust generation will be a direct, negative impact. The duration will be long-term, for the duration of the operation phase. The extent of the impact will local, as the pollutants will be limited in dispersion, occurring onsite and adjacent to the site, as well as the main transport routes. Based on the outcomes of the Air Quality Specialist Report, *Section 10.3 of the EIR, and Annex D,* for all pollutants the predicted ambient concentrations are well below the respective National Ambient Air Quality Standards (NAAQS). Therefore, air emissions generated as a result of the operation phase is not expected to have an adverse effect on health - the degree of change experienced by individuals will be negligible and the scale of the impact will be small. The impact is considered reversible. The frequency of the impact will be constant, as the power plant will operate 24 hrs a day, 7 days a week. Given the above factors, the magnitude of the impact is considered medium.

The vulnerability of receptors is considered low as the Project Site is located in an industrial area with no sensitive receptors located adjacent to the site. People living along transport routes have access to health care and would be able to seek medical attention if their health was adversely affect by air emissions.

Therefore it is anticipated that the significance of the impact will be **Minor (-ve).**

Mitigation

All of the mitigation measures outlined in *Section 10.3 of the EIR, and Air Quality Specialist Report, Annex D* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will ensure that the impact remains of Minor significance.

Table 5.12 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on Human Health due to Air Emissions and Dust Generation	Operation	Minor (-ve)	Minor (-ve)

Table 5.13 Pre- and Post- Mitigation Significance for Impact on Human Health due to Air Emissions and Dust Generation

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Small
- **Frequency:** Constant
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR

5.3 INCREASED NUISANCE FACTORS AND CHANGE IN SENSE OF PLACE

The Project Site is located within an industrial area, adjacent to the Saldanha Steel facility. The land immediately surrounding the site it utilised for industrial purposes, grazing or is vacant land. Within the broader area, much of the surrounding land to the north and east is utilised for agriculture, nature reserves and recreational activities, residential and holiday homes.
There are existing visual intrusions around the Project Site, such as power lines, railway pylons, industrial and port facilities, therefore, the landscape should not be seen as pristine.

The Project will introduce a gas-fired power plant and associated infrastructure such as a substation and Operation and Maintenance (O&M) buildings into the area, within close proximity to existing industrial infrastructure. The construction and operation of the Project will lead to an increase in ambient noise, the generation of dust and increased traffic volumes, all of which have the ability to alter the sense of place of the existing environment.

5.3.1 Construction, and Decommissioning Phase: Increased Nuisance Factors and Change in Sense of Place

Impact Description

Impacts associated with air quality, traffic and noise have been assessed by specialists and are discussed in *Section 10.9 of the EIR, the Traffic Assessment Report (Annex D), the Noise Impact Assessment Report (Annex D) and Air Quality Specialist Report (Annex D).*

The Project will cause nuisance of the communities in the ADI due to noise, dust and vibration, as well as increased traffic volumes during construction and decommissioning.

Noise levels are expected to increase as a result of construction activities on site such as trucks that deliver construction equipment and materials; earthworks using heavy machinery, and site preparation, or piling activities if required.

Additional vehicle movements during peak periods are anticipated to be in the order of 600 person trips during the peak hour or 275 cars, the equivalent of 18 minibus taxis and two buses. The minbus taxis and buses will collect and dispatch the workforce in the vicinity of the site, including areas in the ADI (such as Ward 3 and 4) and AII (such as Vredenburg).

The anticipated ambient noise levels during the construction phase of the Project has been modelled and based on the results thereof, it is anticipated that the change in ambient noise levels will be negligible during construction. The construction phase sound levels may impact on the ambient noise levels for an area of 2 500 m from the Project Site, the Site located in an industrial area and ambient noise levels are not going to exceed the 35 dBA guideline at any of the identified receptors.

The increase in traffic volumes will be notable during peak traffic times in the morning and afternoon, and may frustrate other road users, but the increase in traffic will be manageable through the implementation of mitigation measures.

Dust associated with the Project will be largely limited to the Project site.

While each of the above mentioned impacts are considered to be largely manageable, the combined effect of the noise, dust and traffic impacts are likely to have a negative impact on the sense of place for some stakeholders.

Impact Assessment

The impacts associated with increased nuisance factors and change in sense of place during construction and decommissioning will be a direct, negative impact. The duration will be short-term, for the duration of the construction

phase. The extent of the impact will local, limited to the site and immediate surrounds, as well as the local transport routes.

The scale of the impact will be medium. The impact is considered reversible. The frequency of the impact will vary depending on construction activities, but it will be often as it relates to nuisance factors, and constant as it relates to sense of place. Given the above factors, the magnitude of the impact is considered medium.

The vulnerability of receptors is considered small to medium, as traffic volumes in the area are low, and road users will find the increased traffic volumes frustrating. The construction phase sound levels may impact on the ambient noise levels for an area of 2 500 m from the Project Site.

Therefore it is anticipated that the significance of the impact will be **Moderate negative.**

Mitigation

All of the mitigation measures outlined in *Section 10.9 of the EIR, the Traffic Assessment Report, the Noise Impact Assessment Report and Air Quality Specialist Report (Annex D)* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will result in the impact being of Minor significance.

Table 5.14 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Nuisance due to Noise, Dust and Vibration during Construction and Decommissioning	Construction	Moderate (-ve)	Minor (-ve)

Table 5.15 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place during Construction and Decommissioning

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Short-term
- **Scale:** Medium
- **Frequency:** Often to constant
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MINOR NEGATIVE.

5.3.2 Operation Phase: Increased Nuisance Factors and Change in Sense of Place

Impact Description

The Project will cause nuisance to the communities in the ADI due to noise, dust and vibration, as well as increased traffic volumes during operation. This will affect the communities and households closest to the Project site and along the main access roads, as well as along the routes used to transport the workforce to and from the site on a daily basis.

During operation, the power plant will operate 24 hours a day, seven days a week. It is anticipated that the change in ambient noise levels will be negligible during Phase 1 of the project and low during Phase 2, with the 35dBA ambient guideline been slightly exceeded at two sensitive receptors. This noise will have a more constant characteristic and will be perceived as a humming sound. Operational phase sound levels may impact on the ambient noise levels for an area of 3,000 m from the proposed activity.

The Project associated traffic will decrease during the operations phase as there will be fewer people employed by the Project during this phase. Additional vehicle movements are associated with the commuting of employees to and from work each day. Additional vehicle movements during peak periods are anticipated to be in the order of 177 person trips during the peak hour or 80 cars, the equivalent of 5 minibus taxis and one bus.

The presence of the Project may alter the visual character of the landscape during the operation phase. While the Project Site is located in an industrial area, there are a number of tourism and recreational areas in the border surrounding areas, as listed above. *Figure 5.1* provides an analysis of the view shed of the Project, ie it indicated, based on topography and landscape features, where the Project will be visible from. It does not take into account

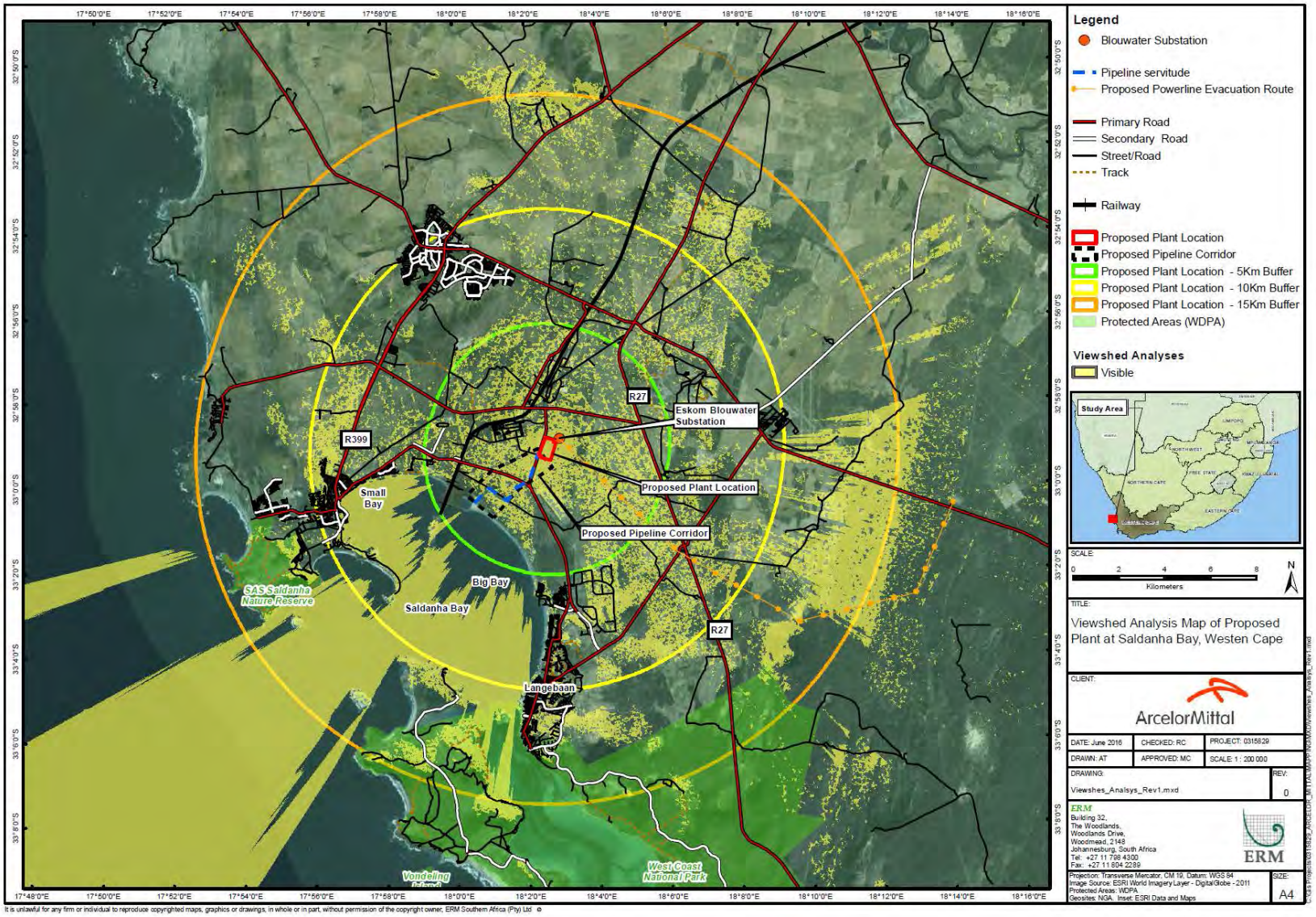
how visible the how Project will be based on distance from the Project. Based on *Figure 5.1* the Project may be partially visible from some sensitive areas, such as Langebaan, Mykanos, the West Coast National Park. It will also be visible from surrounding residential areas. Based on a Visual Impact Assessment for a similar power plant facility with an estimated height of 40 m in Saldanha Bay (M. Cilliers (PrLArch.) & D. Townshend (BL (UP)), it is noted that the vanishing threshold (1) is estimated at 8 km away during the day and 16 km away at night. The proposed facility is located in proximity to the following potentially affected receptors:

- 7 km from Blouwater Bay residential area
- 8 km from Louwville residential area
- 6.5 km from Mykonos tourism and recreational facilities
- 6.5 km from the West Coast Fossil Park
- 10 km from Langebaan residential area
- 10 km from Langebaan Weg
- 13 km from SAS Saldanha Contractual Nature Reserve
- 14 km from Jacobsbaai residential area
- 20 km from the West Coast National Park

The Project will be visible from a number of tourism and recreational areas, as well as residential area. Given the distance between the Project and the potential receptors (largely in excess of 6 km), it can be concluded that while the Project will be visible, it will not dominate the landscape or detract from the receptors experience in of the area

(1) This is the distance where no discernible impact is observed, even if the proposal is technically still visible.

Figure 5.1 *View Shed for the Saldanha Steel Gas-fired Power Plant, not taking into Account Vanishing Threshold*



Impact Assessment

The impacts due to increased nuisance factors and change in sense of place during operation will be a direct, negative impact. The duration will be long-term, for the duration of the operation phase. The extent of the impact will local, limited to the site and immediate surrounds, as well as the local transport routes. It is anticipated that the change in ambient noise levels will be negligible during Phase 1 of the project and low during Phase 2, with the 35dBA ambient guideline being slightly exceeded at two sensitive receptors. The Project will be visible from a number of tourism and recreational areas, as well as residential area. Given the distance between the Project and the potential receptors (largely in excess of 6 km), it can be concluded that while the Project will be visible, it will not dominate the landscape or detract from the receptors experience in of the area. Never-the-less, for those receptors impacted by for increased nuisance factors and change in sense of place the scale of the impact will be medium.

The impact is considered irreversible. The frequency of the impact will be constant for the duration of the operation phase. Given the above factors, the magnitude of the impact is considered medium.

The vulnerability of receptors is considered medium as most sensitive receptors are located in quiet areas, with low ambient noise levels, low traffic volumes, and are people who are attracted to the area for outdoor and recreational activities (particularly in the case of those visiting parks and tourism facilities).

Therefore it is anticipated that the significance of the impact will be **Moderate (-ve).**

Mitigation

The ability to which visual impacts can be managed is limited by the size of the facility and the industry standards governing setbacks and fire control. However, the following measures should be implemented to minimise the impact of lighting at night:

- Lighting should be limited to areas where it is required.
- Lights should be directional and avoid light spillage.
- Low-level lights should be used over flood lights along walkways.

All of the mitigation measures outlined in *Section 10.9 of the EIR, the Traffic Assessment Report the Noise Impact Assessment Report and Air Quality Specialist Report (Annex D)* must be implemented by the Project.

In addition, the Project will develop and implement a Grievance Mechanism to address stakeholder concerns related to the Project in a timely manner.

Residual Impact

The implementation of mitigation measures will result in the remaining of **Moderate negative** significance.

Table 5.16 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place During Operation

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Increased nuisance factors and change in sense of place operation	Operation	Moderate (-ve)	Moderate (-ve)

Table 5.17 Pre- and Post- Mitigation Significance for Increased Nuisance Factors and Change in Sense of Place Operation

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long-term
- **Scale:** Medium
- **Frequency:** Constant
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE.

5.4 WORKER HEALTH AND SAFETY AND RIGHTS

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working and living conditions.

These issues will be considered not only for workers who are directly employed by the Project but also contractors (including sub-contractors) and workers within the supply chain. The main risks in relation to worker's management and rights are associated with the use of contractors and subcontractors and the supply chain.

The Project is expected create 450 direct employment opportunities during the peak of the construction period, which will be approximately 48 months in duration. The majority of workers will be engaged by the EPC contractor and will consist of a semi-skilled to skilled workforce. The operation phase is

planned for a lifespan of 25 - 30 years and will involve around 95 permanent site employees including skilled and semi-skilled staff.

The expected impacts on worker rights and H&S as a result of construction, operation and decommissioning activities and Project operation are as follows:

- Risk to workers H&S due to hazardous construction and decommissioning activities;
- Risk to workers H&S due to hazardous operation activities; and
- Violation of workers' rights.

This impact assessment is based on the assumption that no specific Project H&S policies, procedures and training provisions are in place for construction workers (both of EPC Contractor and subcontractors) as limited information is available on this at the current Project stage.

5.4.1 Construction and Decommissioning Phase: Risk to Workers' H&S due to Hazardous Construction Activities

Impact Description

The construction activities will involve the following main activities (in order of occurrence):

- Site preparation including levelling;
- Piling of the foundations;
- Concrete works in scope of building construction;
- Construction of fuel supply arrangements;
- Construction of the powerline; and
- Underground pipeline laying.

Details of the activities associated with decommissioning are not yet detailed but will involve removal of all installed infrastructure.

These activities will involve the operation of heavy equipment and trucks, working at height, working in confined spaces, construction traffic, use of electric devices, handling of hazardous materials and other hazardous activities. Due to the nature of the activities being undertaken during construction and decommissioning, worker H&S is a key risk with the potential for accidents that may result in injuries and fatalities as well as lost man-hours.

Within South Africa, worker health and safety falls under the ambit of the Department of Labour, and is primarily governed through the Occupational Health and Safety Act (OSHA) (Act No. 83 of 1993). Employees working informally and those with limited or without awareness of their rights (for example, migrant workers, or those newly entering the labour market) are likely to be most at risk of working in unsafe conditions.

Impact Assessment

The impact on worker health and safety from the Project will be a direct, negative impact. The duration will be short-term, for the duration of the construction phase. The extent of the impact will be regional, as it will affect those directly employed by the Project, as well as people employed in the supply chain. The scale of the impact will be large for anyone adversely affected by a health and safety incident on the Project, as they may experience a temporary loss of work time, or in the worst-case scenario may be rendered permanently unable to work. In most instances, this impact is considered reversible, as incidences can be addressed through medical intervention where required and health and safety can be constantly improved to avoid future incidences. The frequency of the impact will not be uniform, but will likely occur often the duration of the construction phase. The magnitude of the impact is therefore considered Medium.

The vulnerability of the workers to this impact is considered low, as there are laws in place in South Africa to protect worker rights. However, migrant workers, or those newly entering the labour market may not be aware of their rights, and people may be willing to compromise their rights to secure employment in light of high unemployment rates.

The impact is therefore considered to be of Minor - Moderate negative significance.

Mitigation

- The Project will comply with all applicable South African legislation in terms of health and safety, and worker rights, which will include access to workmans compensation for loss of income resulting from an onsite incident.

- As part of the contractor and supplier selection process the Project will take into consideration performance with regard to worker management, worker rights, health and safety as outlined in South African law, international standards and the Project's policies.

- The Project will provide support to contractors and subcontractors to ensure that labour and working conditions are in line with South African law through capacity building.

- Workers will be provided with primary health care and basic first aid at construction camps /worksites.

- Facilities and operations will be developed, planned and maintained such that robust barriers are in place to prevent accidents. All employees have the duty to stop any works if adequate systems to control risks are not in place.

- In line with the worker code of conduct employees should not be under the influence of intoxicants which could adversely affect the ability of that employee to perform the work or adversely affect the health and safety of other employees, other persons or the environment.

- The Project will provide of Personal Protective Equipment (PPE), training and monitoring as well as ongoing safety checks and safety audits.

Residual Impact

Following the implementation of mitigation measures the impact significance will be (post-mitigation) of Minor negative significance**.**

Table 5.18 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Construction Activities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Risk to Workers' H&S due to Hazardous	Construction	Minor to Moderate (-ve)	Minor (-ve)

Table 5.19 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Construction and Decommissioning Activities

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low to Medium

Impact Magnitude: Low

- **Extent:** Regional
- **Duration:** Short-term
- **Scale:** Large
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR to MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measures will ensure the impact remains **MINOR NEGATIVE.**

5.4.2 Operation Phase: Risk to Workers' H&S due to Hazardous Operation Activities

Please note: For the operation of the Project the mitigation and prevention measures outlined above for construction (Section 5.4.1) are considered as embedded controls.

Impact Description

Hazardous activities during the operation phase and regular maintenance activities will include, but not be limited to; the operation of heavy equipment and trucks, use of electrical devices including high voltage, working at height, maintenance of high pressure pipework and vessels and handling of hazardous materials. During these activities the workers will be at risk for accidents and injury.

Impact Assessment

The impact on worker health and safety as a result of the Project will be a direct, negative impact. The duration will be long-term, for the duration of the operation phase. The extent of the impact will be regional, as it will affect those directly employed by the Project, as well as people employed in the supply chain. The scale of the impact will be large for anyone adversely affected by a health and safety incident on the Project, as they may experience a temporary loss of work time, or in the worst-case scenario may be rendered permanently unable to work. In most instances, this impact is considered reversible, as incidences can be addressed through medical intervention where required and health and safety can be constantly improved to avoid future incidences. The frequency of the impact will not be uniform, but will likely occur occasionally the duration of the operation phase. The magnitude of the impact is therefore considered small.

The vulnerability of the workers to this impact is considered low, as there are laws in place in South Africa to protect worker rights and most employees will be highly skilled engineers and technicians, who have likely been educated around their rights and H&S practices.

The impact is therefore considered to be of minor significance.

Mitigation

The implementation of mitigation measures defined for the construction phase will continued throughout the operation phase with consideration in the health and safety management system of the specific risks associated with operation and maintenance activities and the new size and structure of the workforce. In this regard, mitigation measures outlined in *Section 5.4.1* above are applicable to the operation.

Residual Impacts

The implementation of mitigation measures will ensure that the significance remains of minor negative significance.

Table 5.20 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Operation Activities

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Risk to Workers' H&S due to Hazardous Operation Activities	Operation	Minor (-ve)	Minor (-ve)

Table 5.21 Pre- and Post- Mitigation Significance for Risk to Workers' H&S due to Hazardous Operation Activities

Nature and Type: Direct, negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Low

Impact Magnitude: Low

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Large
- **Frequency:** Rare
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): Enhancement measures will ensure the impact remains **MINOR NEGATIVE.**

5.5 CUMULATIVE IMPACTS

The Project is located in an area ear-marked for further industrial development. The National Department of Energy, through its Gas to Power Programme, is investigating the feasibility of development of a gas-fired power station in the Saldanha Bay area. In addition, the IDZ is being promoted as an oil and gas hub and industrial development is being encouraged in the area.

The preceding impact assessment assessed the socio-economic impacts associated with the Project largely in isolation. It is important to, assess cumulative impacts associated with a proposed development and there also is a legislated requirement in South Africa to do so. The cumulative impacts on the socio-economic environment are discussed below.

5.5.1 Method

There are numerous proposed developments in the Saldanha – Vredenburg area. At this stage, not all developments can be confirmed and the timing of the developments is not known. A selection of similar developments and

those either confirmed or most likely to conme to fruition have been considered in this cumulative impact assessment including:

- The IDZ development itself, covering an area of up to 4000ha;
- Afrisam Cement Plant;
- LPG storage Facilities – Sunrise and Avidia ;
- Vredenburg Industrial Development
    - Frontier Separation Plant;
    - Chlor-Alkali Facility;
- One desalination plant; and
- One additional 1000 MW gas-fired power plant.

The cumulative impact of the above mentioned projects, together with the Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay may impact of the following:

- Economy, Employment and Skills
- Community Health Safety and Security
- Pressure on Social Infrastructure and Services

At the request of the Department of Environmental Affairs, the methodology described in *Chapter 1* has been used to assess the cumulative impacts.

5.5.2 Cumulative Impacts of the Socioeconomic Environment

Economy, Employment and Skills Development

Impact Description

The development of large scale industrial projects will result in increased direct and indirect employment during the construction and operation of each of the projects. The nature and extent of the benefits will depend on the employment strategy of the various developers and the extent to which they are committed to maximise local employment.

There may be overlap between the construction phases of the Project with the other developments, or they may run consecutively. Either way, this will result in a significant uplift in local employment directly and indirectly through the procurement of goods and services. Furthermore, those that have been employed by one of the developers may be in better position to find employment with the other developers as they will have increased their skills and experience. As such, the potential for cumulative positive benefits associated with economy, employment and skills development is considered to be higher than for the Project alone.

The operation of the developments outlined will occur over the same period of time and will be located in close proximity as such the economic, employment and skills development opportunities outlined will be greater for all the projects combined then just for the Project development.

It should be noted that expectations regarding economic development, employment and skills development will be high amongst stakeholders in the local community and as such, in the event that one developer does not meet expectations, there is the potential for all developers to be the target of this negative feedback.

Impact Assessment

The cumulative creation of local employment opportunities, skills enhancement and local business opportunities will be a direct, indirect and induced impact. The duration will be medium to long-term, as the Projects will not all happen concurrently. Employment will be created for South Africans at a local and regional level depending on skills requirements of each project, as such the extent will be regional. For those who are able to secure employment on the Project the scale will be medium to high, depending on the duration of the contract. The magnitude of the impact will be positive.

Given the capacity of the local workforce to fill unskilled and semi-skilled employment positions, together with the opportunity to increase skills and work experience, the vulnerability is medium.

The significance of the impact is rated as **Moderate (+ve)**.

Proposed mitigation/ enhancement

It is recommended the Project investigates opportunities to work with other developers to develop a collaborative approaches to training, employment and skills development for the local population, starting now in the run up to Project construction. This may include developing a coordinated standard set of requirements for service providers (eg required labour numbers of carpenters, welders, Heavy Goods Vehicle drivers, etc. and the minimum qualifications required for these) and making the communities aware of these requirements. The developers should also plan and implement a coordinated approach to community skills development based on these requirements.

Residual impacts

The implementation of the above mentioned mitigation measures will ensure that the positive impact on the Economy, Employment and Skills Development remains **moderate positive.**

Table 5.22 ***Pre- and Post- Mitigation Significance for Economy, Employment and Skills Development Cumulative Impact***

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Economy, Employment and Skills Development	Cumulative Impact	Moderate (+ve)	Moderate (+ve)

A summary for the impact presented below.

Table 5.23 ***Pre- and Post- Mitigation Significance for Economy, Employment and Skills Development Cumulative Impact***

Nature and Type: Indirect positive impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Positive

- **Extent:** Regional
- **Duration:** Long Term
- **Scale:** Medium to Large
- **Reversibility:** N/A
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE POSITIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE POSITIVE.

Community Health Safety and Security

Impact Description

The presence of an external workforce for the combined projects housed within the communities and construction camps could increase the spread of communicable diseases and STIs such as HIV/AIDS. The profile of these diseases will be influenced by the existing health profile of communities within the area of influence of the project and that of the workers, which is difficult to predict for the various projects.

Increased air emissions as a result of the Project and another power plant as well as additional risks of industrial accidents and explosions could result in cumulative impacts on community health and safety. However, according to the Air Quality Report (Annex D of EIR), the cumulative impact on air quality is expected to be minor, and according to the QRA(Annex D of EIR), the cumulative risks associated with the Project are acceptable.

While the Project alone is not expected to attract vast numbers of jobseekers to the area, the development of multiple projects is likely to attract people seeking employment opportunities, particularly in light of a declining agricultural sector in the West Coast District Municipality, and given that Saldanha Bay is already seen as an economic hub. An influx of jobseekers will

result in increased competition for employment which may contribute locally to social tension and conflict within the local communities.

Impact Assessment

The impacts related to community health and safety in the Project Area will be indirect and negative. The impact will be experienced at a local level, within the ADI. The duration of the impact will be long term, as projects may occur over an extended period of time. The scale of the impact will be large for those affected as it will lead to a fundamental change in their life, and/ or health status, particularly for those affected by violence, unwanted pregnancies or HIV/ AIDS. For those affected, the impact will be largely irreversible. Given the above, the magnitude of the impact is considered medium.

In light of this, the vulnerability of receptors is considered medium, however, teenage girls are considered to be highly sensitive to this impact.

The significance of the impact is rated as **Moderate negative** overall, but the significance will be of **high** negative to those affected by unwanted pregnancies and HIV/ AIDS.

Proposed mitigation/ enhancement

- The Project should engage with other developers to ensure that community education and awareness campaigns in relation to health, safety and security are developed and implemented collaboratively to avoid duplication of effort.

- The Project should engage with its neighbours to develop combined emergency response plans which take into account all the proposed developments and the community. This should consider combined use of security personal and risks from unplanned events.

Residual impacts

The implementation of the above mitigation measures would ensure that the impact significance **remains that of Moderate.**

A summary for the cumulative impact is present below.

Table 5.24 ***Pre- and Post- Mitigation Significance for Community Health and Safety Cumulative Impact***

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts Associated with the Presence of a Workforce	Cumulative Impact	Moderate (-ve)	Moderate (-ve)

Table 5.25 Pre- and Post- Mitigation Significance for Community Health and Safety Cumulative Impact

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Large
- **Reversibility:** Irreversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE

Pressure on Social Infrastructure and Services

Impact Description

Related to the above, the influx of jobseekers together with presence of the workforce associated with each Project could place additional pressure on the delivery of social infrastructure and services, in particular housing. This is largely related to the unskilled workforce, as it is expected that the skilled and semi-skilled workforce would be able to enter the housing market.

Projects that bring a large external unskilled workforce in the area and do not provide accommodation will be increasing the burden on the provision of low cost housing. The SBLM is faced with a housing backlog, and healthcare facilities are under pressure.

Impact Assessment

The impacts related to increased pressure on existing social infrastructure and services will be an indirect impact. The impacts will be negative as they will place pressure on infrastructure and services and the local government, who will have to provide the services as demand grows.

The impact will be experienced at a local level, within the ADI. The impacts will be long-term as the provision of social infrastructure and services may take time to catch-up with the increased demand. The scale of the impact will be medium, as it will notable but will not dominate over existing conditions. The impact is revisable as social infrastructure and services can be improved to address the impact. Given the information presented above, the impact will be medium in magnitude.

The population within the SBLM has been increasing at a rate greater than expected which has been attributed to the in-migration of people seeking economic opportunities. There is an existing housing backlog in the SBLM, and health services are under pressure. Therefore, the vulnerability of receptors is considered medium.

Therefore, the significance of the impact is rated as **Moderate negative.**

Proposed mitigation/ enhancement

Mitigation measures implemented by the Project, particularly a commitment to employing local labour will help to minimise this impact, however, the potential impact on social infrastructure and services remains that of moderate, as the Project cannot influence how other developments employ or house their workforce.

Residual Impact

The impact significance remains of Moderate significance. A summary for the impact is present below.

Table 5.26 ***Pre- and Post- Mitigation Significance for Impacts Associated with Pressure on Social Infrastructure and Services Cumulative Impact***

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Pressure on Social Infrastructure and Services	Cumulative	Moderate (-ve)	Moderate (-ve)

Table 5.27 ***Pre- and Post- Mitigation Significance for Impacts Associated Pressure on Social Infrastructure and Services***

Nature and Type: Indirect negative impact

Sensitivity/Vulnerability/Importance of Resource/Receptor: Medium

Impact Magnitude: Medium

- **Extent:** Local
- **Duration:** Long term
- **Scale:** Medium
- **Frequency:** Often
- **Reversibility:** Reversible
- **Likelihood:** N/A

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE NEGATIVE
IMPACT SIGNIFICANCE (POST-MITIGATION): MODERATE NEGATIVE

5.6 *UNPLANNED EVENTS*

An unplanned event is a reasonably foreseeable event that is not planned to occur as part of the Project (i.e. would not occur as part of routine operating procedures), but which may conceivably occur as a result of Project activities (e.g. accidents). The risk of unplanned events related to the Project are accessed in *Section 10.12* of the *EIR*.

Both potential positive and negative socio-economic impacts associated with the development of the Saldanha Steel Independent Gas-fired Power Plant have been identified and assessed through this SIA. The key findings have been summarized below.

- Employment creation, skills enhancement and local business opportunities: The Project will create up to 450 employment opportunities during the construction phase and 95 during the operation phase. It is anticipated the unskilled and to a large extent semi-skilled workforce will be drawn from the local area. Those who secure employment will benefit from on the job training which will leave them well-placed to secure future employment on similar projects.

- Impacts on community health and safety:The presence of the Project could affect the health, safety and security of the communities in the area of influence as a result of worker-community interactions, in-migration to the area, increased disposable income in the local community that may be used for drugs, alcohol and prostitution, the risk of injury associated with construction and decommissioning activities, increased pressure on health care resources and changes to the environment. Air emissions, noise and increased traffic associated with the Project are also considered impacts that may affect community health and safety.

  The impacts on community health and safety range from minor to moderate, however, with the implementation of management measures, these impacts will be minor in significance, with the exception of impacts associated with the presence of the workforce. This is largely due to the long-term impacts that may arise from unwanted pregnancies and an increased incidence of HIV/ AIDS.

- Worker health and safety and rights:Workers' rights, including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working and living conditions. The development of health and safety plans and policies will ensure that this impact is of minor significance.

The implementation of management measures detailed in this report, as well as in other specialist reports are fundamental to ensuring that negative impacts associated with the Project are managed, and the positive impacts are enhanced. Key management measures are summarized below.

- The Project will establish a recruitment policy which prioritises the employment of South African and local residents (originating from the

Local Municipality) over foreigners. Criteria will be set for prioritising local residents and then other South Africans as part of the recruitment process.

- All contractors will be required to recruit in terms of the Project's recruitment policy, where practical.

- The Project will develop an induction programme, including a Code of Conduct, for all workers directly related to the project. A copy of the Code of Conduct to be presented to all workers and signed by each person. The Code of Conduct must address the following aspects:
    - respect for local residents and customs;
    - zero tolerance of bribery or corruption;
    - zero tolerance of illegal activities by construction personnel including: unlicensed prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting;
    - no alcohol and drugs policy during working time or at times that will affect ability to work;
    - description of disciplinary measures for infringement of the Code and company rules. If workers are found to be in contravention of the Code of Conduct, which they signed at the commencement of their contract, they will face disciplinary procedures that could result in dismissal.

- The Project will implement a grievance procedure that is easily accessible to the local community, through which complaints related to contractor or employee behaviour can be lodged and responded to. The Project will respond in a serious manner to any such complaints. Key steps include:
    - circulation of contact details of 'grievance officer' or other key Project contact;
    - awareness raising among the local community regarding the grievance procedure and how it works; and
    - establishment of a grievance register to be updated and maintained by the Project.

- The Project will develop and implement an HIV/AIDS policy and information document for all workers directly related to the Project. The information document will address factual health issues as well as behaviour change issues around the transmission and prevention of of HIV/AIDS.

- All of the mitigation measures outlined in *Section 10 of the EIR, the Traffic Assessment Report (Annex D), the Noise Impact Assessment Report (Annex D) and Air Quality Specialist Report (Annex D)* must be implemented by the Project.

The findings of the Social Impact Assessment for the Saldanha Steel Independent Gas-fired Power Plant indicate that the Project will have positive benefits for the local community through the creation of employment and skills enhancement, during both the construction and operation phases. While potential negative impacts associated with the Project have been identified, these can be managed through the implementation of the mitigation measures outlined in this SIA, the EIR and other specialist reports.

It is, therefore, recommended that the Project be supported subject to the implementation of the mitigation measures outlined in this SIA, the EIR and other specialist reports.

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PRIMARY DATA SOURCES

David Joubert Senior Manager: Strategic Planning and Enterprise Risk Services - Telephonic interview

Comments received during the Draft Scoping Phase

Comments received during the Public Meeting held in Saldanha Bay, 16 February 2016.

COMMENTS FROM THE SCOPING PHASE

The following comments related to potential socio-economic impacts were recorded during the Scoping Phase of the EIA:

1. Sounds good. How many skilled and unskilled jobs will this project create? and when do the intend to start building the gas power plant?

2. Labour employed

There is no breakdown of the labour to be sourced during construction and production into:-

- Skilled – to be brought in by contractors.
- Semi-skilled – to be sourced locally.
- Unskilled – to be sourced locally.

3. Contractors and Sub-contractors should target employing 90 percent semi-skilled and unskilled labour that has 5 years proven residence in the Saldanha Bay Municipal Area.

4. During the EIA stages, applicable skills needs must be identified throughout the different stages of construction and must a training development campaign be launched for individuals and SMME's within the area of jurisdiction.

5. Plans with the municipality should be considered to address possible pressure on the municipal infrastructure, especially basic services. Consideration should be given to the current IDZ developments and its impact on the environment.

Lindsey Bungartz

Senior Consultant
Social Consulting Services (SCS)

Lindsey Bungartz is a Senior Consultant within ERM based in Social Consulting Services team in Cape Town. She joined ERM Southern Africa in October 2007.

Lindsey has a Social Science Degree with majors in Environmental and Geographical Science and Sociology. She has completed a post-graduate Honours Degree in Environmental Management.

Lindsey has extensive experience in the power sector (renewable energy, hydropower, transmission), and has also worked the mining, oil and gas sectors. Through her experience in the power sector (renewable energy, hydropower, transmission), Lindsey has developed a deep understanding of the impacts (both adverse and beneficial) energy projects can on surrounding communities. She has experience in designing and implementing stakeholder engagement plans in a number of different stakeholder landscapes.

Lindsey has worked extensively in South Africa and in various African including Malawi, Mozambique, Ghana, Zambia and Zimbabwe.

Before joining ERM Lindsey worked for Amathemba Environmental Consulting as an Environmental Control Officer and assisting on Basic Assessment Reports. Prior to that, Lindsey completed an internship at Sustainable Energy Africa where she assisted with research on the development of a "Renewable Energy Act for local government."

Lindsey's fields of competence include Social Consulting Services, Environmental Impact Assessments, Environmental Management Plans, Project Management and Administration.

Professional Affiliations & Registrations

- International Association for Impact Assessment South Africa (IAIAsa)

Fields of Competence

- Social Impact Assessment (SIA)
- Social Screening and Risk Identification
- Stakeholder Engagement
- Environmental Impact Assessment (EIA)
- Environmental Management Plans
- Project Management

Education

- Bachelor of Social Science (Honours), Environmental Management, University of Cape Town, South Africa, 2002.
- Bachelor of Social Science (Environmental and Geographical Science and Sociology), University of Cape Town, South Africa, 2001.

Languages

- English
- Afrikaans

Key Industry Sectors

- Power
- Oil & Gas
- Mining
- Telecommunications
- Food & Beverage

Key Projects

Social Consulting Services

Environmental and Social Impact Assessment for a new pipeline and Floating, Storage and Offloading (FSO) in Mozambique, Sasol, 2015 – ongoing
ERM was commissioned to undertake an ESIA for new pipeline from an existing landbased Central Processing Facility to new FSO located 50 km offshore. Lindsey is part Social Specialist team. Her responsibilities included managing subcontractors and coordinating the primary data gathering process. She is responsible for the technical review of the social baseline written by sub-contractors, the identification and assessment of impacts and the development of appropriate mitigation measures. Further, Lindsey is responsible for developing stakeholder engagement material for public participation process associated with the ESIA.

Development of Environmental and Social Management Plans, ACWA Power, 2016
ERM as approached by a ACWA Power to develop a set of environmental and social management plans that would meet IFC requirements and could be rolled out across a number of different Projects in Southern Africa. Lindsey was responsible for the drafting of a comprehensive internal and external Grievance Mechanism and an HIV Awareness Guideline.

ESDD for six solar farms sites in South Africa, confidential client, 2016
ERM was appointed to complete an Environmental and Social Due Diligence for six proposed solar farm sites across SouthAfrica to identify potential cost and time risks, as well as fatal flaws. Lindsey was responsible for identifying and addressing non-technical risks associated with the six sites.

Regional Environmental Impact Assessment for two concession blocks for Sasol, Mozambique, 2015
ERM has been commissioned to undertake a high level and broad environmental and social assessment of two distinct concession blocks. Lindsey is leading the social team, and is responsible for managing local social sub-contractors, overseeing their in-country activities and for technical reviews of all social deliverables on the Project.

Environmental and Social Impact Assessment Due Dilligence for a Wind Farm in South Africa, confidential client, 2015
ERM was appointed to undertake a due diligence of an Environmental and Social Impact Assessment undertaken for a proposed Wind Farms in South Africa, on behalf of a potential investor. Lindsey undertook the review of the ESIA, highlighted rated potential risks and flaws, and advised client on how to address the potential risks.

Stakeholder Engagement and Social Impact Assessment for a Floating Power Plant in Saldanha Bay for the Department of Energy, South Africa, 2015 - ongoing
ERM was appointed to undertake an ESIA for a Floating Power Plant and associated in Saldanha Bay. Lindsey was the Stakeholder Engagement lead for the Project, responsible for designing and implementing a public participation process which meets legislative requirements and takes cognisance of a complicated stakeholder landscape. In addition, Lindsey was responsible for the delivery of the Social Impact Study for the Project, which entailed undertaking primary and secondary data gathering, writing up the social baseline, the identification and assessment of impacts and the development of appropriate mitigation measures.

Stakeholder Engagement and Social Impact Assessment for a Floating Power Plant in Richards Bay for the Department of Energy, South Africa, 2015 - ongoing
ERM was appointed to undertake an ESIA for a Floating Power Plant in Richards Bay. Lindsey was the Stakeholder Engagement lead for the Project, responsible for designing and implementing a public participation process which meets legislative requirements and takes cognisance of a complicated stakeholder landscape. In addition, Lindsey was responsible for the delivery of the Social Impact Study for the Project, which entailed undertaking primary and secondary data gathering, writing up the social baseline, the identification and assessment of impacts and the development of appropriate mitigation measures.

Stakeholder Engagement and Social Impact Assessment for LNG Impact Facilities in Saldanha Bay for the Department of Energy, South Africa, 2015 - ongoing
ERM was appointed to undertake an ESIA for the development of LNG Import Facilities in Saldanha Bay, in furtherance of Department's Gas to Power Programme. Lindsey was the Stakeholder Engagement lead for the Project, responsible for designing and implementing a public participation process which meets legislative requirements and takes cognisance of a complicated stakeholder landscape. In addition, Lindsey was responsible for the delivery of the Social Impact Study for the Project, which entailed

undertaking primary and secondary data gathering, writing up the social baseline, the identification and assessment of impacts and the development of appropriate mitigation measures.

Stakeholder Engagement and Social Impact Assessment for LNG Impact Facilities in Richards Bay for the Department of Energy, South Africa, 2015 - ongoing
ERM was appointed to undertake an ESIA for the development of LNG Import Facilities in Richards Bay, in furtherance of Department's Gas to Power Programme. Lindsey was the Stakeholder Engagement lead for the Project, responsible for designing and implementing a public participation process which meets legislative requirements and takes cognisance of a complicated stakeholder landscape. In addition, Lindsey was responsible for the delivery of the Social Impact Study for the Project, which entailed undertaking primary and secondary data gathering, writing up the social baseline, the identification and assessment of impacts and the development of appropriate mitigation measures.

Stakeholder Engagement and Social Impact Assessment for a Gas-fired Power Plant, ArcelorMittal, South Africa, 2015 - ongoing
ERM was appointed to undertake an ESIA for a gas-fired power plant at ArcelorMittal's Saldanha Steel facility. Lindsey was the Stakeholder Engagement lead for the Project, responsible for designing and implementing a public participation process which meets legislative requirements and takes cognisance of a complicated stakeholder landscape. In addition, Lindsey was responsible for the delivery of the Social Impact Study for the Project, which entailed undertaking primary and secondary data gathering, writing up the social baseline, the identification and assessment of impacts and the development of appropriate mitigation measures.

Environmental and Social Management Plan (ESMP) for a new sugar mill, PressCane, Southern Region, Malawi, 2015
ERM has been appointed to develop a Scoping Report and ESMP for the development of a new sugar mill at an existing site. Lindsey is leading the social baseline reporting, and the development of the social management measures to be included in the ESMP. She will be responsible for disseminating the findings of the ESMP to the stakeholders including government authorities and traditional leaders.

Environmental and Social Impact Assessment for a new sugar mill, EthCo, Central Region Malawi, 2015
ERM has been appointed to undertake an ESHIA for the development of a new sugar mill at a greenfield site in a rural area. Lindsey is leading the baseline fieldwork, consultation and reporting for the SIA and Stakeholder Engagement process. The project will include permanent physical and economic displacement of land users currently utilising the identified Project Site. The SIA will include the identification and assessment of impacts and development of appropriate mitigation measures.

Environmental and Social Impact Assessment Due Dilligence for a Wind Farm in South Africa, confidential client, 2015
ERM was appointed to undertake a due diligence of an Environmental and Social Impact Assessment undertaken for three proposed Wind Farms in South Africa, on behalf of a potential investor. Lindsey undertook the review of the ESIA, highlighted rated potential risks and flaws, and advised client on how to address the potential risks.

Environmental and Social Impact Assessment Due Dilligence for a Wind Farm in South Africa, confidential client, 2015
ERM was appointed to undertake a due diligence of an Environmental and Social Impact Assessment undertaken for a proposed Wind Farms in South Africa, on behalf of a potential investor. Lindsey undertook the review of the ESIA, highlighted rated potential risks and flaws, and advised client on how to address the potential risks. Lindsey accompanied the Client to the site to verify the findings on the ESIA and provided further advice around stakeholder risks associated with the Project.

Environmental and Social Impact Assessment for the OCTP non-associated gas development in Ghana, ENI, 2014 – 2015
ERM was appointed to undertake an ESHIA for the non-associated gas (NAG) development at the Offshore Cape Three Points (OCTP) block and associated onshore receiving facility. Lindsey was part Social Impact Assessment team. Her responsibilities included managing subcontractors and coordinating the primary data gathering process. Further, she was responsible for undertaking secondary data gathering, writing up the social baseline, the identification and assessment of impacts and the development of appropriate mitigation measures.

Social Impact Assessment for the new Muchinga Hydropower Plant on the Mkushi River, Zambia, Muchinga Power Company, 2012 – 2013
ERM was appointed to under an ESIA for the development of a new Hydropower Plant, including a new dam and inundation area. Lindsey was part of a two person team to undertake the SIA for the Project. The SIA entailed the collecting of secondary data and working with local social specialist in gathering primary data, including a household survey and focus group meetings. The SIA included the identification and assessment of impacts and development of appropriate mitigation measures.

Social Impact Assessment for the upgrade of the Mulungushi Hydropower Plant, Zambia, Lumsenfwa Hydro Power Company, 2012 – 2013
ERM was appointed to under an ESIA for the upgrade of the existing Mulungushi Hydropower Plant. Lindsey was part of a two person team to undertake the SIA for the Project. The SIA entailed the collecting of secondary data and working with local social specialist in gathering primary data, including a household survey and focus group meetings. The SIA included the identification and assessment of impacts and development of appropriate mitigation measures.

Post Resettlement Monitoring Review of the permanent resettlement of the Mulepe Village, by the Lunda Northeast Project, Angola, 2013
ERM completed a post resettlement audit for De Beers Angola, Prospecting Limited (DEBAP) in Angola. Lindsey was responsible for reviewing primary data gathered by local sub consultants and compiling the outcome of the resettlement review into a report to be presented to the client.

International Finance Corporation (IFC) Update of SIAs: Port and Mining Complex, Angola, AEMR, 2012 – 2013
ERM was commissioned to update an ESIA for a mine and port, to comply with IFC Performance Standards. Lindsey was part of a team of Social Specialists responsible for updating and rewriting of social baseline, the identification and assessment of impacts, as well as the development of appropriate mitigation measures.

Social Impact Assessment for the Proposed Genoegsaam Solar Park, Eastern Cape, Solaire Direct, 2012
ERM was appointed to undertake a full Scoping/EIA for a proposed solar park in the Eastern Cape. Lindsey was responsible for undertaking the Social Impact Assessment that was integrated into the EIA. The SIA entailed primary and secondary data collection, identification and assessment of impacts and development of appropriate mitigation measures.

Social Impact Assessment for the Proposed Graspan Solar Park, Northern Cape, Solaire Direct, 2012
ERM was appointed to undertake a full Scoping/EIA for a proposed solar park in the Northern Cape. Lindsey was responsible for undertaking the Social Impact Assessment that was integrated into the EIA. The SIA entailed primary and secondary data collection, identification and assessment of impacts and development of appropriate mitigation measures.

Social Impact Assessment for the Proposed Melkvlei Solar Park, Northern Cape, Solar Reserve, 2012
ERM was appointed to undertake a full Scoping/EIA for a proposed solar park in the Northern Cape. Lindsey was responsible for undertaking the Social Impact Assessment that was integrated into the EIA. The SIA entailed primary and secondary data collection, identification and assessment of impacts and development of appropriate mitigation measures.

Social Impact Assessment for the Proposed Ruinte Solar Park, Free State Province, Solar Reserve, 2012
ERM was appointed to undertake a full Scoping/EIA for a proposed solar park in the Free State Province. Lindsey was responsible for undertaking the Social Impact Assessment that was integrated into the EIA. The SIA entailed primary and secondary data collection, identification and assessment of impacts and development of appropriate mitigation measures.

Environmental and Social Screening Study for the Vleesbaai Wind Farm, Western Cape, 2011
ERM was commissioned to undertake a detailed environmental and social screening of a potential wind farm site. Lindsey was responsible for the social component of the deliverable, identifying potential social risks and flaws associated with the proposed site, and presenting recommendations to the client.

Strategic Environmental Assessment for the Mozambique Regional Gateway Programme, 2012
ERM was appointed by the Mozambique Regional Gateway Programme to undertake a Strategic Environmental Assessment for the Programme. Lindsey was responsible for the compilation of the socio-economic baselines for four countries (Botswana, Malawi, Zimbabwe and Zambia), as well as the gathering of primary data through in-country visits.

Social and Communities External Performance Review, Richards Bay Minerals, 2012
ERM was appointed to undertake an assessment and review of the social and communities work carried out during the pre-feasibility phase of the Zulti South Project. Lindsey undertook a document review and internal and external stakeholder consultation to monitor performance against internal standards. The findings of the gap analysis were presented in a report that included series of key themes and made key recommendations for addressing the identified gaps.

Other Social Consulting Projects

Revision of Anglo American's Socio-Economic Assessment Toolkit, SEAT, 2011
ERM was appointed by Anglo American to update their Socio-Economic Assessment Toolkit, SEAT, initially developed by ERM in 2001. Lindsey worked was part of a team of consultants and was responsible for developing new case studies, updating SEAT in accordance with changes made to the IFC and Equator Principals, adding new content and final review of the updated SEAT.

Support on SEAT process for Anglo America, 2011
Lindsey provided support to three Anglo American operations during their SEAT process by reviewing the Draft SEAT report and providing feedback in order to get the SEAT Reports ready for publishing.

Baseline Risk Assessment Report, Anglo Coal, 2009
Lindsey was part of a team that assisted AngloCoal to identify high-level socio-economic risks as part of an exploration phase project. Lindsey was involved primary data collection through focus groups and one-to-one interviews and capturing the findings in a report that would be useful to the client. The team developed a comprehensive stakeholder engagement strategy that addressed the various project components and the cumulative changes in the proposed project area.

SEAT Review for Anglo's Johannesburg Corporate Office, 2009
Lindsey was part of a team that undertook a SEAT Assessment for the Johannesburg Corporate Office. Lindsey was responsible for primary data collection through focus groups and face-to-face interviews at Anglo's Corporate Office in Johannesburg. Together with the team, she consolidated their findings into report that was presented back to the Head Office as part of their Social and Economic Assessment Review.

City of Cape Town Performance Strategy, 2009
ERM was appointed by the City of Cape Town to develop an Environmental Performance Strategy for various departments within the City. Lindsey was involved in the coordination of the interview process with selected key stakeholders within the City and data gathering.

Environmental Impact Assessment and Permitting

Basic Environmental Impact Assessment for a new service station, 2012 - 2013.
ERM was appointed to complete a Basic Assessment for a new filling station in the Western Cape. Lindsey is acting as Project Manager and is responsible for guiding the public participation process, the coordination of specialist studies, identifying and assessing potential positive and negative impacts, as well as proposing mitigation measures for the Project.

Environmental Impact Assessment for the Richtersveld Wind Farm, Northern Cape, G7 Energies, 2010 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed wind farm in the Northern Cape. Lindsey was the consultant on this project responsible for report writing, managing specialists, undertaking research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She was also involved in the stakeholder engagement component associated with this EIA.

Environmental Impact Assessment for the Victoria West Renewable Energy Facility, Northern Cape, Mainstream SA, 2010 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed renewable energy facility, incorporating wind and solar power generating technologies. Lindsey was the consultant on this project responsible for report writing, managing specialists, undertaking research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She was also involved in the stakeholder engagement component associated with this EIA.

Environmental Impact Assessment for the Sutherland Renewable Energy Facility, Western Cape, Mainstream SA, 2010 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed renewable energy facility, incorporating wind and solar power generating technologies. Lindsey was the consultant on this project responsible for report writing, managing specialists, undertaking research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She

was also involved in the stakeholder engagement component associated with this EIA.

Environmental Impact Assessment for the Perdekraal Renewable Energy Facility, Western Cape, Mainstream SA, 2009 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed renewable energy facility, incorporating wind and solar power generating technologies. Lindsey was the consultant on this project responsible for report writing, managing specialists, undertaking research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She was also involved in the stakeholder engagement component associated with this EIA.

Environmental Impact Assessment for the Nooitgedacht Renewable Energy Facility, Western Cape, Mainstream SA, 2009 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed renewable energy facility incorporating wind and solar power generating technologies. Lindsey was the consultant on this project responsible for report writing, managing specialists, undertaking research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She was also involved in the stakeholder engagement component associated with this EIA.

Environmental Impact Assessment for the Konstabel Renewable Energy Facility, Western Cape, Mainstream SA, 2009 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed renewable energy facility incorporating wind and solar power generating technologies. Lindsey was the consultant on this project responsible for report writing, managing specialists, undertaking research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She was also involved in the stakeholder engagement component associated with this EIA.

Environmental Impact Assessment for the Beaufort West Renewable Energy Facility, Western Cape, Mainstream SA, 2009 – 2011
ERM was appointed to undertake a full Scoping/EIA for a proposed renewable energy facility incorporating wind and solar power generating technologies. Lindsey was the consultant on this project responsible for report writing, managing specialists, research for the Social Impact Assessment and liaison with local, provincial and national environmental authorities. She was also involved in the stakeholder engagement component associated with this EIA.

Basic Environmental Impact Assessment for the installation of a transmission line and associated substation, 2010 - 2012
ERM was appointed to complete a Basic Assessment for a new Transmission line in the Mountains near Piketberg. Lindsey is acting as Project Manager and is responsible for guiding the public participation process and completing of the report.

Environmental Scoping Report for the Maasrust Renewable Energy Facility, Western Cape, 2009 – 2010
ERM was appointed to complete an Environmental Scoping Report for a proposed renewable energy facility incorporating wind and solar power generating technologies. Lindsey was a consultant on this project, responsible for report writing, managing specialists, and was also involved in the initial stakeholder engagement component associated with the Scoping Report.

Environmental Scoping Report for the Dwarskersbos Renewable Energy Facility, Western Cape, 2009 – 2010
ERM was appointed to complete an Environmental Scoping Report for a proposed renewable energy facility incorporating wind and solar power generating technologies. Lindsey was a consultant on this project, responsible for report writing, managing specialists, and was also involved in the initial stakeholder engagement component associated with the Scoping Report.

Feasibility study for SATA backhaul project, Southern Africa, 2009
Lindsey was part of a project team that undertook a feasibility study of proposed backhaul routes of subsurface telecommunications cables across Southern Africa. The project involved a desktop-based study of the proposed routes to identify potential environmental and social impacts and provide mitigation measures to reduce potential impacts.

Basic Assessment for wind measuring masts at eight sites in the Western and Northern Cape, 2010
ERM completed a Basic Assessment for the installation of wind measuring masts at eight sites across the country. Lindsey was a project consultant responsible for undertaking the report writing, coordination of public participation process and compiling the environmental management plan.

Basic Environmental Assessment for the installation of Aboveground Storage Tanks at a chemical processing facility in Cape Town, 2009
Lindsey was the project consultant responsible for undertaking this Basic Assessment. She completed the Basic Assessment Report and associated Environmental Management Plan, and was also responsible for coordinating the public participation process that included hosting an open house meeting, and Authority liaison.

Basic Environmental Assessment for the installation of Aboveground Storage Tanks at Johnson & Johnson, East London, 2009/ 2010
Lindsey completed a Basic Assessment Report for the installation of Aboveground Tanks for the storage of Alcohol at the site and writing the Environmental Management Plan. Lindsey was responsible for undertaking the associated public participation process and Authority liaison.

ECO during the repair to the Simonstown Seawall, Metro Rail, 2009/ 2010
Lindsey was part of a team that drew up an Environmental Management Plan for construction work along the Simonstown Railway Line, is a highly sensitive environment. Lindsey also acted as the Environmental Control Officer (ECO) during the construction phase. Her responsibilities included onsite monitoring and producing a report to feedback to the client.

Kerryn Desai

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ENVIRONMENTAL RESOURCES MANAGEMENT'S ArcelorMittal Social Impact Assessment

PEER REVIEW

Reviewed by

Kerryn McKune Desai

July 2016

1 INTRODUCTION

The Department of Environmental Affairs (DEA) require that all specialist reports that are compiled by internal specialists, from the appointed lead Consultancy, be peer reviewed by an external and independent consultant. In this regard, Kerryn McKune Desai[1] was appointed by Environmental Resources Management Southern Africa (Pty) Ltd (ERM) to undertake a peer review of a Social Impact Assessment (SIA) researched and written by an internal ERM social specialist. The SIA is for ArcelorMittal's proposed gas-fired independent power plant that is intended to support Saldanha Steel and other industries in Saldanha Bay.

1.1 Review Approach

The review was undertaken as a desk-based exercise to assess the draft SIA in terms of the specific criteria defined by DEA; as illustrated in Box 1-1.

Box 1-1 DEA Terms of Reference for Peer Reviews

- Is the Terms of Reference acceptable for this specialist study within the context of the proposed project and site location?
- Is the methodology clearly explained and acceptable?
- Are the findings acceptable, and scientifically defensible (review data evidence)?
- Are the mitigation measures and recommendation measures appropriate?
- Is the literature referenced in the report appropriate?
- Is the article well-written and easy to understand?
- Are there any shortcomings to this study, if yes, please describe?

The reviewer was briefed by the lead author about the proposed Project, the SIA methodology (including determination of the area of influence, selection of data gathering techniques, process of identifying and assessing impacts, and process for determining mitigation and management measures), integration with related specialist studies, and assumptions and limitations of the study.

For each of the review criteria stipulated by DEA, the reviewer has rated the information provided in the SIA on a scale of 1 to 5, where 1 = inadequate and 5 = comprehensive. A comment is provided to support each rating and recommended actions are provided.

[1] An overview of the reviewer is provided in *Annex A*. A full CV is available on request.

1.2 Assumptions and Limitations

The following assumptions and limitations apply to this review.

- The review is based only on the criteria defined by the DEA; no other national or international requirements have been assessed.
- It assumed that all Project and baseline information is correct and accurately reflects the respective sources.
- The related specialist studies have not been reviewed, the information and assertions drawn from those reports are assumed to be accurate.

1.3 Report Structure

The report is structured as follows:

- Section 2: review comments and recommendations;
- Section 3: conclusion; and
- *Annex A*: about the reviewer.

2 REVIEW COMMENTS AND RECOMMENDATIONS

DEA Questions	Adequacy (1-5)	Comment
Is the Terms of Reference acceptable for this specialist study within the context of the proposed project and site location?	5	Findings • The Terms of Reference are closely aligned with the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). Section 1.3 outlines the Terms of Reference used to develop this SIA. • All components required in an SIA for a project of this nature and scale are included in the SIA. Recommended Actions • No further work required.
Is the methodology clearly explained and acceptable?	3	Findings • Section 1.4 '*Study Approach and Methodology'* provides an overview of the approach and method followed. A combination of primary and secondary data was used to inform the baseline description, impact identification, impact description and assessment. • No key informants had been interviewed prior to the review. The Social Specialist is in the process of conducting interviews with selected key informants. These interviews must be undertaken to support baseline findings and some of the impact findings. This will add credibility to the SIA. • Section 1.4 does not give a comprehensive list of the secondary data sources or the names/designations or the key informants. This information is currently not included in the report; the Reference List and List of Interviews is incomplete. • It is unclear which related specialist studies have been integrated into the SIA findings. These should be clearly listed in the 'Study *Approach and Methodology* Section. Recommended Actions • Provide some more detail in Section 1.4 about the primary and secondary data sources. Complete the reference list to include secondary and primary sources. • Undertake interviews with selected key informants to support some of the findings and corroborate the assessment. For example: o Speak to a Planner regarding historical and future anticipated growth. Discuss possible reasons for historic and future growth trends, preferred locations for settlement by migrants, social problems that arise, pressure on infrastructure, strategies to address social problems and pressure on infrastructure, etc. The baseline refers to numerous planned infrastructure projects – explore whether these are

DEA Questions	Adequacy (1-5)	Comment
		designed to address current and/or future demand and what percentage growth they are planning for. o Speak to a social worker or clinic representative to explore current/ growing social ills and the reasons for these problems. o Other potential respondents may include an IDP Manager and Ward Councillors. • Clearly state the related specialist reports that were used to inform the SIA.
Are the findings acceptable, and scientifically defensible (review data evidence)?	4	Findings • The baseline and impact findings are based on available secondary data and feedback from the public consultation process. Social conditions and potential socio-economic impacts are not static and can be difficult to predict given that human issues, interests and motives are ever-changing. The Social Specialist has based the assessment on available data, reflection on similar projects in the area, and professional judgement. Feedback from key informants (as identified above) will add credibility to the findings presented in the SIA. Recommended Actions • Undertake key informant interviews with respondents that will support the baseline findings and impacts identified. Incorporate their views into the text, as required.
Are the mitigation measures and recommendation measures appropriate?	3	Findings • Generally, the enhancement and mitigation measures are adequate and suit the scale and significance of the impacts identified and described. Some gaps have been identified. • Impact 1: '*Employment Creation, Skills Enhancement and Local Business Opportunities'* (construction and decommissioning) – there are no enhancement measure provided to address local business opportunities. There are limited measures proposed to develop and build skills of the workforce. • Impact 2: '*Impact on Community Health and Safety'*[2] (linked to influx of job-seekers) – the mitigation measures are vague and will not serve to reduce the significance of the impact as proposed. Consider including [*recommended*] measures that aim to collaborate with the authorities/ other industries to address the impact, etc. It is difficult to include mitigation measures that require partnerships with other parties given that it is not possible to enforce other parties to participate. Also, rethink the reduction in the post-mitigation significance rating - it is extremely difficult to manage indirect impacts.

[2] Note that the impact needs to be revised, as such the mitigation measures will need to be updated to suit the revised impact/s.

DEA Questions	Adequacy (1-5)	Comment
		• Ensure that the pressure on existing social infrastructure and services is assessed, then add mitigation measures that aim to alleviate the pressure; e.g. through Corporate Social Responsibility initiatives, partnerships with authorities/ other industries. • No standalone visual impact assessment was undertaken for this Project. The Social Specialist has used a view shed analysis produced by ERM to discuss the visual impact as it affects the general sense of place of the area. No mitigation measures have been provided to minimise the negative visual impact on the sense of place.
		Recommended Actions • Consider including enhancement measures to address the growth of local business opportunities. • Reflect on, and potentially add, measures to build skills of the local workforce. • Once the impacts related to community health and safety and the increased pressure on infrastructure and services have been refined, update the mitigation measures to adequately address each impact. • Consider categorising the mitigation measures into those that are required and those that are recommended. Mitigation measures that address indirect and induced impacts will require the cooperation of the authorities, surrounding industries and other third parties; it is not possible to enforce their cooperation. As such, these should be recommended. • Add mitigation measures to reduce the visual impacts of the proposed Project.
Is the literature referenced in the report appropriate?	3	Findings • There are references throughout the text. The references appear to be relevant, up-to-date, and varied. • At the time of the review, the reference list was incomplete. The Social Specialist is in the process of compiling it.
		Recommended Actions • Complete the reference list to include all secondary sources used in the text, including the related specialist studies. The list should also clearly indicate all primary sources interviewed, including their designations.
Is the article well-written and easy to understand?	3/4	Findings • The SIA is generally well-written, logical and the points are made clearly. There are a number of minor errors that can be addressed by a final internal review and edit. • There is some repetition of text and sections that are similar and could benefit from being merged. Notably, the '*Project Motivation'* and '*Policy and Planning*

DEA Questions	Adequacy (1-5)	Comment
		Framework' sections are very similar and would serve to simplify the report, if merged. • The project description has been taken from the EIA Report. There are references and links to information that have been cut out of the full version. The project description needs to be reviewed and refined to ensure it is complete and readable. • The '*Cumulative Impact'* and '*Key Findings and Recommendations'* sections need to be updated to reflect the revised impacts.
		Recommended Actions • Once all final comments are addressed, the SIA would benefit from a final internal review and edit to address spelling and grammar mistakes, inconsistencies, and review of additions. Pay particular attention to the '*Project Description'*. • Consider merging the '*Project Motivation'* and '*Policy and Planning Framework'* sections to improve the read and simplify the report. • Update the '*Cumulative Impact'* and '*Key Findings and Recommendations'* to reflect the revised impacts.
Are there any shortcomings to this study, if yes, please describe?	3	Findings *Project Description:* • The Project is located on 2 properties that are both owned by ArcelorMittal. There is no illustration of these properties; it would be useful to see the placement of the proposed project on the ArcelorMittal-owned land. This would serve to demonstrate that key impacts (notably nuisance factors) are limited to ArcelorMittal land. This is not essential but would add value. • The project aspects that may have social consequences need to be covered systematically for each project phase. For example: o there is no information about worker accommodation for either phase; o there is no information about traffic or employment for the operational phase; and o information about water, power, sewerage, etc. need to be covered clearly for each phase. • The route of the pipeline is not described in the 'Project Description'. It is important to describe the land use types and activities that may be affected by the pipeline. It is possible that the proposed pipeline will be located in existing servitudes and on ArcelorMittal-owned land, however the relevant information is not provided. *Baseline Description:* • Section 5.6.2 '*Livelihoods and Economy'* presents the contribution of the various economic sectors. The figures indicate that the most and least dominant economic activities in the WCDM and SBLM are almost exactly opposite. This point needs to be made more clearly, it is currently left up to the reader to determine this.

DEA Questions	Adequacy (1-5)	Comment
		• In Section 5.6.2, it is not clear how or why only some sectors are discussed in greater detail, and not others. For example, despite the Finance sector being the most dominant in the SBLM, it is not discussed further; and the sub-category of agriculture is not discussed despite the relevance for this study. Tourism is discussed in detail (as it should be) but it is not quantified as one of the contributors to the economy – it is possibly subsumed into 'catering and accommodation'. Be consistent when presenting detailed information about WCDM and/or SBLM for the sectors; currently this is not consistent. Describe the sectors in a logical order and make that logic clear for the reader. <u>*Impact Assessment:*</u> • Impact 2: '*Impacts on Community Health and Safety'* – the text in this impact is currently confused (and very repetitive in places). The text refers to the impact being about 'community health and safety', and sometimes to 'the increased pressure on infrastructure and services'; both of which are important and should not be omitted. They may need to be addressed as separate impacts. • Impact 2 is separated into impacts resulting from workers and those resulting from job-seekers; there is no mention of the contribution of the project activities themselves to the impact. For example, the increased pressure on social infrastructure and services as a result of direct project activities has not been assessed, or scoped out. The baseline indicates that there are various infrastructure/ service upgrades, presumably due to an existing lack of capacity. The Project itself could further exacerbate the problem. • Impact 2 also addresses the impact of air emissions on health. The Air Quality (AQ) Assessment assessed this impact on human health and found that the impact is negligible due to low level emissions and no sensitive receptors in proximity to the source (with the exception of those located along the roads). The impact should not be reassessed here. The findings of the AQ Study should be used to inform the impact on nuisance factors/ Sense of Place. • The impact assessment does not assess the potential impacts linked with the construction and operation of the pipeline. Depending on the pipeline route (not described in the '*Project Description*'), there may be loss of agricultural land, or similar. It is possible that the pipeline will run in existing servitudes or over ArcelorMittal land. In the absence of a description or map, it is difficult to determine. • The '*Cumulative Impact'* and '*Key Finding'* sections need to be updated to reflect the impacts identified and described.
		Recommended Actions • Include a map showing the placement of the proposed project on ArcelorMittal-owned land. This would add value but is not essential. • Update the '*Project Description'* to ensure it is relevant for the SIA. Include all relevant information to support social impacts for all pertinent project phases (e.g. traffic, employment, worker accommodation, use of social infrastructure). • Elaborate on, and potentially restructure, Section 5.6.2 to more accurately reflect the economic contributions of the various sectors and to illustrate the

DEA Questions	Adequacy (1-5)	Comment
		relative importance of each. Include more detailed descriptions of the 'finance' and the 'agricultural' sectors given their importance in the SBLM. • Review and restructure Impact 2: '*Impacts on Community Health and Safety'* in a manner that addresses the findings above. The impact focus needs to be clarified. Ensure that the increased pressure on infrastructure and services is also assessed. The impacts of the direct project activities (including workers) and the indirect influx of job-seekers must also be covered; as related to each of the defined impacts. • The impact on human health due to emissions should not be repeated in the SIA as it was assessed in the AQ study. Incorporate the findings into the impact on nuisance factors/ sense of place – as relevant for the social receptors. • Describe the route of the pipeline and the land uses and activities that will be affected. As required, describe and assess the associated construction and operation phase impacts of the pipeline. If the pipeline traverses ArcelorMittal-owned land only, then the impacts will be limited; however, these should be mentioned and scoped out (this may have been clear in the Scoping Report[3]). • Update the cumulative impact section to reflect the identified impacts.

[3] The Scoping Report was not assessed as part of this Peer Review.

3 CONCLUSION

The SIA is generally well-written and comprehensive. The socio-economic baseline description is particularly strong and provides all relevant information to support the identification and assessment of impacts.

There are some gaps that will need to be filled to improve the rigour of the study and to ensure that all relevant impacts are clearly identified, described and assessed. In turn, the related mitigation measures will need to be incorporated. The most notable areas for improvement are:

- outstanding key informant interviews to support some of the baseline findings and impacts;
- unpacking of the impact of increased pressure on existing social infrastructure and resources resulting from direct project activities (including workers) and indirect activities (notably the influx of job-seekers to the area);
- assessment of (or clearly scoping out) the impacts of the Project/ pipeline on land use activities;
- updating mitigation measures related to pressure on infrastructure and services and visual impacts of the Project; and
- a final review and edit to address spelling and grammar mistakes, inconsistencies and readability.

Once the recommended actions have been addressed, it is the opinion of the reviewer that the SIA is comprehensive and will suitably address the potential socio-economic impacts of the proposed Project.

ANNEX A: ABOUT THE REVIEWER

Kerryn McKune Desai

Kerryn offers nearly fifteen years of experience in the fields of socio-economic development and social performance in corporate, non-profit and academic environments. Her social capabilities draw on in-depth knowledge of accepted best practice social performance. She has experience in the following practice areas:

- social impact assessment and peer review;
- stakeholder engagement planning and implementation;
- review and assessment of existing and planned social programmes at both the corporate and operational levels;
- review/ gap analyses of existing reports and management plans;
- social risk identification and assessment;
- resettlement planning and reviews;
- auditing of social and labour/ working conditions;
- development and facilitation of training and capacity building; and
- qualitative research and analysis.

She has diverse sector expertise, including work in the mining, oil and gas, renewable energy, and telecommunications sectors. She has worked throughout Africa, including South Africa, Botswana, Uganda, Cameroon, Ghana, Nigeria, Tanzania, Guinea, Namibia, Zambia, São Tomé and Príncipe, Mozambique, as well as in Albania and Turkey.

She aims to use her skills and experience to support companies and projects to plan for and manage their challenging socio-economic environments and the associated risks. The anticipated outcome would be to build trust based on best practice principles, a positive reputation, and the attainment of a regulatory and social license to operate.

Table.1 Reponses to Peer Review Recommended Actions

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
Is the Terms of Reference acceptable for this specialist study within the context of the proposed project and site location?	5	Findings The Terms of Reference are closely aligned with the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). Section 1.3 outlines the Terms of Reference used to develop this SIA. All components required in an SIA for a project of this nature and scale are included in the SIA.	
		Recommended Actions No further work required.	No actions required.
Is the methodology clearly explained and acceptable?	3	Findings Section 1.4 'Study Approach and Methodology' provides an overview of the approach and method followed. A combination of primary and secondary data was used to inform the baseline description, impact identification, impact description and assessment. No key informants had been interviewed prior to the review. The Social Specialist is in the process of conducting interviews with selected key informants. These interviews must be undertaken to support baseline findings and some of the impact findings. This will add credibility to the SIA. Section 1.4 does not give a comprehensive list of the secondary data sources or the names/designations or the key informants. This information is currently not included in the report; the Reference List and List of Interviews is incomplete. It is unclear which related specialist studies have been integrated into the SIA findings. These should be clearly listed in the 'Study Approach and Methodology Section.	
		Recommended Actions Provide some more detail in Section 1.4 about the primary and secondary data sources. Complete the reference list to include secondary and primary sources. Undertake interviews with selected key informants to support some of the findings and corroborate the assessment. For example:	Reference list complete refer to Chapter 8. Interviews undertaken with key informants listed in Chapter 8.

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
		o Speak to a Planner regarding historical and future anticipated growth. Discuss possible reasons for historic and future growth trends, preferred locations for settlement by migrants, social problems that arise, pressure on infrastructure, strategies to address social problems and pressure on infrastructure, etc. The baseline refers to numerous planned infrastructure projects – explore whether these are designed to address current and/or future demand and what percentage growth they are planning for. Speak to a social worker or clinic representative to explore current/ growing social ills and the reasons for these problems. Other potential respondents may include an IDP Manager and Ward Councillors. Clearly state the related specialist reports that were used to inform the SIA.	Provided in Section 1.4.
Are the findings acceptable, and scientifically defensible (review data evidence)?	4	Findings The baseline and impact findings are based on available secondary data and feedback from the public consultation process. Social conditions and potential socio-economic impacts are not static and can be difficult to predict given that human issues, interests and motives are ever-changing. The Social Specialist has based the assessment on available data, reflection on similar projects in the area, and professional judgement. Feedback from key informants (as identified above) will add credibility to the findings presented in the SIA.	
		Recommended Actions Undertake key informant interviews with respondents that will support the baseline findings and impacts identified. Incorporate their views into the text, as required.	Interviews undertaken with key informants listed in Chapter 8.
Are the mitigation measures and recommendation measures appropriate?	3	Findings Generally, the enhancement and mitigation measures are adequate and suit the scale and significance of the impacts identified and described. Some gaps have been identified. Impact 1: 'Employment Creation, Skills Enhancement and Local Business Opportunities' (construction and decommissioning) – there are no enhancement measure provided to address local business opportunities. There are limited measures proposed to develop and build skills of the workforce. Impact 2: 'Impact on Community Health and Safety'[2] (linked to influx of job- seekers) – the mitigation measures are vague and will not serve to reduce the significance of the impact as	

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
		proposed. Consider including [recommended] measures that aim to collaborate with the authorities/ other industries to address the impact, etc. It is difficult to include mitigation measures that require partnerships with other parties given that it is not possible to enforce other parties to participate. Also, rethink the reduction in the post-mitigation significance rating - it is extremely difficult to manage indirect impacts.	
		Ensure that the pressure on existing social infrastructure and services is assessed, then add mitigation measures that aim to alleviate the pressure; e.g. through Corporate Social Responsibility initiatives, partnerships with authorities/ other industries. No standalone visual impact assessment was undertaken for this Project. The Social Specialist has used a view shed analysis produced by ERM to discuss the visual impact as it affects the general sense of place of the area. No mitigation measures have been provided to minimise the negative visual impact on the sense of place.	
		Recommended Actions Consider including enhancement measures to address the growth of local business opportunities. Reflect on, and potentially add, measures to build skills of the local workforce. Once the impacts related to community health and safety and the increased pressure on infrastructure and services have been refined, update the mitigation measures to adequately address each impact. Consider categorising the mitigation measures into those that are required and those that are recommended. Mitigation measures that address indirect and induced impacts will require the cooperation of the authorities, surrounding industries and other third parties; it is not possible to enforce their cooperation. As such, these should be recommended. Add mitigation measures to reduce the visual impacts of the proposed Project.	Additional management measures included. Impact of social infrastructure and services has been refined as suggested by peer reviewer. Additional mitigation measures included. Post-mitigation to remain moderate. Mitigation measures to address visual impact have been included.
Is the literature referenced in the report appropriate?	3	Findings There are references throughout the text. The references appear to be relevant, up-to-date, and varied. At the time of the review, the reference list was incomplete. The Social Specialist is in the process of compiling it.	

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
		Recommended Actions Complete the reference list to include all secondary sources used in the text, including the related specialist studies. The list should also clearly indicate all primary sources interviewed, including their designations.	Reference list complete refer to Chapter 8. Interviews undertaken with key informants listed in Chapter 8.
Is the article well- written and easy to understand?	3/4	Findings The SIA is generally well-written, logical and the points are made clearly. There are a number of minor errors that can be addressed by a final internal review and edit. There is some repetition of text and sections that are similar and could benefit from being merged. Notably, the 'Project Motivation' and 'Policy and Planning Framework' sections are very similar and would serve to simplify the report, if merged. The project description has been taken from the EIA Report. There are references and links to information that have been cut out of the full version. The project description needs to be reviewed and refined to ensure it is complete and readable. The 'Cumulative Impact' and 'Key Findings and Recommendations' sections need to be updated to reflect the revised impacts.	
		Recommended Actions Once all final comments are addressed, the SIA would benefit from a final internal review and edit to address spelling and grammar mistakes, inconsistencies, and review of additions. Pay particular attention to the 'Project Description'. Consider merging the 'Project Motivation' and 'Policy and Planning Framework' sections to improve the read and simplify the report. Update the 'Cumulative Impact' and 'Key Findings and Recommendations' to reflect the revised impacts.	Project description has been refined. 'Project Motivation' and 'Policy and Planning Framework' sections have been merged. Key Findings and Recommendations and Cumulative Impact sections have been updated.
Are there any shortcomings to this study, if yes, please describe?	3	Findings <u>Project Description:</u> The Project is located on 2 properties that are both owned by ArcelorMittal. There is no illustration of these properties; it would be useful to see the placement of the proposed project on the ArcelorMittal-owned land. This would serve to demonstrate that key impacts (notably nuisance factors) are limited to ArcelorMittal land. This is not essential but	

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
		would add value. The project aspects that may have social consequences need to be covered systematically for each project phase. For example: there is no information about worker accommodation for either phase; there is no information about traffic or employment for the operational phase; and information about water, power, sewerage, etc. need to be covered clearly for each phase. The route of the pipeline is not described in the 'Project Description'. It is important to describe the land use types and activities that may be affected by the pipeline. It is possible that the proposed pipeline will be located in existing servitudes and on ArcelorMittal-owned land, however the relevant information is not provided. <u>Baseline Description:</u> Section 5.6.2 'Livelihoods and Economy' presents the contribution of the various economic sectors. The figures indicate that the most and least dominant economic activities in the WCDM and SBLM are almost exactly opposite. This point needs to be made more clearly, it is currently left up to the reader to determine this.	
		In Section 5.6.2, it is not clear how or why only some sectors are discussed in greater detail, and not others. For example, despite the Finance sector being the most dominant in the SBLM, it is not discussed further; and the sub- category of agriculture is not discussed despite the relevance for this study. Tourism is discussed in detail (as it should be) but it is not quantified as one of the contributors to the economy – it is possibly subsumed into 'catering and accommodation'. Be consistent when presenting detailed information about WCDM and/or SBLM for the sectors; currently this is not consistent. Describe the sectors in a logical order and make that logic clear for the reader. <u>Impact Assessment:</u> Impact 2: 'Impacts on Community Health and Safety' – the text in this impact is currently confused (and very repetitive in places). The text refers to the impact being about 'community health and safety', and sometimes to 'the increased pressure on infrastructure and services'; both of which are important and should not be omitted. They may need to be addressed as separate impacts. Impact 2 is separated into impacts resulting	

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
		from workers and those resulting from job-seekers; there is no mention of the contribution of the project activities themselves to the impact. For example, the increased pressure on social infrastructure and services as a result of direct project activities has not been assessed, or scoped out. The baseline indicates that there are various infrastructure/ service upgrades, presumably due to an existing lack of capacity. The Project itself could further exacerbate the problem. Impact 2 also addresses the impact of air emissions on health. The Air Quality (AQ) Assessment assessed this impact on human health and found that the impact is negligible due to low level emissions and no sensitive receptors in proximity to the source (with the exception of those located along the roads). The impact should not be reassessed here. The findings of the AQ Study should be used to inform the impact on nuisance factors/ Sense of Place. The impact assessment does not assess the potential impacts linked with the construction and operation of the pipeline. Depending on the pipeline route (not described in the 'Project Description'), there may be loss of agricultural land, or similar. It is possible that the pipeline will run in existing servitudes or over ArcelorMittal land. In the absence of a description or map, it is difficult to determine. The 'Cumulative Impact' and 'Key Finding' sections need to be updated to reflect the impacts identified and described.	
		Recommended Actions Include a map showing the placement of the proposed project on ArcelorMittal- owned land. This would add value but is not essential. Update the 'Project Description' to ensure it is relevant for the SIA. Include all relevant information to support social impacts for all pertinent project phases (e.g. traffic, employment, worker accommodation, use of social infrastructure). Elaborate on, and potentially restructure, Section 5.6.2 to more accurately reflect the economic contributions of the various sectors and to illustrate the relative importance of each. Include more detailed descriptions of the 'finance' and the 'agricultural' sectors given their importance in the SBLM.	Project description has been updated and refined. Section 5.6.2 has been restructured as suggested.
		Review and restructure Impact 2: 'Impacts on	Impact of social

DEA Questions	Adequacy (1-5)	Comment	Actions Taken
		Community Health and Safety' in a manner that addresses the findings above. The impact focus needs to be clarified. Ensure that the increased pressure on infrastructure and services is also assessed. The impacts of the direct project activities (including workers) and the indirect influx of job-seekers must also be covered; as related to each of the defined impacts. The impact on human health due to emissions should not be repeated in the SIA as it was assessed in the AQ study. Incorporate the findings into the impact on nuisance factors/ sense of place – as relevant for the social receptors. Describe the route of the pipeline and the land uses and activities that will be affected. As required, describe and assess the associated construction and operation phase impacts of the pipeline. If the pipeline traverses ArcelorMittal-owned land only, then the impacts will be limited; however, these should be mentioned and scoped out (this may have been clear in the Scoping Report[3]). Update the cumulative impact section to reflect the identified impacts.	infrastructure and services has been refined as suggested by peer reviewer. Key Findings and Recommendations and Cumulative Impact sections have been updated.

ARCELOR MITTAL

GAS-FIRED INDEPENDENT POWER PLANT TO SUPPORT SALDANHA STEEL AND OTHER INDUSTRIES IN SALDANHA BAY

COMBINED CYCLE GAS TURBINE POWER PLANT (CCGTPP)

REMAINING EXTENT PORTION 129 OF THE FARM YZERVARKENSRUG & PORTION 195 OF THE FARM JACKELSKLOOF, SALDANHA BAY

TRAFFIC IMPACT ASSESSMENT

JULY 2016

K&T PROJECT REFERENCE: 15047R

REVISION 1

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Details of this report

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Document Title	Traffic Impact Statement (TIA)
K&T Project Reference	15047R
File Name	Arcelor Mittal Saldanha TIA Report - June 2016
Prepared by	Hoosain Cassoo and Dana Hagins

Report Revision Record

Revision	Date	Description
0	June 2016	Traffic Impact Assessment Report
1	July 2016	Traffic Impact Assessment Report Final

This report has been prepared by Kantey & Templer (Pty) Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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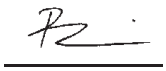
For and on behalf of

Kantey & Templer (Pty) Ltd

Approved by: B A PHILLIPS

Signed: 

Position: Executive Associate

Date: 19 July 2016

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EXECUTIVE SUMMARY

This report documents the anticipated traffic impacts of the proposed gas-fired independent power plant to support Saldanha Steel and other industries in Saldanha Bay. The combined cycle gas turbine power plant (CCGTPP) is to be situated on remaining extent portion 129 of the farm Yzervarkensrug & portion 195 of the farm Jackelskloof, Saldanha Bay.

The pipeline construction from the Port of Saldanha to the site will need to be trenched beneath road crossings and/or thrust bored with conventional horizontal drilling. This is not a traffic consideration per say other than temporary traffic accommodation at road crossings and therefore is not reported on any further in this document.

PROJECT DESCRIPTION

The proposed development will be located on a green field site owned by Arcelor Mittal within the IDZ of the Port of Saldanha. The site is identified for industrial development in terms of the Saldanha SDF.

Arcelor Mittal (referred to herein as “the Client”), intends on developing the property for energy production in the form of a CCGTPP. A portion of the power produced will be used to establish sustainable steel production at Arcelor Mittal’s Saldanha Steel works and the balance of the energy produced will be fed back into the Eskom grid.

This Traffic Impact Assessment Report forms part of the engineering and built environment planning. The objective of this project is to provide a Combined Cycle gas Turbine for Saldanha Steel works and the surrounding areas.

The Power Plant shall consist of the following components:

- Access road to site;
- 132 kV and 400 kV switchyard;
- Control and electrical building;
- Central control room, warehouse and administrative buildings;
- Firefighting systems;
- Fuel/gas/diesel storage facilities
- Emergency backup generators (diesel or LPG); and demineralising resins, lubricants, grease and turbine cleaning detergents, fire extinguishing foams).

Construction for the proposed Power Plant will be implemented in two phases. Phase one and two combined is expected to produce approximately 1,507 MW of power to the Saldanha Industrial area and its surroundings.

STUDY AREA AND ANALYSIS SCENARIOS

The studied intersections listed below were selected in relation to the site and with reference to the Spatial Development Framework (2011) namely for the adjacent intersections in the TIA study area – Therefore three key intersections for the AM and PM peak hour traffic operations were selected for evaluation.

1. R27 (TR77/1) and R45 (TR21/2)
2. R27 (TR77/1) and TR 85/1
3. TR 85/1 and OP7644

For this study, the following scenarios were evaluated:

- ***Existing*** – Existing Conditions (2016)
- ***Future*** – Future Conditions during the construction phase (2018 and 2019)
- ***Future*** – Future Conditions with the operational phase (2020)

TRAFFIC IMPACT SIGNIFICANCE

The study found that the implementation of the proposed project is expected to have a low impact on the traffic operations at the above mentioned key intersections in both the construction and operational phases of the project. The site traffic is expected to be well absorbed within the road network which is currently operating at low volume to capacity (V/C) ratios. There are no mitigation measures required as a direct result of the project once operational, however, it is recommended that the accesses to the site be upgraded to incorporate turning movements in order to minimise / mitigate potential impacts from the construction traffic to the development. These measures may be beneficial in the long term given the significant development taking place north-east of the site in the Saldanha Bay IDZ.

SIGNIFICANCE RATINGS DEFINITIONS FOR IMPACT ASSESSMENTS[1]

No Impact: Zero impact

Slightly Significant (Low Impact): Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both.

Significant (Medium Impact): Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible.

[1] Impact Significance, DEAT, 2002, ISBN 0797039767

Highly Significant (High Impact): Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no mitigation that could offset the impact, or mitigation is difficult, expensive, time consuming or some combination of these.

1. INTRODUCTION

This chapter discusses the purpose of the traffic impact assessment, identifies the study area and criteria used to identify significant project impacts.

Kantey & Templer was appointed by ERM Southern Africa on behalf of Arcelor Mittal (herein referred to as "the Client") to prepare a Traffic Impact Assessment Report in respect of the proposed combined cycle gas turbine power plant on the remaining extent portion 129 of farm Yzervarkensrug and portion 195 of the farm Jackelskloof, Saldanha Bay, Western Cape (herein referred to as "the site").

Refer to Figure 1 for the locality plan.

The additional traffic resulting from the proposed development is the subject of this Traffic Impact Assessment (TIA). The TIA is a statutory requirement for developments generating more than 150 person trips during peak hours.

This TIA is prepared in accordance with standards set by the South African Committee of Transport Officials[2] (COTO) and the Saldanha Bay Municipal Regulations. The specific objectives of the report are to:

(i) Describe the extent of the proposed development

(ii) Assess the existing traffic operations on the road network in the vicinity of the site

(iii) Predict the extent of the traffic generated by the new development and estimate the distribution of that new traffic

(iv) Assess the effect that this generated traffic is likely to have on the existing road network

(v) Make recommendations for improvements to the existing road network and intersections affected by the generated traffic.

[2] COTO, TMH17 Vol 1, South African Trip Data Manual, Sep 2012.

2. LANDUSE & TRANSPORTATION

The site is located in the north-east direction of Saldanha and north of Langebaan. The site will serve the following land use purpose(s), namely:

- Industrial:
  - Access road to site;
  - 132 kV and 400 kV switch yard;
  - Control and electrical building;
  - Central control room, warehouse and administrative buildings;
  - Firefighting systems;
  - Fuel/gas/diesel storage facilities
  - Emergency backup generators (diesel or LPG); and demineralising resins, lubricants, grease and turbine cleaning detergents, fire extinguishing foams).

3. ROAD NETWORK

The site is well served by existing road infrastructure. The access to the development is via TR 85/1 coming from the east off the R27 (TR77/1). Provincial Road OP7644 abuts the site the west and links TR85/1 to MR559. OP7644 is a two lane undivided rural roadway from which access to the site is provided opposite the Arcelor Mittal entrance.

Figure 1: Site Locality Sketch

©Google Earth Aerial Image, 2016

4. EXISTING TRAFFIC CONDITIONS

Existing background traffic information was obtained from traffic counts conducted by Nick Venter Traffic Studies (NVTS) on the road network taken on Thursday, 12 May 2016. The key intersections in the study area was analysed in order to assess the existing traffic operations during the typical weekday AM and PM peak commuter periods.

The existing traffic data is illustrated in the traffic diagrams at the back of the report. The details of the traffic count are contained in Appendix A. The key intersections in the study area are as follows:

1. R27 (TR 77/1) and R45 (TR21/2)
2. R27 / TR85/1 and TR 85/1
3. TR 85/1 and OP7644

According to the results of the SIDRA analysis it appears that the traffic operations at the existing intersections are currently operating at a Level of Service (LOS) A[3] in the AM and PM peak hours, respectively.

5. BACKGROUND PROJECTS

There are a number of background projects planned within the Saldanha Bay IDZ which will increase the traffic in the study area. The anticipated increases are off a low base and hence it is unlikely that the combined effect will create further impacts to the key intersections within the study area. Especially, considering that turning lanes will be introduced at the two site access points.

[3] Level of Service (LOS) A is a measure of effectiveness of an intersection where “A” is good and depicts free flow conditions.

6. TRIP GENERATION

The trip generation requires an estimation of the additional traffic to be generated by the additional land uses.

CONSTRUCTION TRAFFIC

During the peak construction period, it is expected that up to approximately 450 workers will be employed during the development of the site. The private car, public transport and NMT percentages and person trips are shown in Table 1.

Table 1: Modal split of person trips during construction

Mode	Car	Taxi	Bus	Walk	Cycle
Percentage	55%	30%	10%	4%	1%
Person Trips	247	135	45	18	5
Vehicles	206	14	2	N/A	N/A

Note: Vehicle occupancy = 1,2, minibus taxi = 10, bus = 30

The anticipated traffic during the construction period is in the order of 450 person trips during the peak hour or 206 cars, 14 minibus taxis and two buses. The cars may enter the site and park in the open areas during construction. The minibus taxis and buses may collect and dispatch passengers in the vicinity of the site.

The documentation provided shows that the anticipated truck traffic is likely to be in the order of 246 trucks per day or 15 to 20 trucks per hour which equates to one every three minutes. This is considered to be intensive truck traffic and will need to be managed both in terms of surface damage as well as signage and marshalling at the delivery yard and at the site entrance. A road condition survey will need to be conducted prior to construction in order to gauge the damage to the road as a result of the intensive heavy traffic. Most of the damage is likely to occur within the proximity to the access to the site.

OPERATIONAL TRAFFIC

After completion of the project it is expected that traffic flowing into the development will decline and only operational staff will be moving in and out of the Power Plant.

During the operational phase 95 employees are expected to occupy the development, which shall consist of full-time and part-time employees. The private car, public transport and NMT percentages and person trips are shown in Table 2.

Table 2: Modal split of person trips during operations

Mode	Car	Taxi	Bus	Walk	Cycle
Percentage	55%	30%	10%	4%	1%
No. of Trips	52	28	10	4	1
Vehicles	43	3	1	N/A	N/A

Note: Vehicle occupancy = 1,2, minibus taxi = 10, bus = 30

The anticipated traffic during the operational phase of the project is in the order of 95 person trips during the peak hour or 43 cars, 3 minibus taxis and one bus. The cars may enter the site and park in the open areas during construction. The minibus taxis and buses may collect and dispatch passengers in the vicinity of the site.

7. SITE TRAFFIC DISTRIBUTION

Traffic that is expected to be generated by a development project must be distributed and assigned to the road network so that the impact of the proposed project on the roadway links and intersections within the study area can be analysed.

The gravity model is used to distribute the trips manually based on the likelihood that the number of trips between two zones is proportional to the magnitude of each zone, and inversely proportionate to the distance between the two zones.

The site traffic will be distributed 55% originating from the east of Vredenburg, Velddrif and Langebaanweg areas, 20% from the southern Yzerfontein and Melkbosstrand areas, 20% from the Langebaan and Saldanha areas and 5% from Vredenburg and Saldanha.

The trip distribution patterns are illustrated in Figures 8 and 9 at the back of the report.

8. POTENTIAL IMPACT

The traffic operations were analysed using Signalised and Unsignalised Intersection Design and Research Aid software package[4] (SIDRA). The software package determines the existing and future operational Levels of Service and expected average delays at the key intersections in the study area with the additional traffic from the proposed development.

ANALYSIS METHODOLOGY

Level of Service

Traffic operations at intersections are typically described in terms of "Level of Service" (LOS). LOS is a qualitative measure of the effect of several factors on traffic operating conditions, including speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort, and convenience. It is generally measured quantitatively in terms of vehicular delay and described using a scale that ranges from LOS A to F, with LOS A representing essentially free-flow conditions and LOS F indicating over-capacity conditions with substantial congestion and delay.

Table 3 summarizes the relationships between the average control delay per vehicle and LOS for signalized intersections, roundabouts and stop and yield controls.

Table 3: Level-of-Service definitions based on delay (HCM[5] method)

Level of Service		Control delay per vehicle in seconds (d) (including geometric delay)	
		Signals and Roundabouts	Stop Signs and Give Way (Yield) Signs
A	Good progression, few stops, short cycle lengths	$d \leq 10$	$d \leq 10$
B	Good progression and/or short cycle lengths, more vehicle stops	$10 < d \leq 20$	$10 < d \leq 15$
C	Fair progression, significant proportion of vehicles must stop	$20 < d \leq 35$	$15 < d \leq 25$
D	Congestion becomes noticeable; longer delays, high v/c ratio	$35 < d \leq 55$	$25 < d \leq 35$
E	At or beyond acceptable delay, poor progression, long queues	$55 < d \leq 80$	$35 < d \leq 50$
F	Unacceptable to drivers. Arrival volumes greater than discharge capacity, unstable unpredictable flows	$80 < d$	$50 < d$

[4] SIDRA Version 5 Software, SidraSolutions, Australia, 2010.
[5] HCM Highway Capacity Manual of the Transport Research Board (TRB), 2010.

The traffic generated by the site can be expected to influence the key intersections of the study area, namely:

1. R27 (TR 77/1) and R45 (TR 22/1)
2. R27 (TR 77/1) and TR 85/1
3. TR 85/1 and OP7644

Figure 2: Existing Road Geometry of R27 & R45

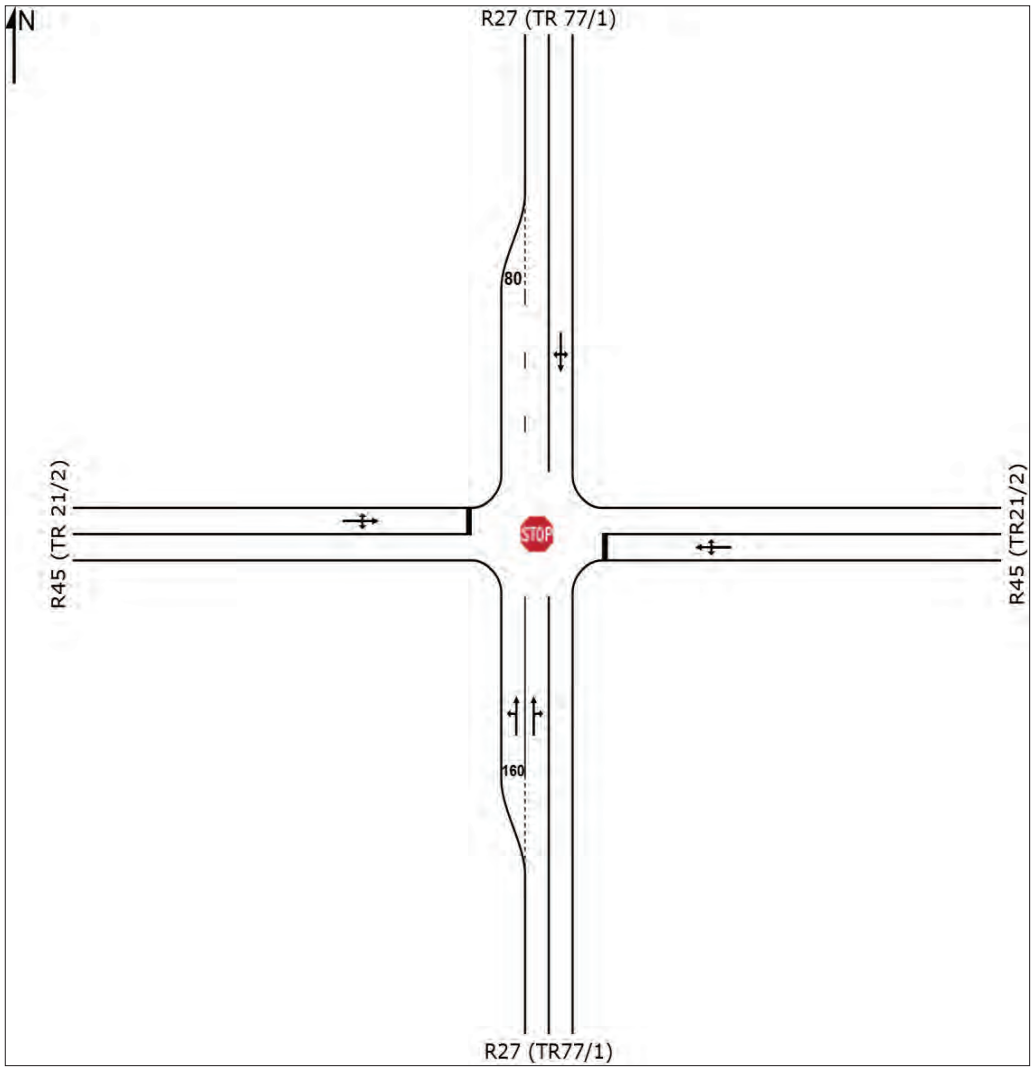


Figure 3: Existing Road Geometry of R27 & TR 85/1

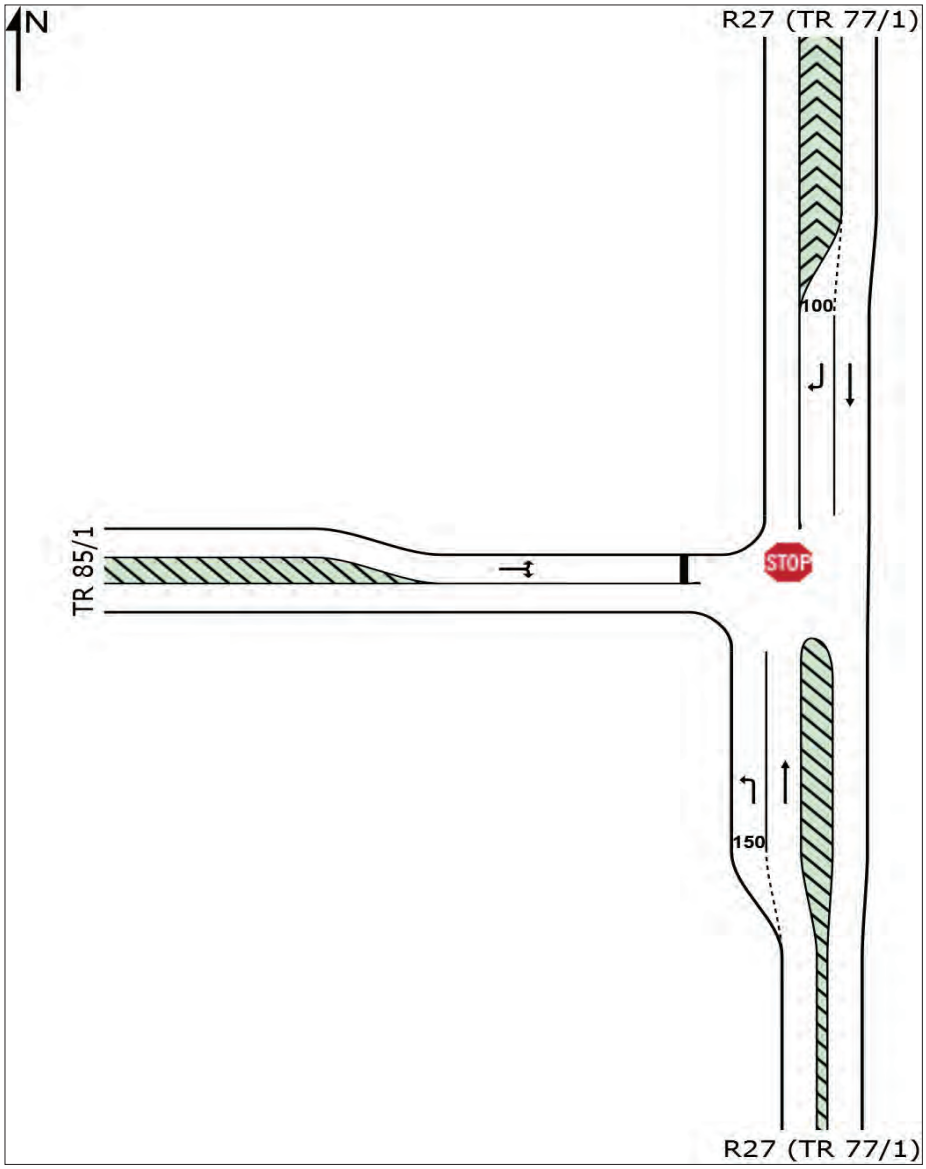
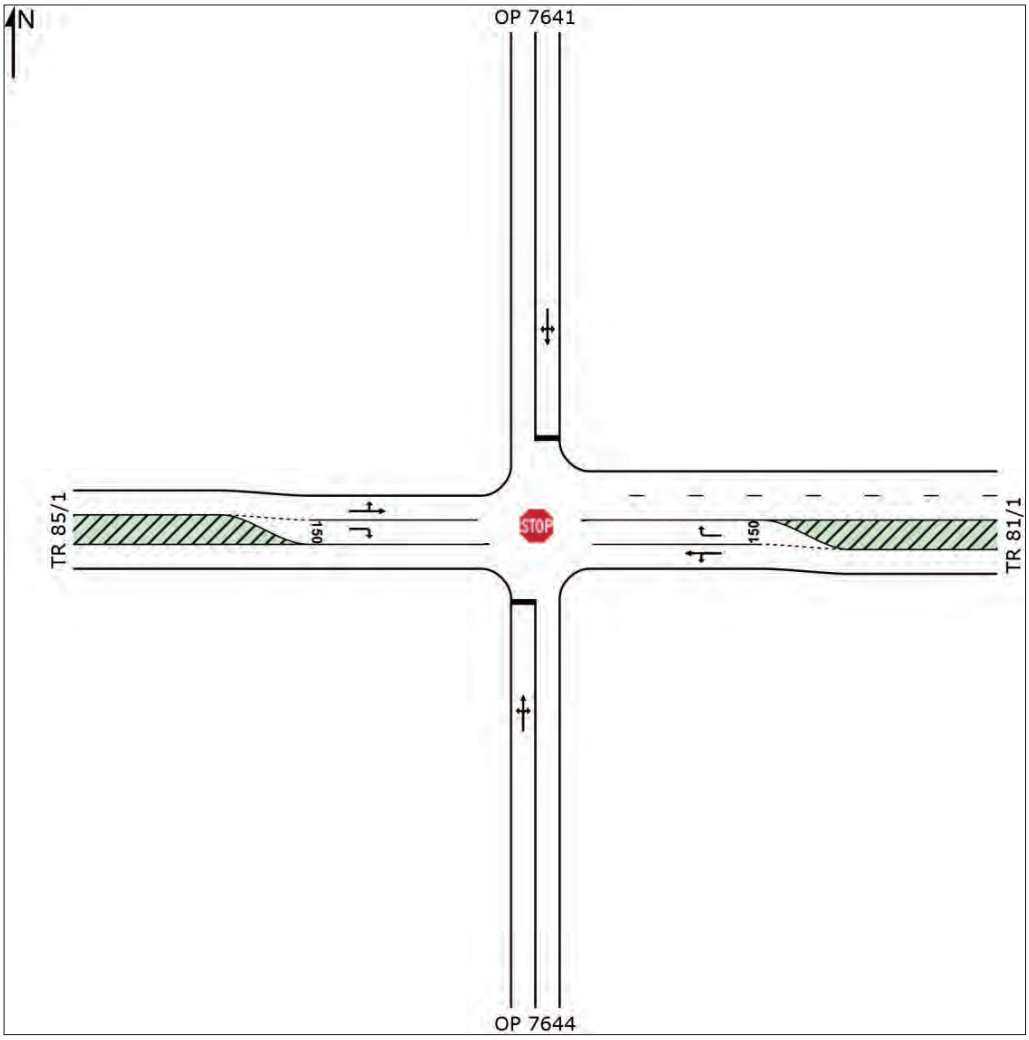


Figure 4: Existing Road Geometry of TR 85/1 & OP7644



CONSTRUCTION PHASE

Table 4: Traffic Operations at intersection of R27 (TR 77/1) / R45 (TR 21/2) during construction

Intersection of R27 (TR 77/1) / R45 (TR 21/2)						
Measures of Effectiveness	Intersection Type					
	Stop Controlled					
	Existing 2016 Scenario Without the project		Future 2018 Scenario Construction		Future 2019 Scenario Construction	
	Peak Hour		Peak Hour		Peak Hour	
	AM	PM	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A	A	A
Delay (Sec) Overall	6.9	7.0	6.9	7.5	7.1	7.7
V/C Ratio	0.208	0.248	0.324	0.384	0.341	0.404

Table 5: Traffic Operations at intersection of R27 (TR 77/1) / TR 85/1 during construction

Intersection of R27 (TR 77/1) / TR 85/1						
Measures of Effectiveness	Intersection Type					
	Stop Controlled					
	Existing 2016 Scenario Without the project		Future 2018 Scenario Construction		Future 2019 Scenario Construction	
	Peak Hour		Peak Hour		Peak Hour	
	AM	PM	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A	A	A
Delay (Sec) Overall	4.1	4.2	6.0	6.3	6.1	6.4
V/C Ratio	0.104	0.142	0.328	0.376	0.340	0.389

Table 6: Traffic Operations at intersection of TR 85/1 / OP7644 during construction

Intersection of TR 85/1 / OP7644				
Measures of Effectiveness	Intersection Type			
	Stop Controlled			
	Future 2018 Scenario		Future 2019 Scenario	
	Peak Hour		Peak Hour	
	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A
Delay (Sec) Overall	5.3	5.2	5.3	5.3
V/C Ratio	0.338	0.322	0.346	0.328

OPERATIONAL PHASE

Table 7: Traffic Operations at intersection of R27 / R45 when operational

Intersection of R27 (TR 77/1) / R45 (TR 21/2)				
Measures of Effectiveness	Intersection Type			
	Stop Controlled			
	Existing 2016 Scenario		Future 2020 Scenario	
	Peak Hour		Peak Hour	
	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A
Delay (Sec) Overall	6.9	7.0	7.1	7.4
V/C Ratio	0.208	0.248	0.273	0.334

Table 8: Traffic Operations at intersection of R27 / TR 85/1 when operational

Intersection of R27 (TR 77/1) / TR 85/1				
Measures of Effectiveness	Intersection Type			
	Stop Controlled			
	Existing 2016 Scenario		Future 2020 Scenario	
	Peak Hour		Peak Hour	
	AM	PM	AM	PM
Levels of Service (LOS)	A	A	A	A
Delay (Sec) Overall	4.1	4.2	4.7	4.8
V/C Ratio	0.104	0.142	0.173	0.221

Table 9: Traffic Operations at intersection of TR 85/1 / OP7644 when operational

Intersection of TR 85/1 / OP7644		
Measures of Effectiveness	Intersection Type	
	Stop Controlled	
	Future 2020 Scenario	
	Peak Hour	
	AM	PM
Levels of Service (LOS)	A	A
Delay (Sec) Overall	1.6	1.7
V/C Ratio	0.143	0.112

9. GEOMETRIC IMPROVEMENTS

There are no geometric improvements to the external road network attributable to the traffic generated by the proposed development of the power plant. There may, however, be some localised improvements at the access point in the form of turning lanes for road safety purpose and the addition of destination signage and regulatory road markings and signage at the entrance to the site. There may also be a requirement of additional destination signage to the site. The proposed turning lanes are shown on the preliminary site development plan found in Appendix C.

10. RISK ASSESSEMENT

The risk assessment of the proposed improvements to OP7644 should be the subject of a Road Safety Audit (RSA) at the detailed design stage. Provided that the design standards are adhered to and that the construction work zone and road works are monitored by a resident engineer, there should be no significant risk associated with the construction and operational traffic to the site. Well managed work zones and road works can be safely traversed without any impact on the through traffic.

11. ACCESS TO SITE

The development will gain access from the existing road network that extends towards the TR77/1 (R27) originating from Velddrift and Yzerfontein and south from the proposed development via the MR559 originating from Mykonos and Langebaan. OP7644 serves as the main access road parallel to the development connecting TR85/1 in the North and MR559 in the south.

There will be no road access from the existing road leading up to the existing substation to the north of the site.

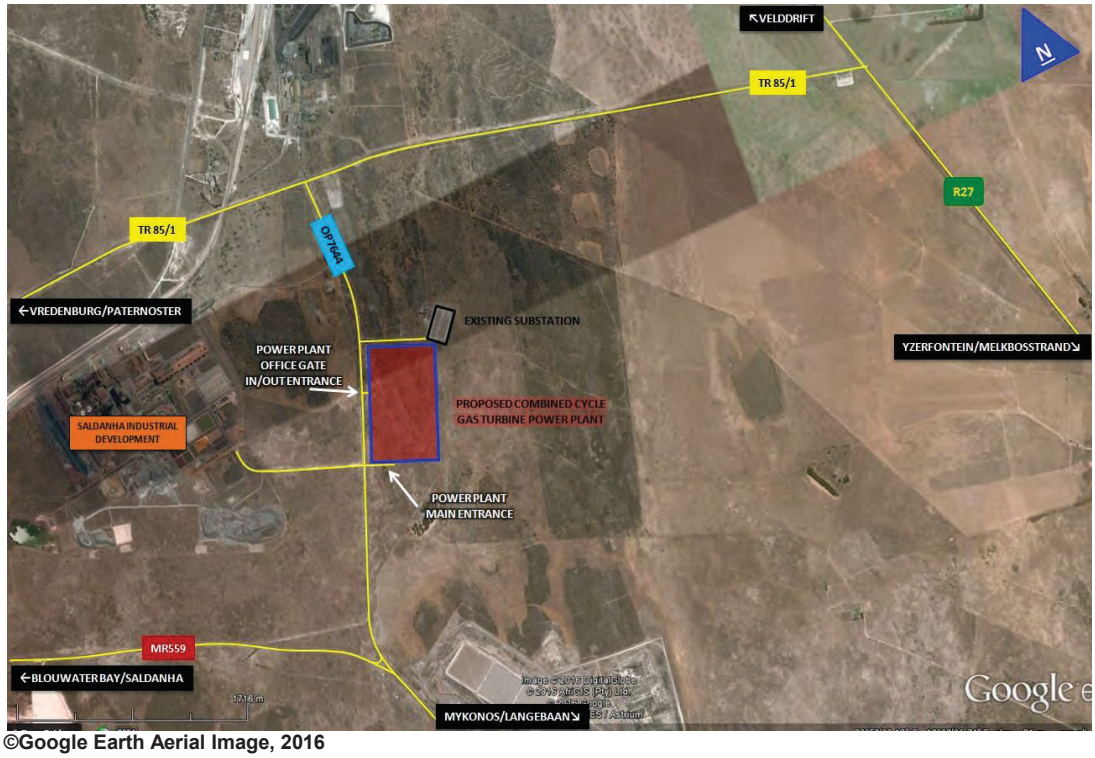
NORTHERN ACCESS

According to the preliminary site layout plan an in/out office gate is proposed on the west of the Power Plant off OP7644. Entrance to the office gate is located approximately 5.8km from the studied intersection of the TR77/1 (R27) and TR85/1.

SOUTHERN ACCESS

The southern access is the main entrance into the development via a new access road off OP7644. This main entrance is located approximately 6.35km from the intersection of TR85/1 and TR77/1 (R27).

Figure 5: Site access



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12. PARKING REQUIREMENTS

The minimum parking requirements for an industrial development of this nature are as follows:

Table 10: Construction Phase Parking

Mode of vehicle	Number of Construction Employees	Percentage Private Motor Vehicle	Parking Bays required (Temporary)
Car	450	55%	206

Note: Average Vehicle Occupancy is 1.2 persons per car.

The construction stage parking can be accommodated on site in an open area that is graded with a gravel surface wearing course.

Table 11: Operational Phase Parking

Mode of vehicle	Number of Construction Employees	Percentage Vehicle Usage	Parking Bays required (Permanent)
Car	95	55%	43

Note: Average Vehicle Occupancy is 1.2 persons per car.

13. PEDESTRIANS

It would be preferable for the project to be pedestrian friendly internally with adequate sidewalks and traffic calming devices that enables a conducive non-motorised transport environment.

14. PUBLIC TRANSPORT

The site will be well served by public transport, predominantly by minibus taxi but also by the local bus service. It may be advisable to place a public transport embayment downstream of the entrance to the power plant and on both sides of the OP7644 particularly to accommodate the Minibus Taxis that will stop in the vicinity of the site.

15. REFUSE COLLECTION

A refuse room is required in order to adequately serve the development. Municipal refuse collection or private refuse collection will need to be carefully planned in order to obtain a reasonable level of service. Recycling at the source should be encouraged.

16. CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that:

1. The development of a Combined Cycle Gas Turbine Power Plant is planned for the site and is likely to be constructed over two years from 2018 to 2019 and become operational in 2020.

2. The access to the development will be from OP7644 directly opposite the access to Arcelor Mittal as shown on the SDP.

3. The main access has been planned to incorporate turning lanes to the development access intersection from OP7644, although these are not essential for the traffic operation, they would improve road safety and are therefore recommended.

4. The anticipated traffic during the construction period is in the order of 450 person trips during the peak hour or 206 cars, 14 minibus taxis and two buses.

5. The anticipated truck traffic of 246 trucks per day will impact on the road surface at the entrance to the site. Peak hour truck traffic is likely to be in the order of 20 trucks per hour and will not have a significant impact on operations. It will, however, be necessary to monitor the damage with a before and after survey of the roadway condition.

6. The anticipated traffic during the operational phase of the project is in the order of 95 person trips during the peak hour or 43 cars, 3 minibus taxis and one bus.

7. The background traffic on the road network is fairly low and recent traffic counts taken during the study show that there are no existing traffic problems at any of the key intersections during the peak hours.

8. The 4% per annum growth rate was used to estimate the 2020 scenario with implementation.

9. The key intersections were studied in detail and analysed in terms of the LOS, Delay and V/C ratios. The Level of Service (LOS) for the current traffic operations at the key intersections is operating at favourable levels of service during peak hours. The prevailing LOS A is indicative of good progression, few stops and average delays of less than 10 seconds.

10. The trip distribution adopted in this study is based on the anticipated pattern of travel to and from the site. The site traffic will be distributed 55% originating from the east of Vredenburg, Velddrif and Langebaanweg areas, 20% from the southern Yzerfontein and

Melkbosstrand areas, 20% from the Langebaan and Saldanha areas and 5% from Vredenburg and Saldanha.

11. The additional traffic generated by the proposed development is expected to have a low impact on the road network during the peak hours. Impact is of a low order and therefore likely to have little real effect on prevailing traffic operations.

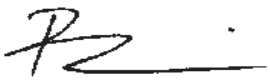
12. Combined effect of the project with the implementation of further projects in the Saldanha Bay IDZ were considered and were predicted to have no significant impact on the key intersections in the study area.

13. Access to the site has been carefully considered and the proposed access is from OP7644 with proposed turning lanes in the vicinity of the access to the site.

Accordingly it is recommended that: -

(i) The Road Authority should approve the proposed development, as the impact of the additional traffic can be mitigated by the improvements associated with the planned turning lanes on OP7644.

(ii) Minibus taxi embayment should be provided on either side of the main access as the number of taxis travelling to the site may increase during the construction and operational phases of the project.



B A PHILLIPS (Pr Tech Eng)
(Pr No. 200770081)

19 July 2016

H CASSOO

17. REFERENCES

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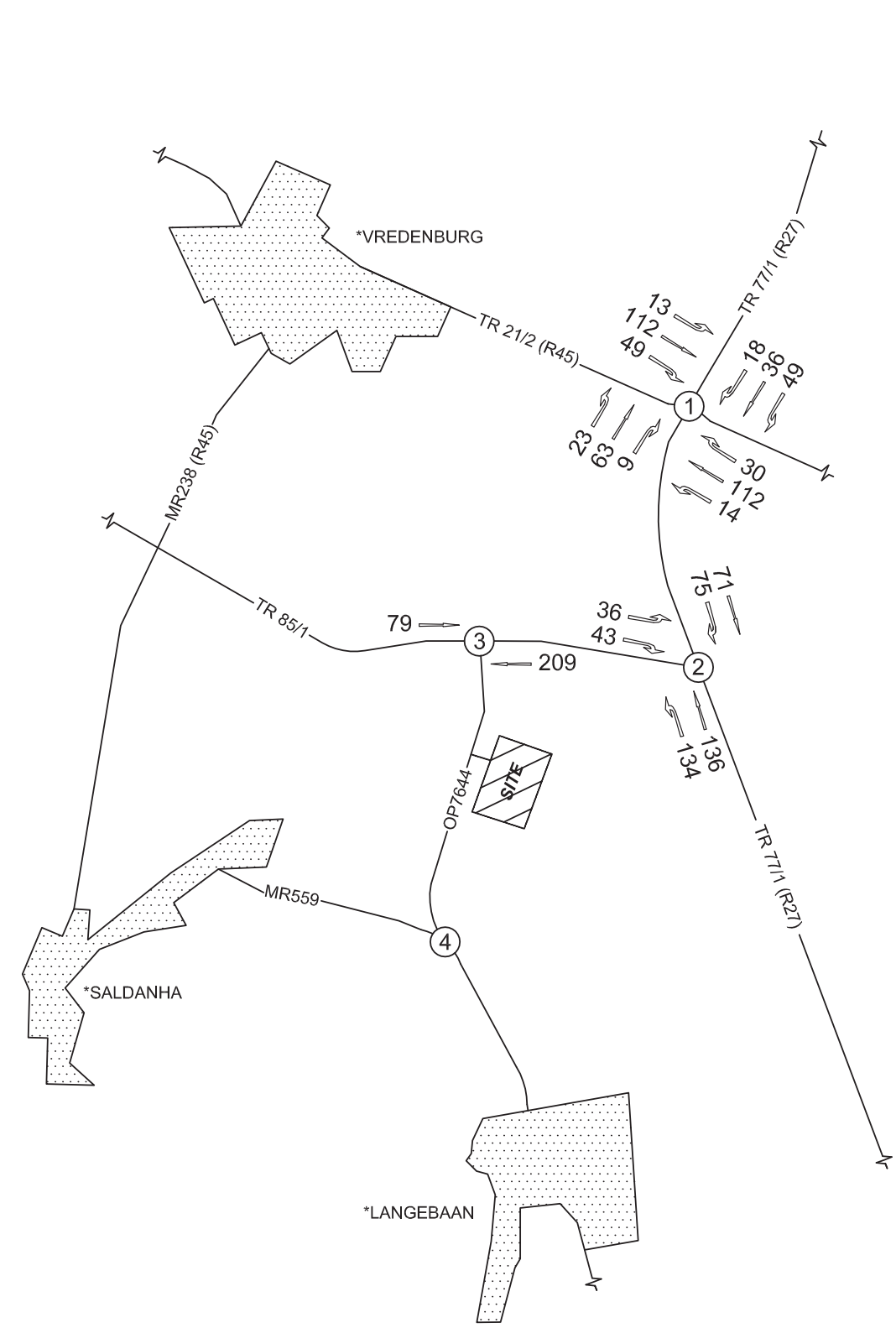


DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

EXISTING AM PEAK HOUR
THURSDAY, 12 MAY 2016
07:00 - 08:00

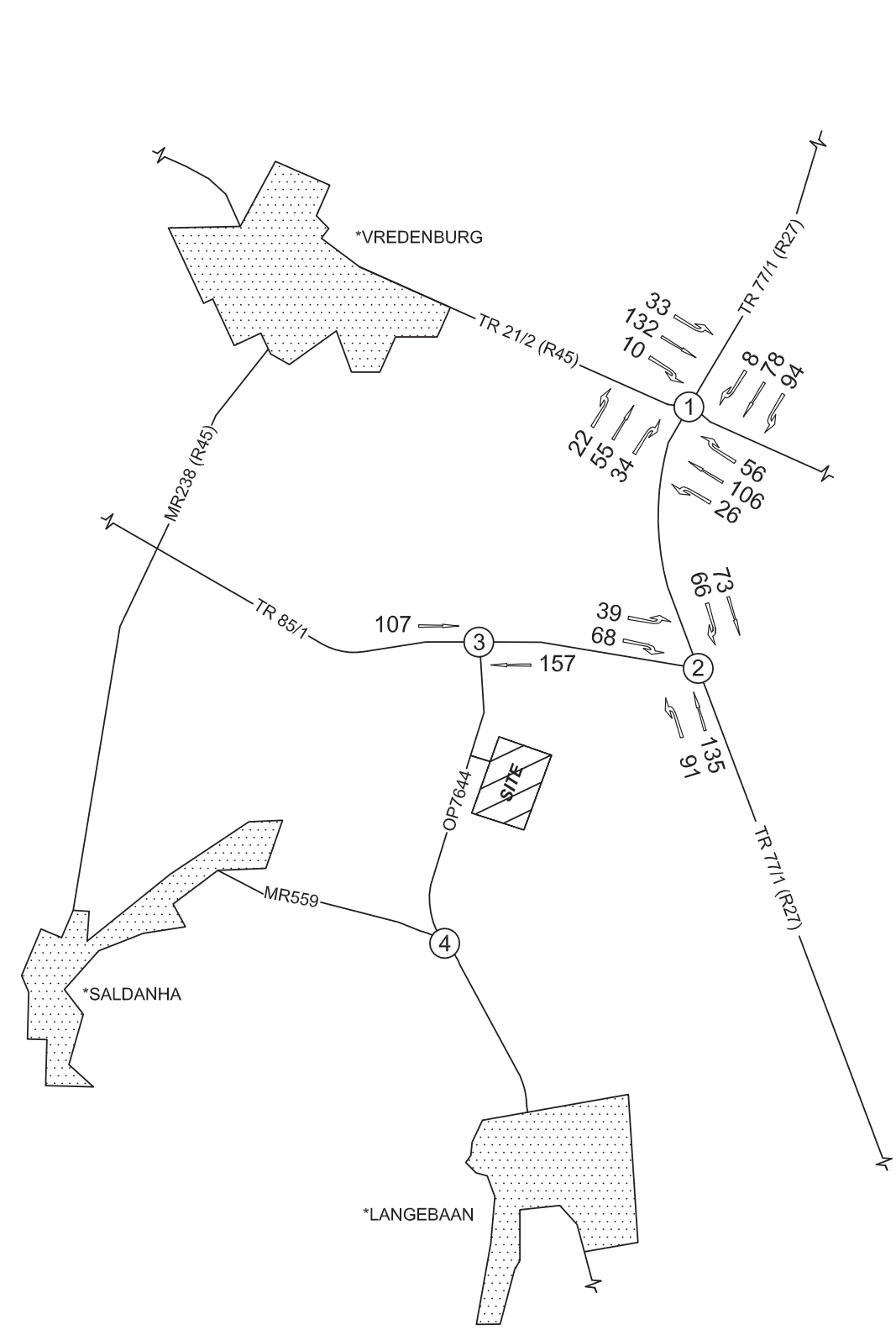
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: EXISTING AM PEAK TRAFFIC

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	6



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD	— — —	PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

EXISTING PM PEAK HOUR
THURSDAY, 12 MAY 2016
16:30 - 17:30

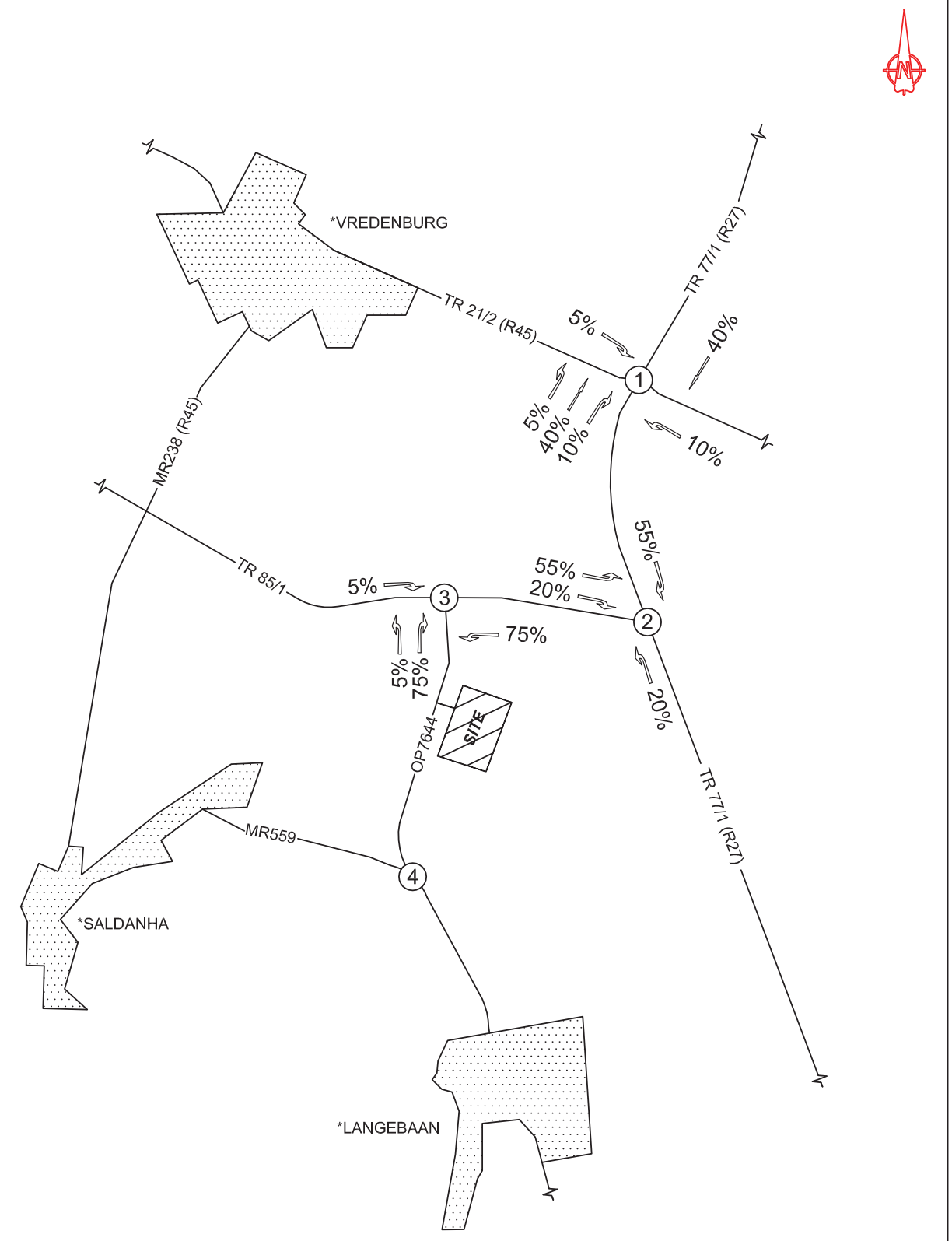
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: EXISTING PM PEAK TRAFFIC

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	7



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

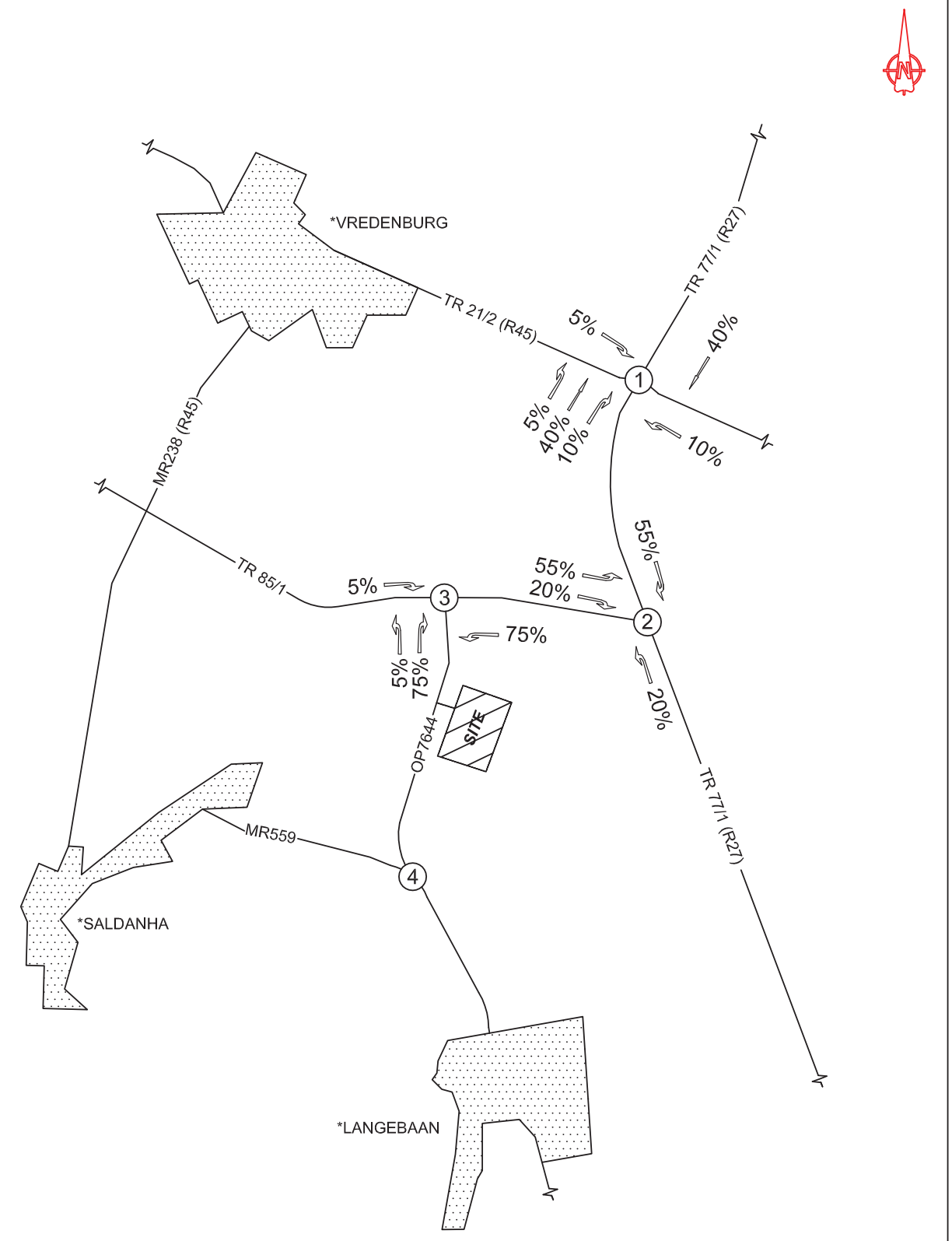
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: PERCENTAGE DISTRIBUTION FOR AM PEAK

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	8



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD	— — —	PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

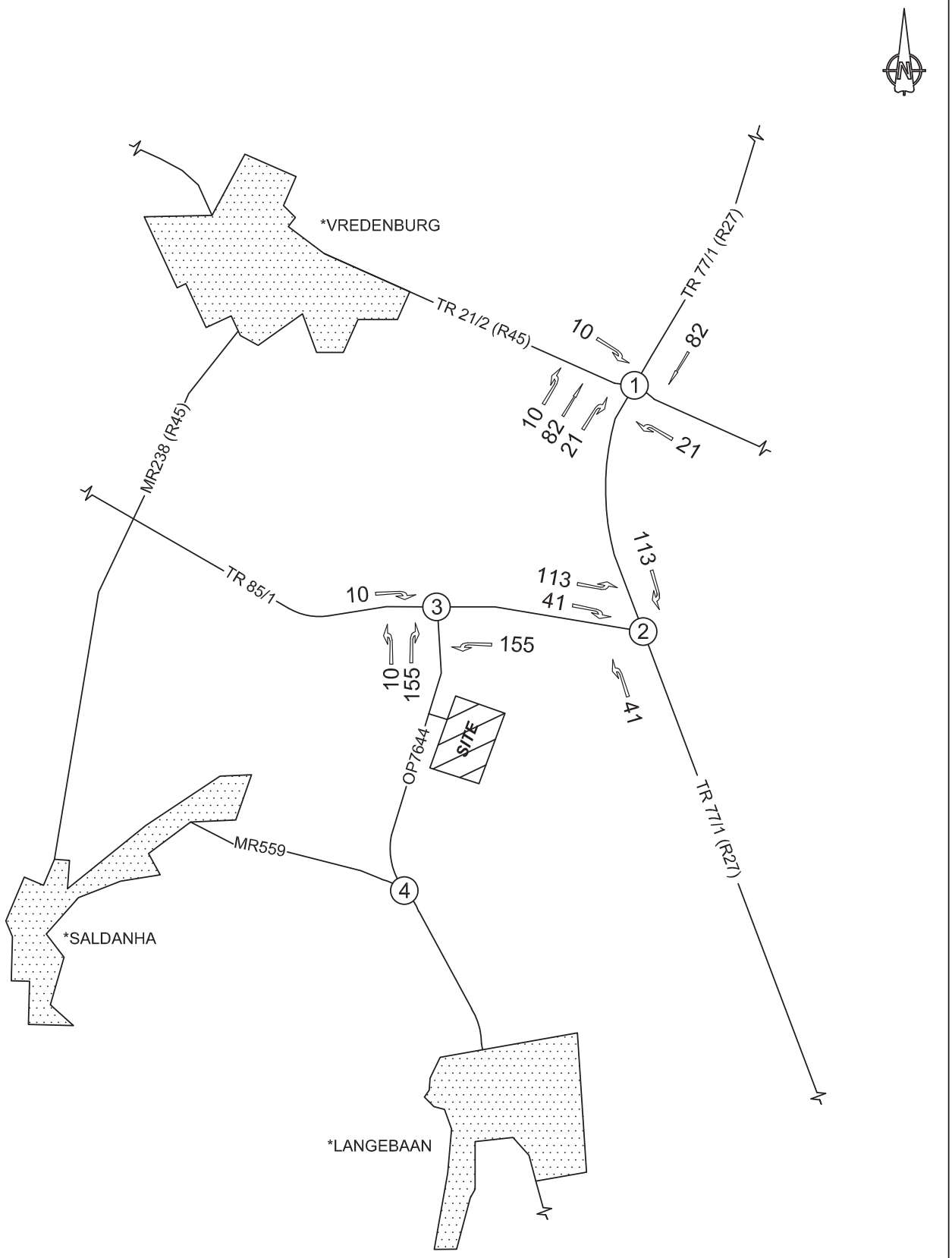
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: PERCENTAGE DISTRIBUTION FOR PM PEAK

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	9



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

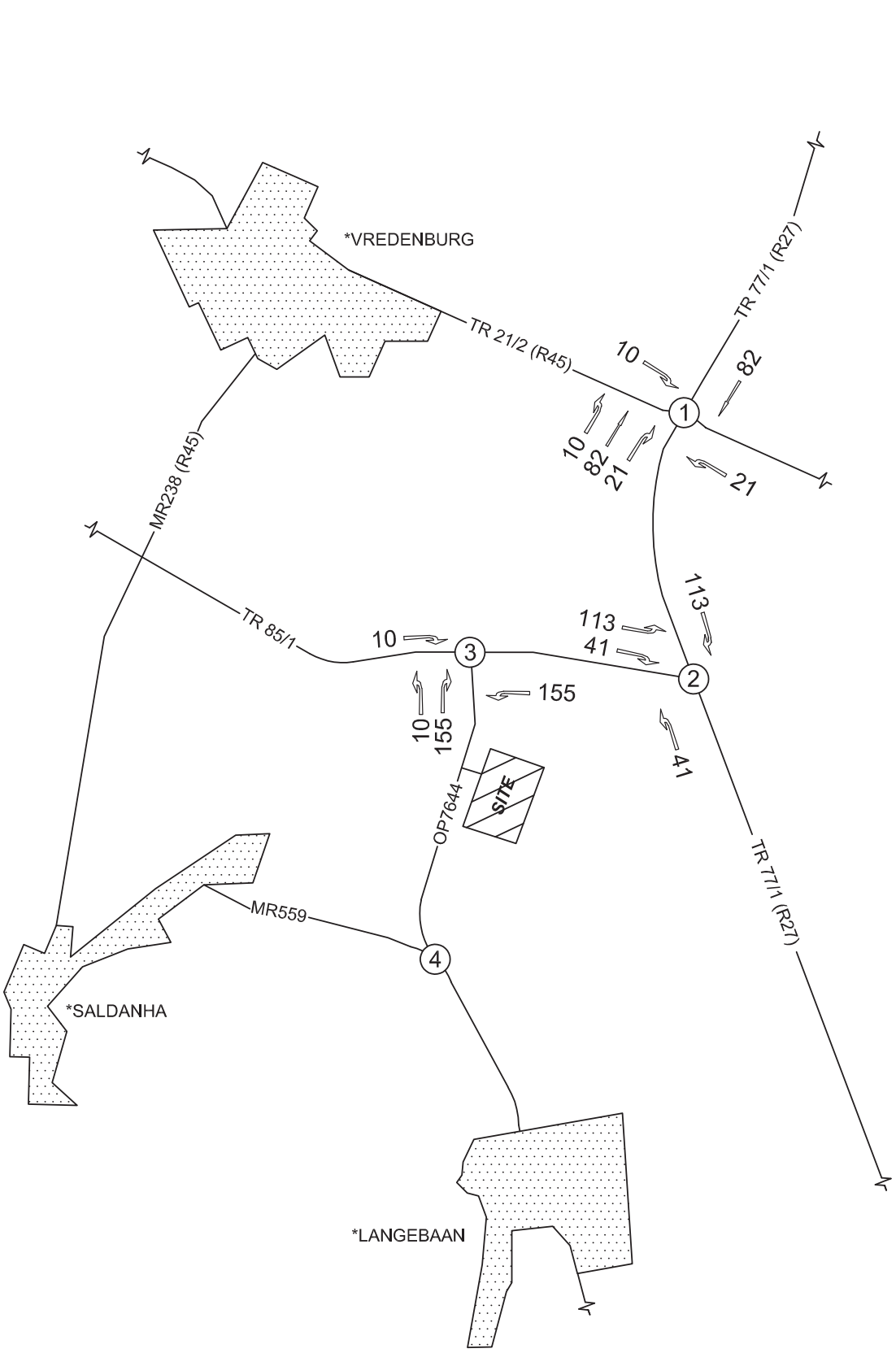
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: SITE TRAFFIC FOR CONSTRUCTION - AM PEAK FLOW

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	10



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

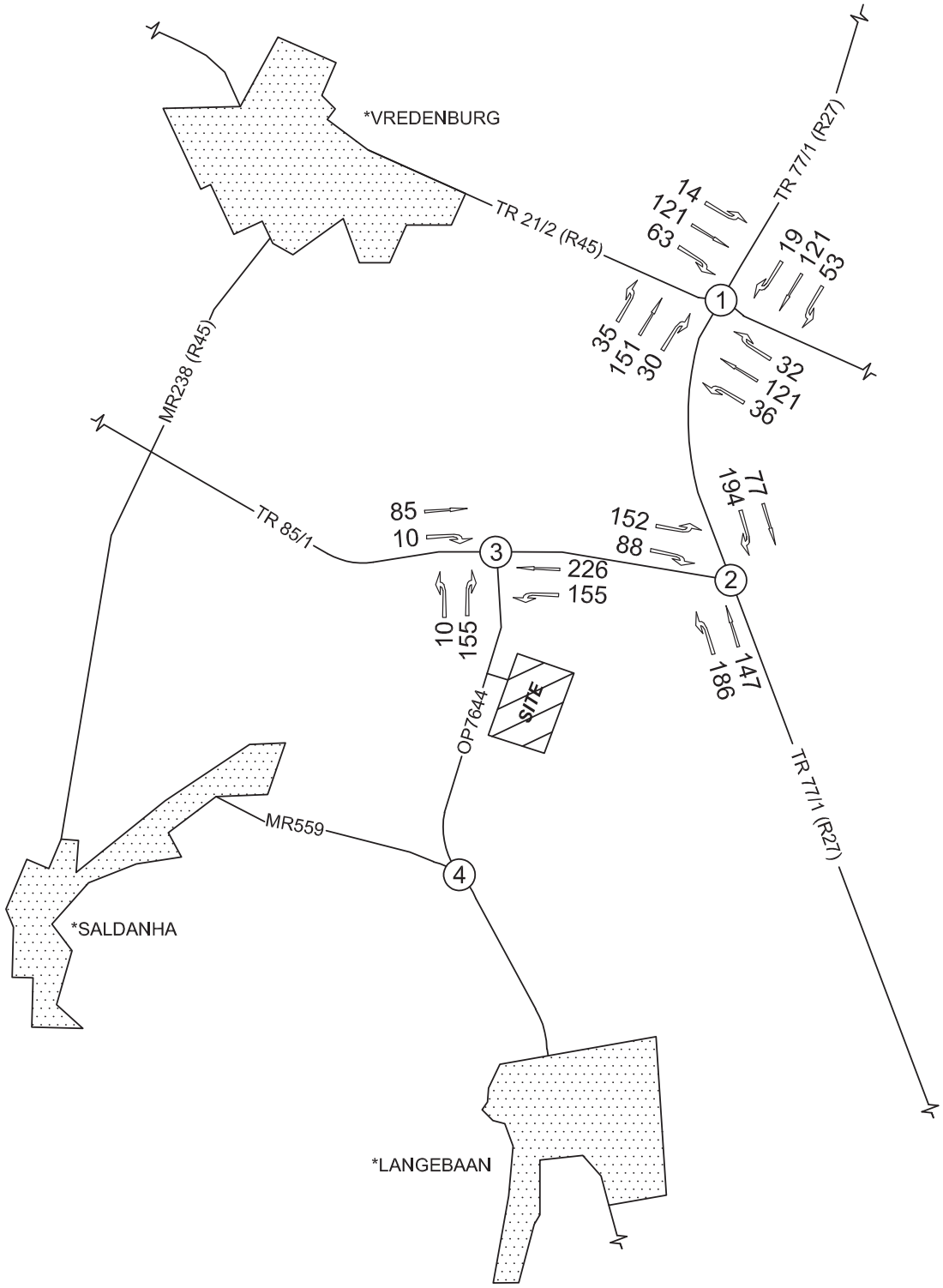
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: SITE TRAFFIC FOR CONSTRUCTION - PM PEAK FLOW

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	11



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

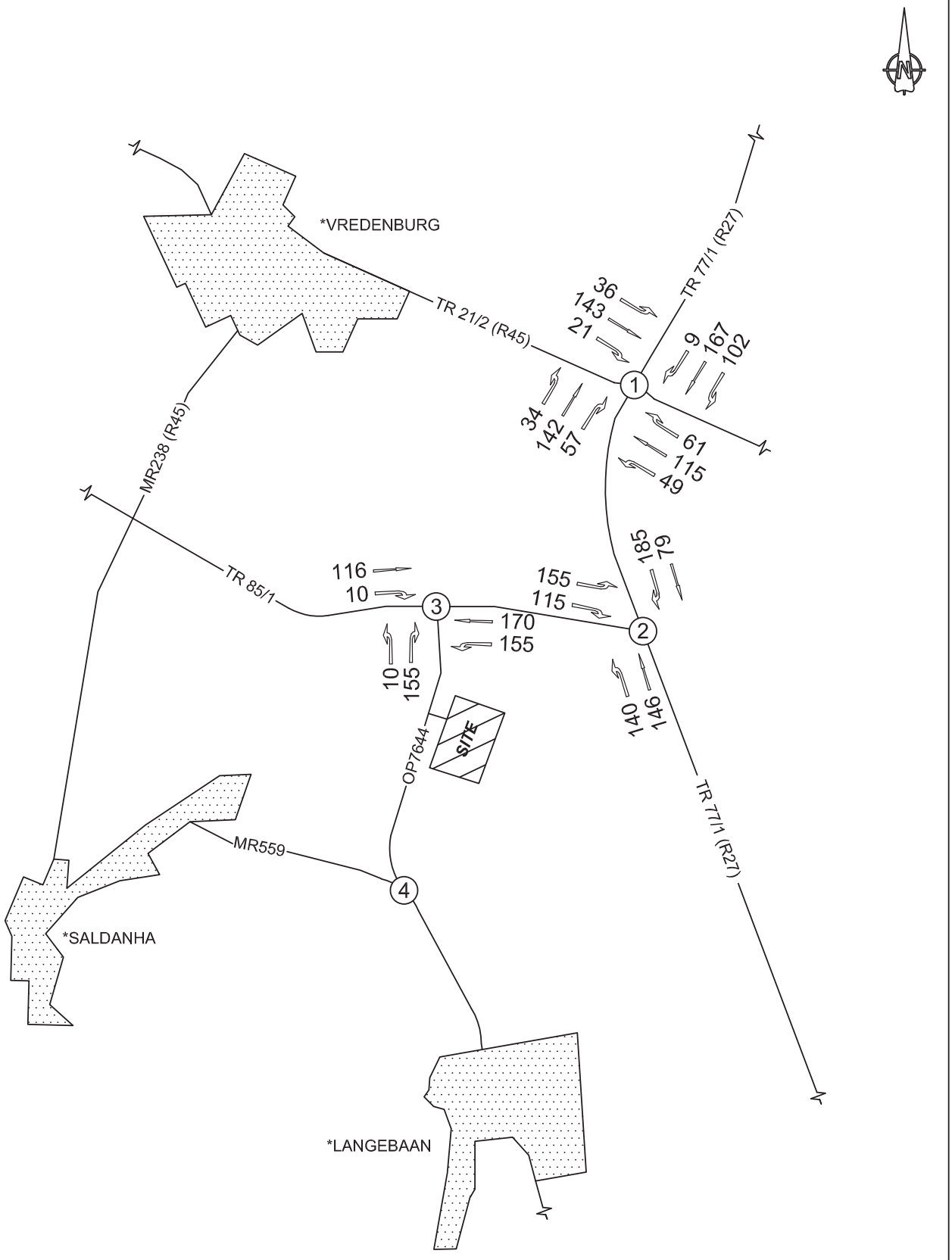
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: FUTURE 2018 AM TRAFFIC FOR CONSTRUCTION

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	12



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

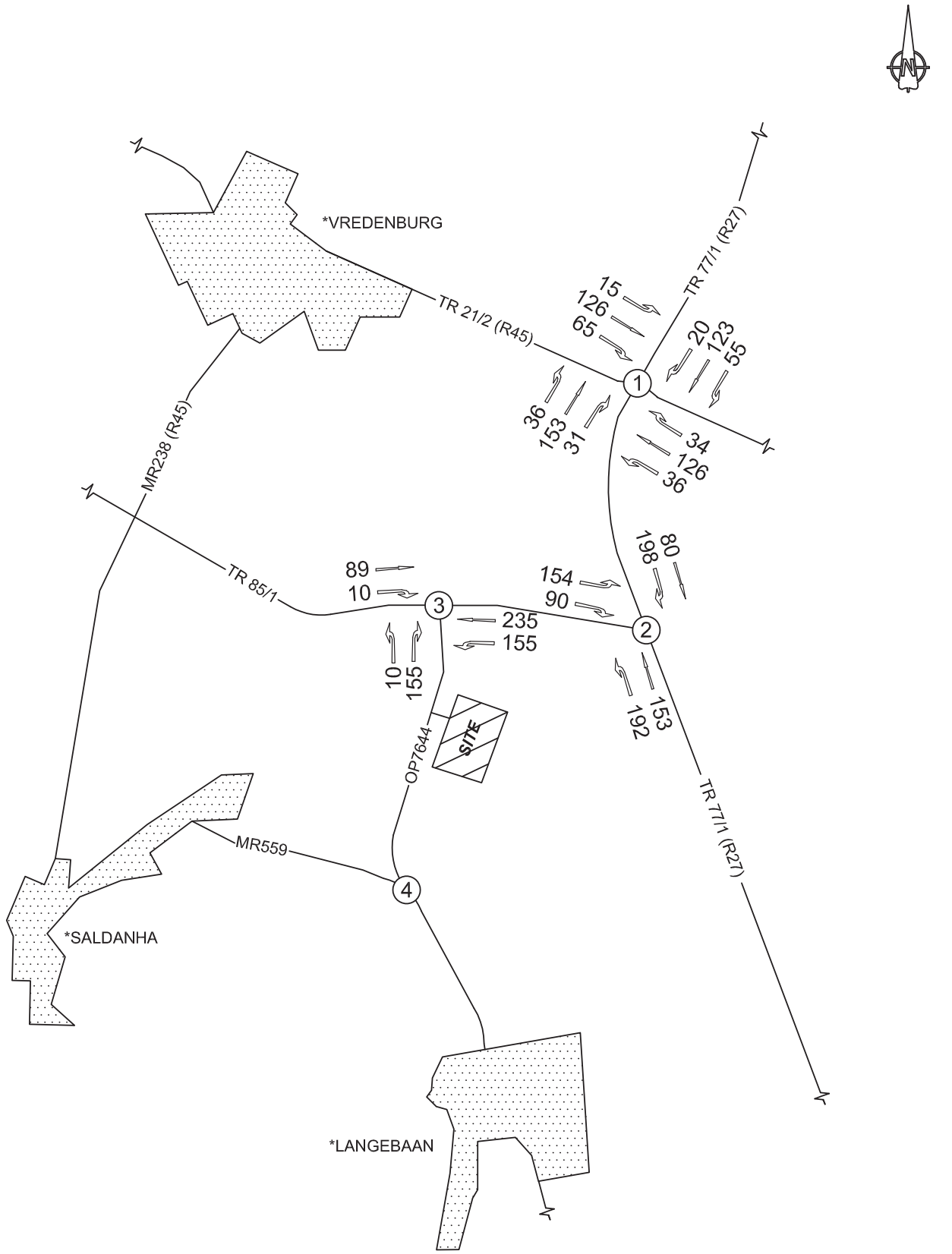
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: FUTURE 2018 PM TRAFFIC FOR CONSTRUCTION

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	13



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

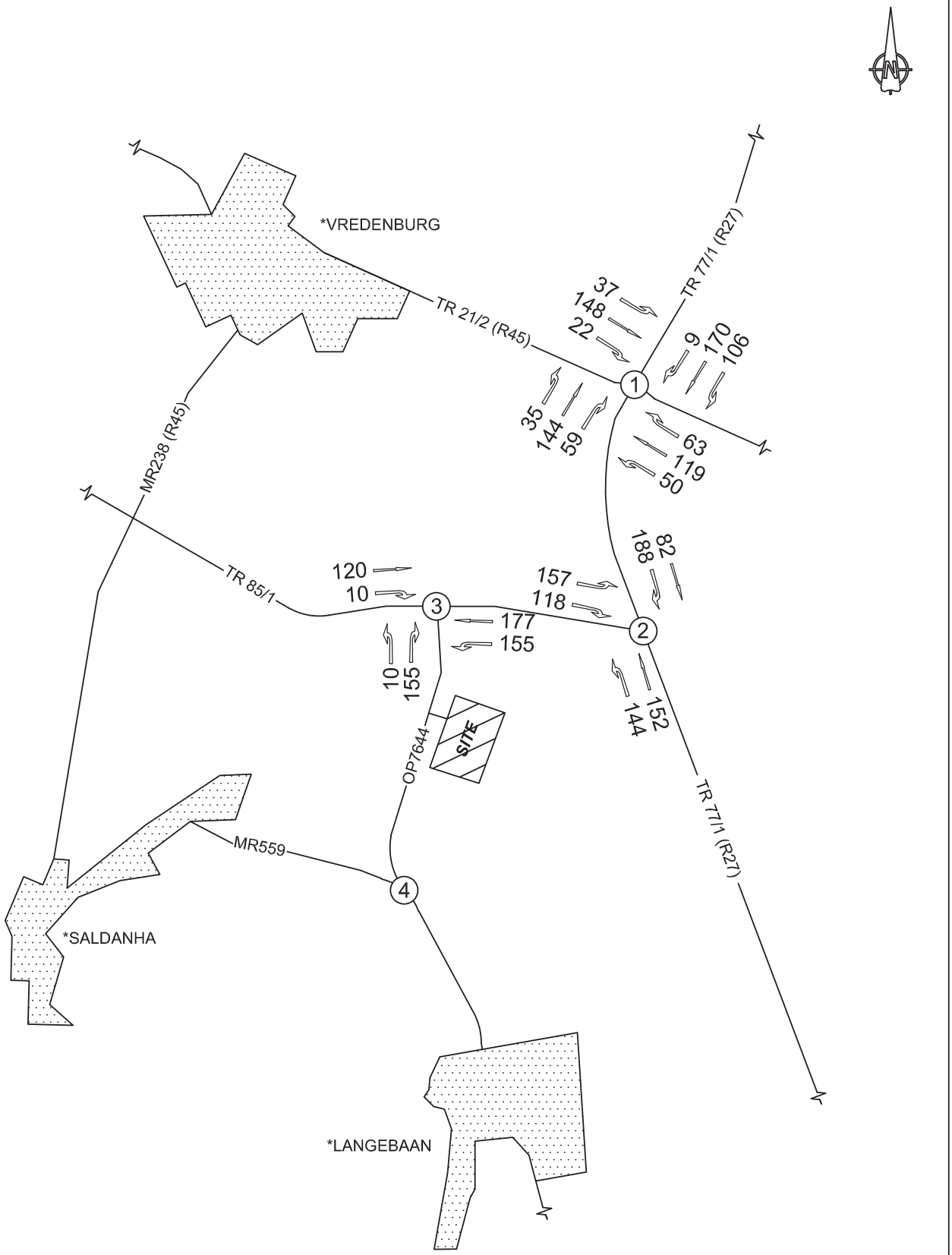
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: FUTURE 2019 AM TRAFFIC FOR CONSTRUCTION

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	14



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

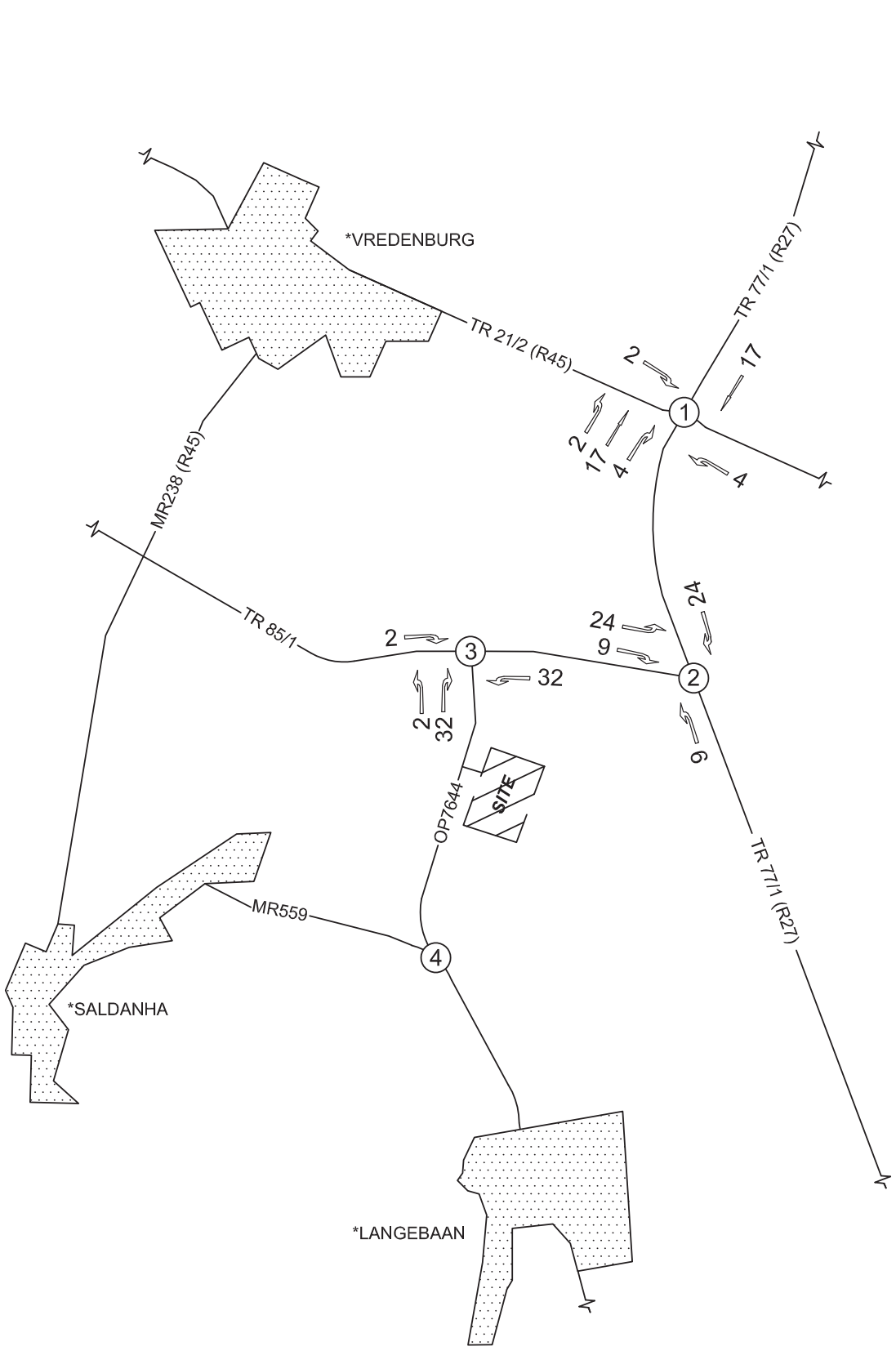
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: FUTURE 2019 PM TRAFFIC FOR CONSTRUCTION

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	15



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

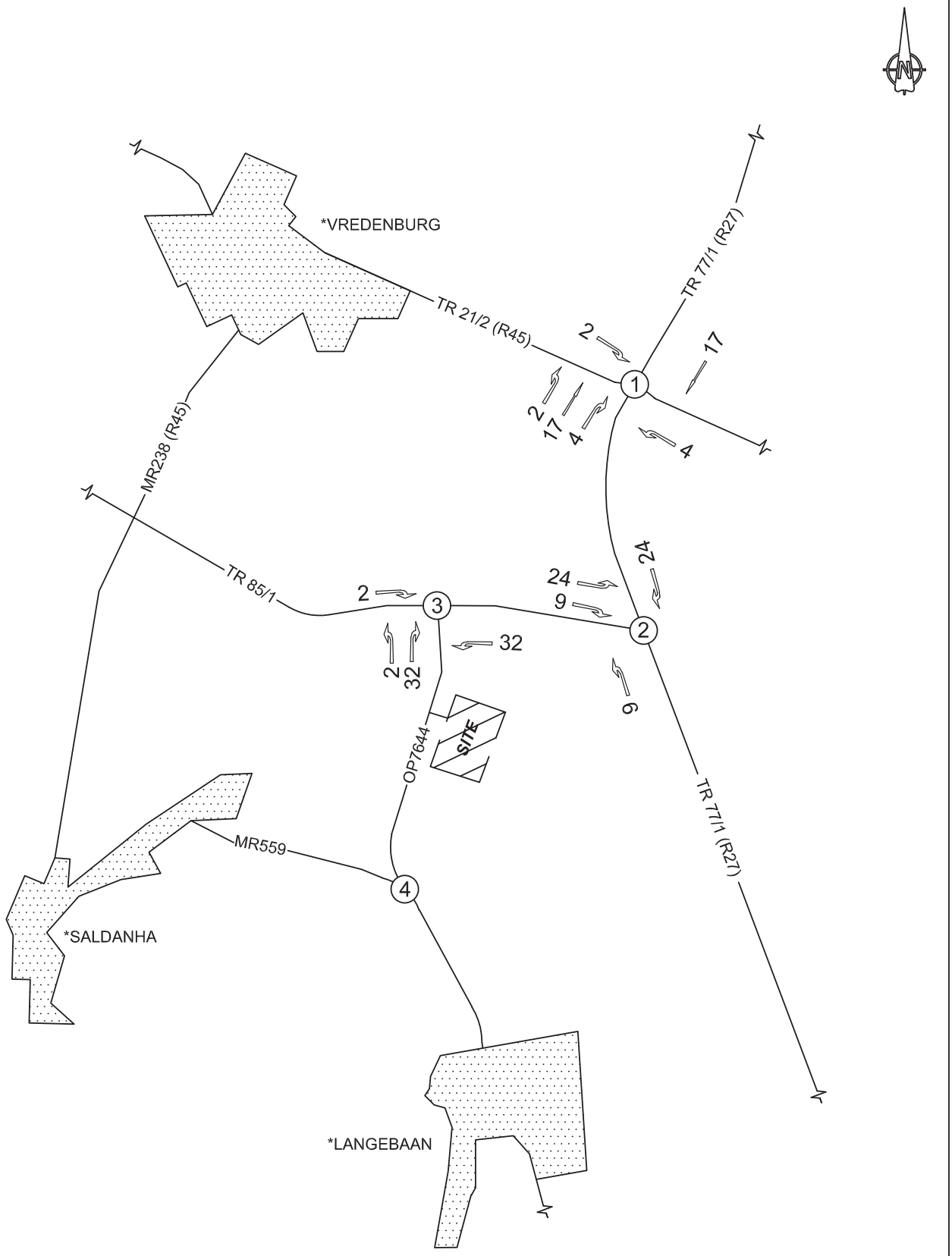
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: SITE TRAFFIC FOR AM PEAK FLOW

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	16



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

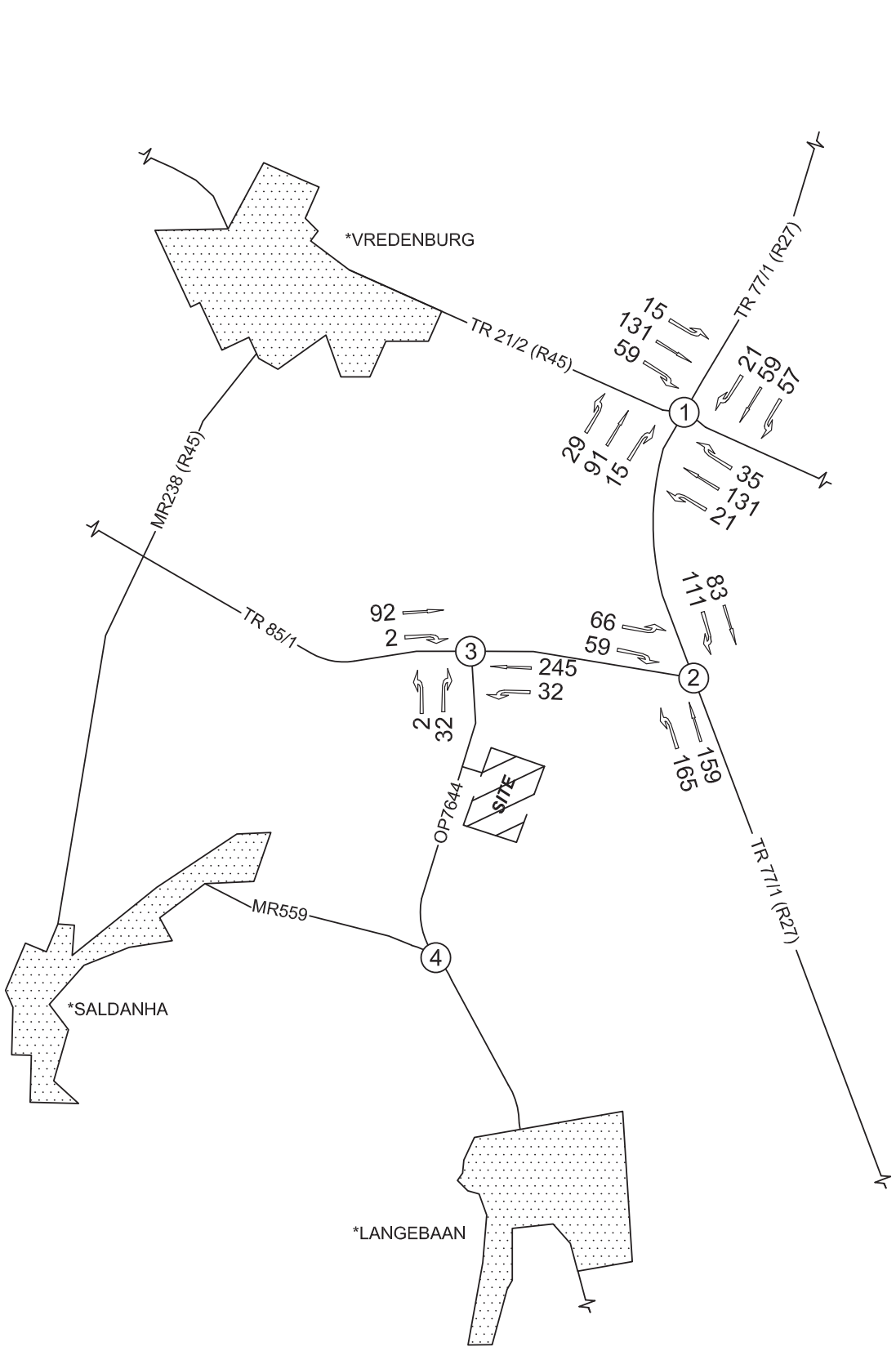
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: SITE TRAFFIC FOR PM PEAK FLOW

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	17



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

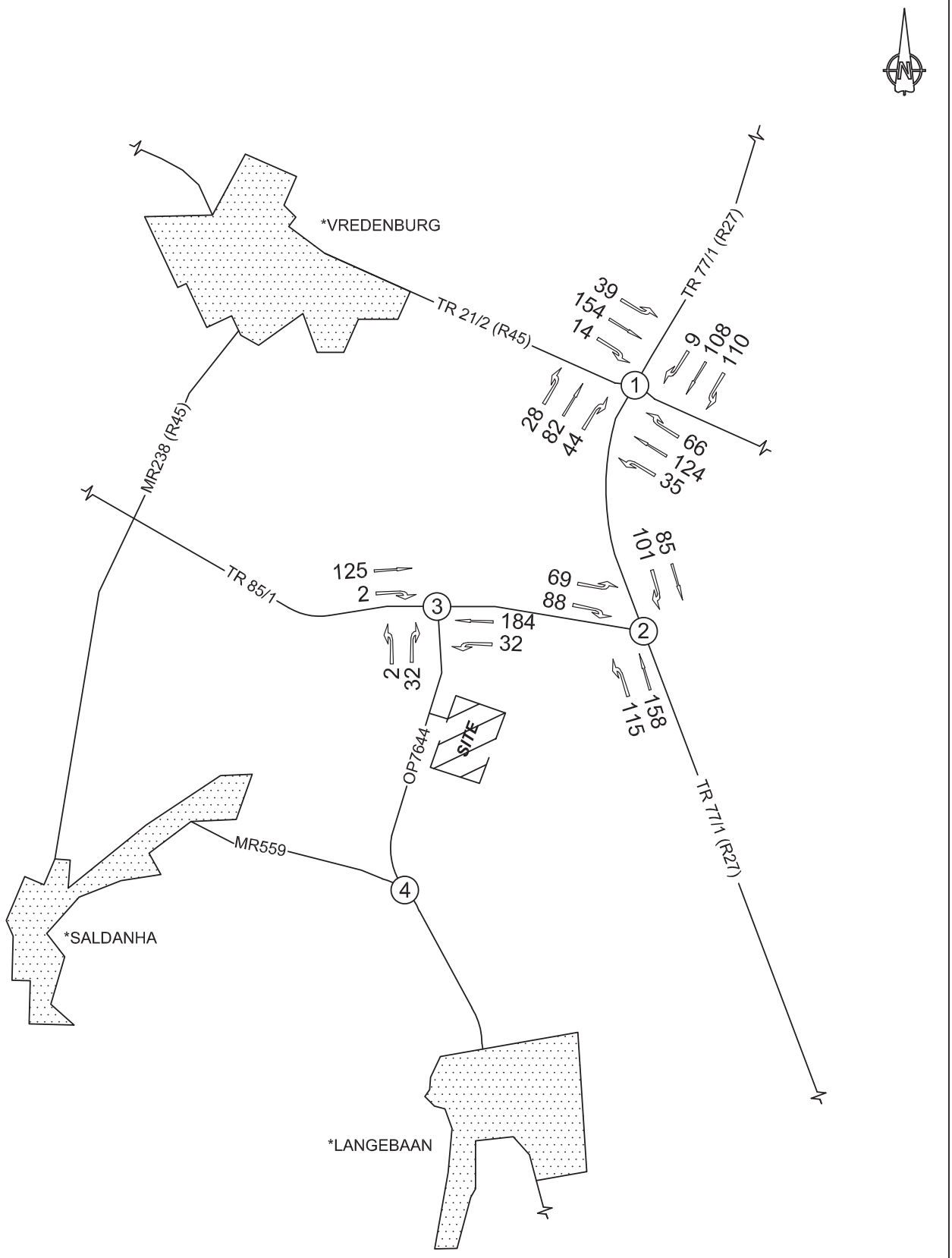
KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

PROJECT: ARCELOR MITTAL

TITLE: FUTURE AM 2020 TRAFFIC FLOW - OPERATIONAL

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	18



DEFINITIONS		LEGEND	
*	TOWN	10	TRAFFIC MOVEMENT
R	REGIONAL ROUTE	①	STOP CONTROLLED INTERSECTION
TR	TRUNK ROAD		EXISTING ROAD
OP	ONDERGESKIKTE PAD		PROPOSED ACCESS
MR	MAIN ROAD		CONTINUING ROAD

KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	DH	JUNE 2016
CHECKED	BAP	JUNE 2016
APPROVED	BAP	JUNE 2016

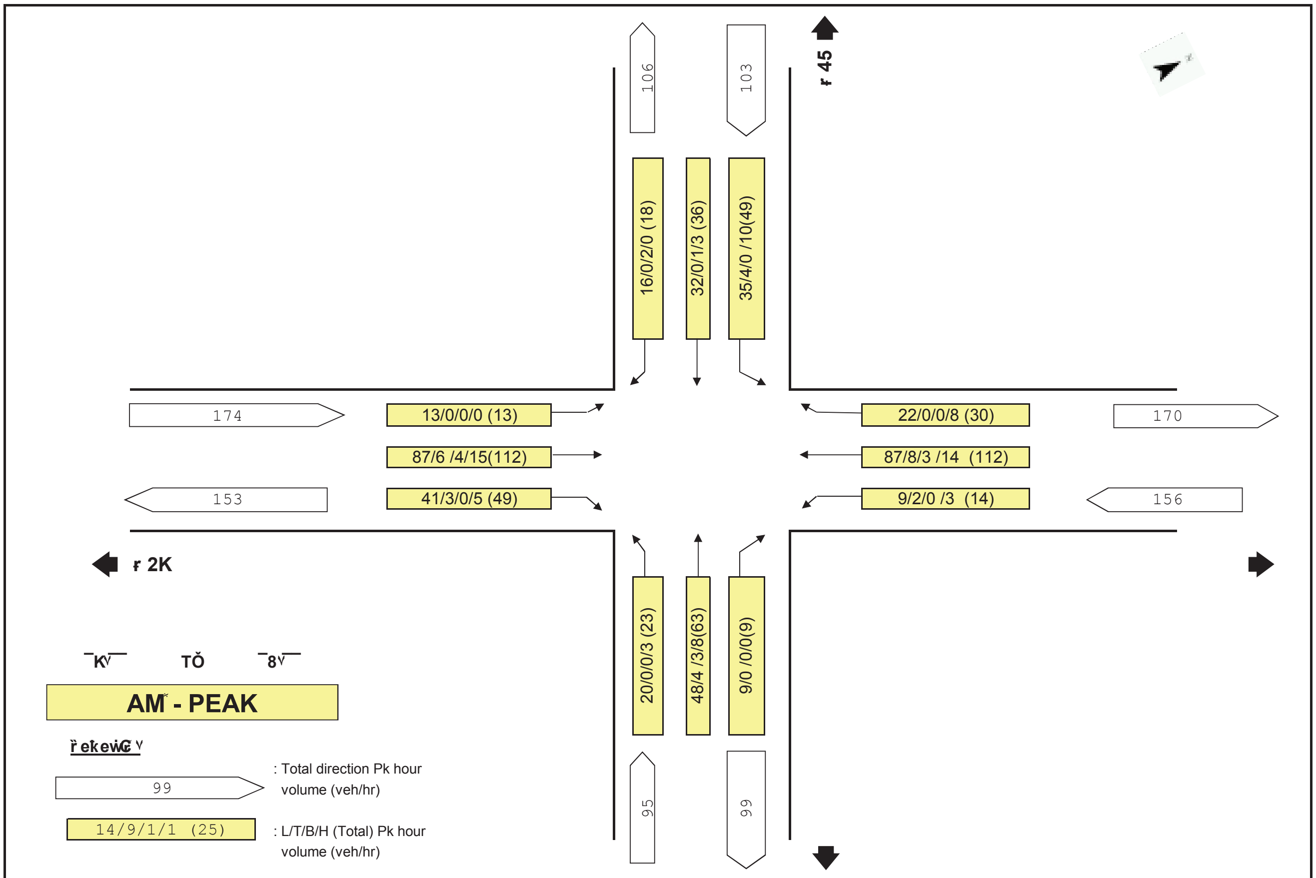
PROJECT: ARCELOR MITTAL

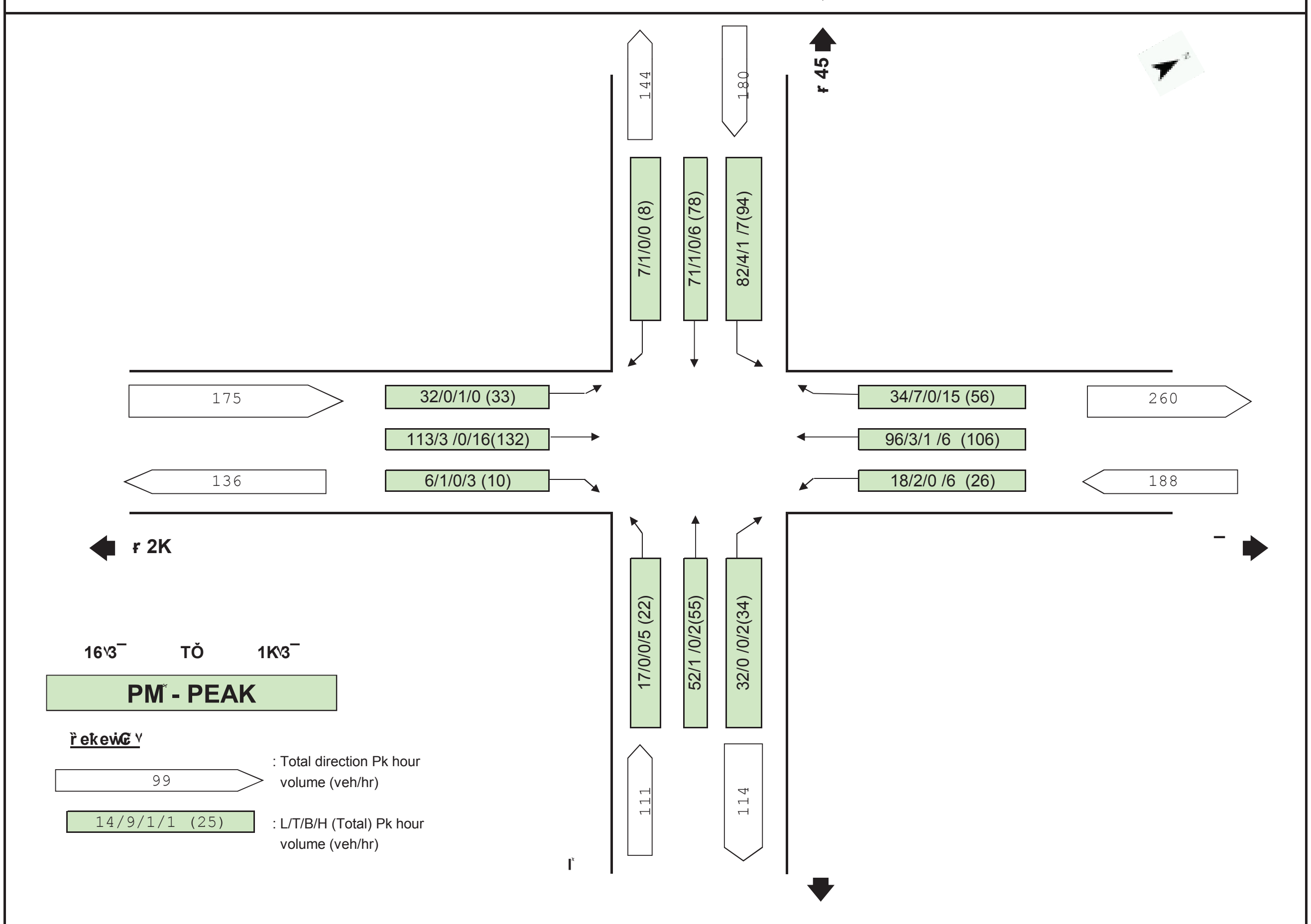
TITLE: FUTURE PM 2020 TRAFFIC FLOW - OPERATIONAL

PROJECT NO.	SCALE	FIGURE
15047R	N.T.S	19

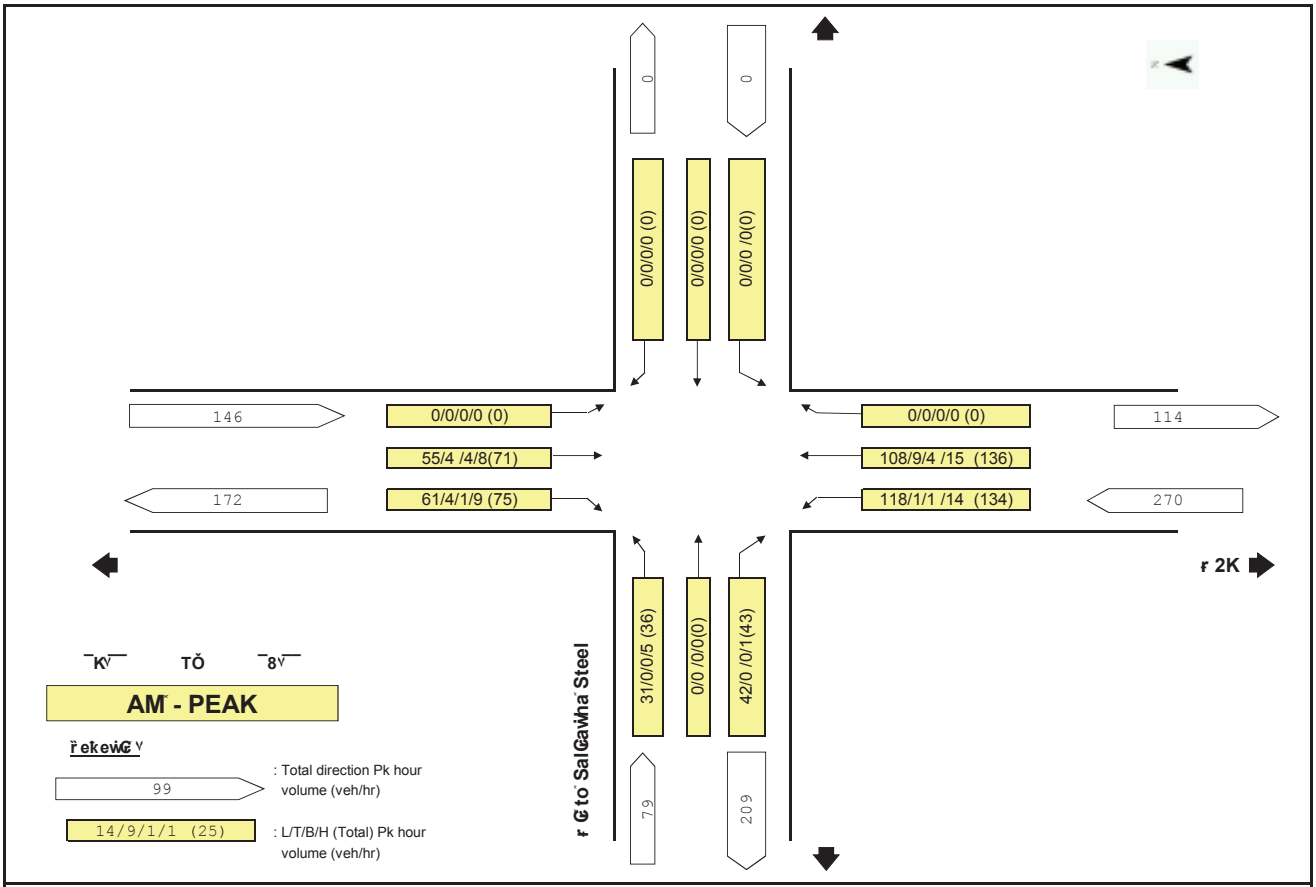
APPENDIX A

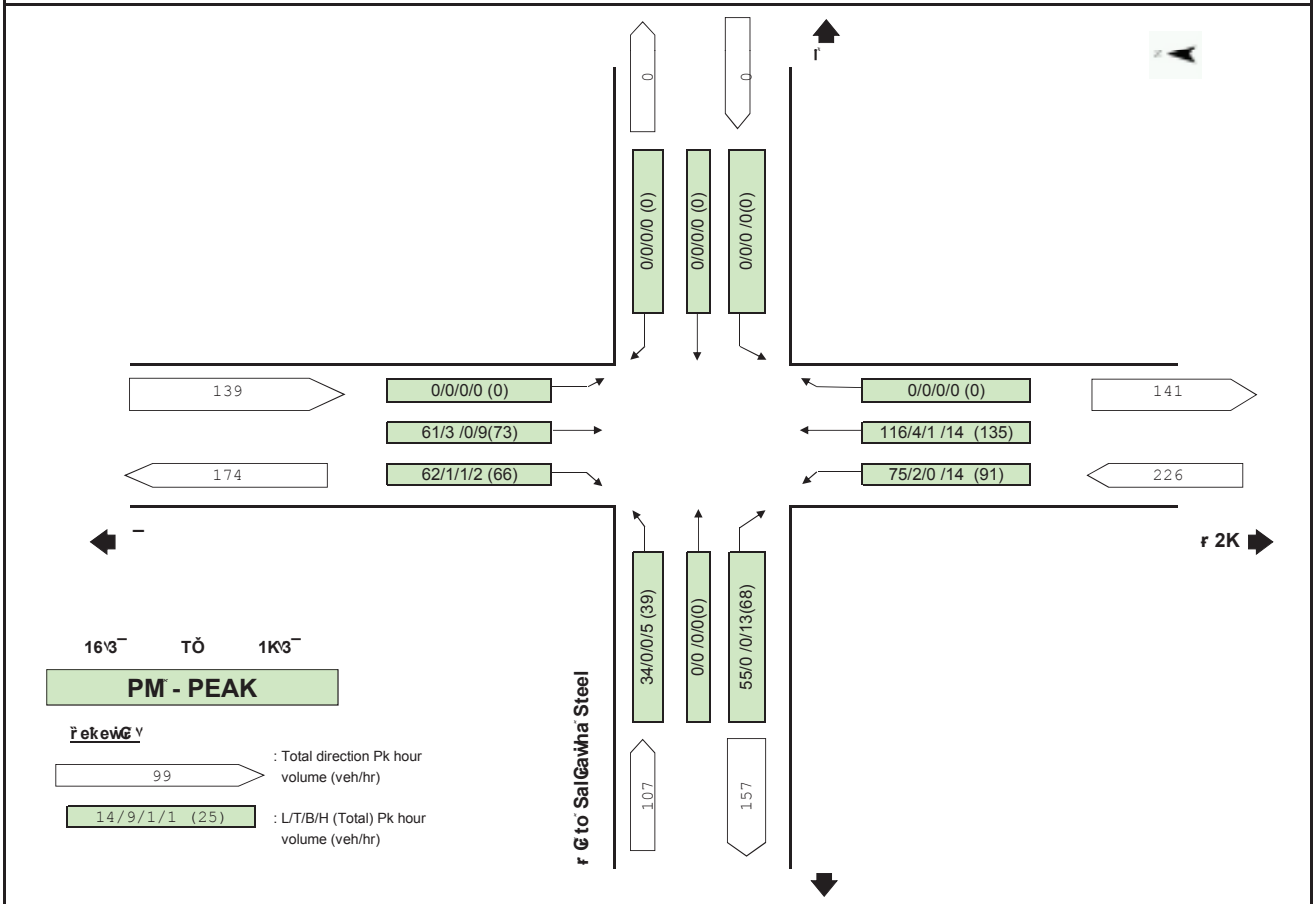
TRAFFIC COUNT DATA


106
103
16/0/2/0 (18)
32/0/1/3 (36)
35/4/0 /10(49)
174
13/0/0/0 (13)
87/6 /4/15(112)
41/3/0/5 (49)
153
22/0/0/8 (30)
87/8/3 /14 (112)
9/2/0 /3 (14)
170
156
20/0/0/3 (23)
48/4 /3/8(63)
9/0 /0/0(9)
95
99
AM - PEAK
99
: Total direction Pk hour volume (veh/hr)
14/9/1/1 (25)
: L/T/B/H (Total) Pk hour volume (veh/hr)


144
180
7/1/0/0 (8)
71/1/0/6 (78)
82/4/1 /7(94)
175
32/0/1/0 (33)
113/3 /0/16(132)
6/1/0/3 (10)
136
34/7/0/15 (56)
96/3/1 /6 (106)
18/2/0 /6 (26)
260
188
17/0/0/5 (22)
52/1 /0/2(55)
32/0 /0/2(34)
111
114
PM - PEAK
99
: Total direction Pk hour volume (veh/hr)
14/9/1/1 (25)
: L/T/B/H (Total) Pk hour volume (veh/hr)

	[illegible]	Figure





	%ite! &e$tiow 2 Mr "' ' (Tr KK)1 *r 2K+	Fik !e
	1"#Kr A!$elo! Mittal	

APPENDIX B

SIDRA MOVEMENT SUMMARIES

(COPIES AVAILABLE ON REQUEST)

MOVEMENT SUMMARY

Site: 01 [01AM2016EX]

R27 (TR 77/1) & R45 (TR 21/2)
Existing AM Peak Hour Traffic
2016
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	23	0.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.47	58.8
2	T1	63	0.0	0.035	0.0	LOS A	0.1	0.4	0.05	0.11	59.8
3	R2	9	0.0	0.035	5.7	LOS A	0.1	0.4	0.06	0.08	59.4
Approach		95	0.0	0.035	1.9	NA	0.1	0.4	0.04	0.20	59.5
East: R45 (TR21/2)											
4	L2	14	0.0	0.179	8.2	LOS A	0.8	5.6	0.30	0.89	58.1
5	T1	112	0.0	0.179	9.1	LOS A	0.8	5.6	0.30	0.89	51.2
6	R2	30	0.0	0.179	10.3	LOS B	0.8	5.6	0.30	0.89	50.8
Approach		156	0.0	0.179	9.2	LOS A	0.8	5.6	0.30	0.89	53.2
North: R27 (TR 77/1)											
7	L2	49	0.0	0.059	5.7	LOS A	0.2	1.1	0.09	0.36	54.9
8	T1	36	0.0	0.059	0.1	LOS A	0.2	1.1	0.09	0.36	59.2
9	R2	18	0.0	0.059	5.8	LOS A	0.2	1.1	0.09	0.36	54.6
Approach		103	0.0	0.059	3.8	NA	0.2	1.1	0.09	0.36	58.0
West: R45 (TR 21/2)											
10	L2	13	0.0	0.208	8.0	LOS A	0.9	6.6	0.13	0.96	50.8
11	T1	112	0.0	0.208	9.3	LOS A	0.9	6.6	0.13	0.96	50.7
12	R2	49	0.0	0.208	10.5	LOS B	0.9	6.6	0.13	0.96	57.9
Approach		174	0.0	0.208	9.5	LOS A	0.9	6.6	0.13	0.96	55.3
All Vehicles		528	0.0	0.208	6.9	NA	0.9	6.6	0.16	0.68	56.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01AM2018FU - CONSTRUCTION]

R27 (TR 77/1) & R45 (TR 21/2)
Future AM Peak Hour Traffic during Plant Construction Phase
2018
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	35	0.0	0.035	5.6	LOS A	0.0	0.0	0.00	0.31	59.1
2	T1	151	0.0	0.081	0.1	LOS A	0.2	1.4	0.10	0.16	59.6
3	R2	30	0.0	0.081	6.0	LOS A	0.2	1.4	0.13	0.12	59.2
Approach		216	0.0	0.081	1.8	NA	0.2	1.4	0.09	0.18	59.5
East: R45 (TR21/2)											
4	L2	36	0.0	0.273	8.6	LOS A	1.2	8.6	0.47	0.93	57.8
5	T1	121	0.0	0.273	11.4	LOS B	1.2	8.6	0.47	0.93	50.0
6	R2	32	0.0	0.273	13.5	LOS B	1.2	8.6	0.47	0.93	49.7
Approach		189	0.0	0.273	11.2	LOS B	1.2	8.6	0.47	0.93	54.0
North: R27 (TR 77/1)											
7	L2	53	0.0	0.107	5.8	LOS A	0.2	1.5	0.09	0.21	56.1
8	T1	121	0.0	0.107	0.2	LOS A	0.2	1.5	0.09	0.21	59.5
9	R2	19	0.0	0.107	6.3	LOS A	0.2	1.5	0.09	0.21	55.9
Approach		193	0.0	0.107	2.3	NA	0.2	1.5	0.09	0.21	59.2
West: R45 (TR 21/2)											
10	L2	14	0.0	0.324	8.6	LOS A	1.6	11.5	0.42	0.98	49.1
11	T1	121	0.0	0.324	12.1	LOS B	1.6	11.5	0.42	0.98	49.0
12	R2	63	0.0	0.324	14.7	LOS B	1.6	11.5	0.42	0.98	57.5
Approach		198	0.0	0.324	12.7	LOS B	1.6	11.5	0.42	0.98	54.7
All Vehicles		796	0.0	0.324	6.9	NA	1.6	11.5	0.26	0.56	57.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01AM2019FU - CONSTRUCTION]

R27 (TR 77/1) & R45 (TR 21/2)
Future AM Peak Hour Traffic during Plant Construction Phase
2019
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	36	0.0	0.036	5.6	LOS A	0.0	0.0	0.00	0.31	59.1
2	T1	153	0.0	0.083	0.1	LOS A	0.2	1.4	0.10	0.16	59.6
3	R2	31	0.0	0.083	6.0	LOS A	0.2	1.4	0.13	0.12	59.2
Approach		220	0.0	0.083	1.9	NA	0.2	1.4	0.09	0.18	59.5
East: R45 (TR21/2)											
4	L2	36	0.0	0.288	8.6	LOS A	1.3	9.3	0.49	0.94	57.8
5	T1	126	0.0	0.288	11.6	LOS B	1.3	9.3	0.49	0.94	49.9
6	R2	34	0.0	0.288	13.9	LOS B	1.3	9.3	0.49	0.94	49.5
Approach		196	0.0	0.288	11.5	LOS B	1.3	9.3	0.49	0.94	53.8
North: R27 (TR 77/1)											
7	L2	55	0.0	0.110	5.8	LOS A	0.2	1.5	0.10	0.21	56.1
8	T1	123	0.0	0.110	0.2	LOS A	0.2	1.5	0.10	0.21	59.5
9	R2	20	0.0	0.110	6.3	LOS A	0.2	1.5	0.10	0.21	55.8
Approach		198	0.0	0.110	2.4	NA	0.2	1.5	0.10	0.21	59.1
West: R45 (TR 21/2)											
10	L2	15	0.0	0.341	8.8	LOS A	1.8	12.5	0.43	0.99	48.9
11	T1	126	0.0	0.341	12.4	LOS B	1.8	12.5	0.43	0.99	48.8
12	R2	65	0.0	0.341	15.1	LOS C	1.8	12.5	0.43	0.99	57.4
Approach		206	0.0	0.341	13.0	LOS B	1.8	12.5	0.43	0.99	54.6
All Vehicles		820	0.0	0.341	7.1	NA	1.8	12.5	0.27	0.57	57.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01AM2020FU - OPERATIONAL]

R27 (TR 77/1) & R45 (TR 21/2)
Future AM Peak Hour Traffic for the Plant Operational Phase
2020
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	29	0.0	0.022	5.6	LOS A	0.0	0.0	0.00	0.42	58.9
2	T1	91	0.0	0.050	0.1	LOS A	0.1	0.7	0.07	0.14	59.7
3	R2	15	0.0	0.050	5.8	LOS A	0.1	0.7	0.08	0.10	59.3
Approach		135	0.0	0.050	1.9	NA	0.1	0.7	0.06	0.19	59.5
East: R45 (TR21/2)											
4	L2	21	0.0	0.234	8.3	LOS A	1.1	7.5	0.38	0.90	58.0
5	T1	131	0.0	0.234	9.8	LOS A	1.1	7.5	0.38	0.90	50.7
6	R2	35	0.0	0.234	11.5	LOS B	1.1	7.5	0.38	0.90	50.4
Approach		187	0.0	0.234	10.0	LOS A	1.1	7.5	0.38	0.90	53.3
North: R27 (TR 77/1)											
7	L2	57	0.0	0.077	5.7	LOS A	0.2	1.4	0.10	0.31	55.2
8	T1	59	0.0	0.077	0.2	LOS A	0.2	1.4	0.10	0.31	59.3
9	R2	21	0.0	0.077	6.0	LOS A	0.2	1.4	0.10	0.31	55.0
Approach		137	0.0	0.077	3.4	NA	0.2	1.4	0.10	0.31	58.4
West: R45 (TR 21/2)											
10	L2	15	0.0	0.273	8.1	LOS A	1.3	8.9	0.24	0.95	50.3
11	T1	131	0.0	0.273	10.1	LOS B	1.3	8.9	0.24	0.95	50.2
12	R2	59	0.0	0.273	11.9	LOS B	1.3	8.9	0.24	0.95	57.8
Approach		205	0.0	0.273	10.4	LOS B	1.3	8.9	0.24	0.95	55.1
All Vehicles		664	0.0	0.273	7.1	NA	1.3	8.9	0.21	0.65	57.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01PM2016EX]

R27 (TR 77/1) & R45 (TR 21/2)
Existing AM Peak Hour Traffic
2016
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	22	0.0	0.019	5.6	LOS A	0.0	0.0	0.00	0.36	59.0
2	T1	55	0.0	0.044	0.3	LOS A	0.2	1.3	0.17	0.29	59.4
3	R2	34	0.0	0.044	6.0	LOS A	0.2	1.3	0.23	0.26	58.9
Approach		111	0.0	0.044	3.1	NA	0.2	1.3	0.16	0.29	59.2
East: R45 (TR21/2)											
4	L2	26	0.0	0.248	8.4	LOS A	1.1	7.9	0.40	0.91	57.9
5	T1	106	0.0	0.248	9.9	LOS A	1.1	7.9	0.40	0.91	50.5
6	R2	56	0.0	0.248	12.0	LOS B	1.1	7.9	0.40	0.91	50.2
Approach		188	0.0	0.248	10.3	LOS B	1.1	7.9	0.40	0.91	53.6
North: R27 (TR 77/1)											
7	L2	94	0.0	0.097	5.6	LOS A	0.1	0.6	0.03	0.33	55.5
8	T1	78	0.0	0.097	0.0	LOS A	0.1	0.6	0.03	0.33	59.4
9	R2	8	0.0	0.097	5.8	LOS A	0.1	0.6	0.03	0.33	55.2
Approach		180	0.0	0.097	3.2	NA	0.1	0.6	0.03	0.33	58.6
West: R45 (TR 21/2)											
10	L2	33	0.0	0.209	8.1	LOS A	0.9	6.6	0.14	0.96	50.6
11	T1	132	0.0	0.209	10.2	LOS B	0.9	6.6	0.14	0.96	50.5
12	R2	10	0.0	0.209	11.2	LOS B	0.9	6.6	0.14	0.96	57.9
Approach		175	0.0	0.209	9.9	LOS A	0.9	6.6	0.14	0.96	52.1
All Vehicles		654	0.0	0.248	7.0	NA	1.1	7.9	0.19	0.66	56.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01PM2018FU - CONSTRUCTION]

R27 (TR 77/1) & R45 (TR 21/2)
Future PM Peak Hour Traffic during Plant Construction Phase
2018
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	34	0.0	0.040	5.6	LOS A	0.0	0.0	0.00	0.27	59.2
2	T1	142	0.0	0.093	0.4	LOS A	0.4	2.6	0.19	0.24	59.4
3	R2	57	0.0	0.093	6.4	LOS A	0.4	2.6	0.27	0.22	59.0
Approach		233	0.0	0.093	2.6	NA	0.4	2.6	0.18	0.24	59.3
East: R45 (TR21/2)											
4	L2	49	0.0	0.384	9.9	LOS A	2.2	15.1	0.57	1.01	57.4
5	T1	115	0.0	0.384	13.8	LOS B	2.2	15.1	0.57	1.01	48.3
6	R2	61	0.0	0.384	17.5	LOS C	2.2	15.1	0.57	1.01	48.0
Approach		225	0.0	0.384	13.9	LOS B	2.2	15.1	0.57	1.01	53.2
North: R27 (TR 77/1)											
7	L2	102	0.0	0.148	5.6	LOS A	0.1	0.8	0.03	0.23	56.2
8	T1	167	0.0	0.148	0.1	LOS A	0.1	0.8	0.03	0.23	59.6
9	R2	9	0.0	0.148	6.3	LOS A	0.1	0.8	0.03	0.23	56.0
Approach		278	0.0	0.148	2.3	NA	0.1	0.8	0.03	0.23	59.2
West: R45 (TR 21/2)											
10	L2	36	0.0	0.326	8.7	LOS A	1.7	11.6	0.35	0.98	48.8
11	T1	143	0.0	0.326	13.7	LOS B	1.7	11.6	0.35	0.98	48.7
12	R2	21	0.0	0.326	15.9	LOS C	1.7	11.6	0.35	0.98	57.4
Approach		200	0.0	0.326	13.0	LOS B	1.7	11.6	0.35	0.98	51.6
All Vehicles		936	0.0	0.384	7.5	NA	2.2	15.1	0.27	0.58	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01PM2019FU - CONSTRUCTION]

R27 (TR 77/1) & R45 (TR 21/2)
Future PM Peak Hour Traffic during Plant Construction Phase
2019
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	35	0.0	0.041	5.6	LOS A	0.0	0.0	0.00	0.27	59.2
2	T1	144	0.0	0.095	0.4	LOS A	0.4	2.7	0.20	0.24	59.4
3	R2	59	0.0	0.095	6.4	LOS A	0.4	2.7	0.28	0.23	59.0
Approach		238	0.0	0.095	2.7	NA	0.4	2.7	0.19	0.24	59.3
East: R45 (TR21/2)											
4	L2	50	0.0	0.404	10.1	LOS B	2.3	16.3	0.58	1.02	57.3
5	T1	119	0.0	0.404	14.2	LOS B	2.3	16.3	0.58	1.02	48.1
6	R2	63	0.0	0.404	18.2	LOS C	2.3	16.3	0.58	1.02	47.7
Approach		232	0.0	0.404	14.4	LOS B	2.3	16.3	0.58	1.02	53.0
North: R27 (TR 77/1)											
7	L2	106	0.0	0.152	5.6	LOS A	0.1	0.8	0.03	0.23	56.2
8	T1	170	0.0	0.152	0.1	LOS A	0.1	0.8	0.03	0.23	59.5
9	R2	9	0.0	0.152	6.3	LOS A	0.1	0.8	0.03	0.23	56.0
Approach		285	0.0	0.152	2.3	NA	0.1	0.8	0.03	0.23	59.1
West: R45 (TR 21/2)											
10	L2	37	0.0	0.344	8.9	LOS A	1.8	12.7	0.36	0.98	48.5
11	T1	148	0.0	0.344	14.1	LOS B	1.8	12.7	0.36	0.98	48.4
12	R2	22	0.0	0.344	16.3	LOS C	1.8	12.7	0.36	0.98	57.3
Approach		207	0.0	0.344	13.4	LOS B	1.8	12.7	0.36	0.98	51.5
All Vehicles		962	0.0	0.404	7.7	NA	2.3	16.3	0.27	0.59	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 01 [01PM2020FU - OPERATIONAL]

R27 (TR 77/1) & R45 (TR 21/2)
Future PM Peak Hour Traffic for the Plant Operational Phase
2020
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR77/1)											
1	L2	28	0.0	0.026	5.6	LOS A	0.0	0.0	0.00	0.33	59.1
2	T1	82	0.0	0.061	0.3	LOS A	0.3	1.8	0.19	0.27	59.4
3	R2	44	0.0	0.061	6.1	LOS A	0.3	1.8	0.26	0.25	58.9
Approach		154	0.0	0.061	2.9	NA	0.3	1.8	0.17	0.28	59.2
East: R45 (TR21/2)											
4	L2	35	0.0	0.334	8.9	LOS A	1.7	12.1	0.49	0.95	57.7
5	T1	124	0.0	0.334	11.3	LOS B	1.7	12.1	0.49	0.95	49.6
6	R2	66	0.0	0.334	14.4	LOS B	1.7	12.1	0.49	0.95	49.3
Approach		225	0.0	0.334	11.8	LOS B	1.7	12.1	0.49	0.95	53.2
North: R27 (TR 77/1)											
7	L2	110	0.0	0.122	5.6	LOS A	0.1	0.7	0.03	0.30	55.7
8	T1	108	0.0	0.122	0.0	LOS A	0.1	0.7	0.03	0.30	59.4
9	R2	9	0.0	0.122	6.0	LOS A	0.1	0.7	0.03	0.30	55.4
Approach		227	0.0	0.122	3.0	NA	0.1	0.7	0.03	0.30	58.7
West: R45 (TR 21/2)											
10	L2	39	0.0	0.278	8.1	LOS A	1.3	9.0	0.21	0.95	50.0
11	T1	154	0.0	0.278	11.4	LOS B	1.3	9.0	0.21	0.95	49.9
12	R2	14	0.0	0.278	12.8	LOS B	1.3	9.0	0.21	0.95	57.7
Approach		207	0.0	0.278	10.9	LOS B	1.3	9.0	0.21	0.95	51.8
All Vehicles		813	0.0	0.334	7.4	NA	1.7	12.1	0.23	0.64	56.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02AM2016EX]

R27 (TR 77/1) & TR 85/1
Existing AM Peak Traffic
2016
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	134	0.0	0.072	5.5	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	136	0.0	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		270	0.0	0.072	2.8	NA	0.0	0.0	0.00	0.29	59.3
North: R27 (TR 77/1)											
8	T1	71	0.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	75	0.0	0.068	6.6	LOS A	0.3	1.9	0.36	0.61	59.0
Approach		146	0.0	0.068	3.4	NA	0.3	1.9	0.18	0.32	59.4
West: TR 85/1											
10	L2	36	0.0	0.104	8.7	LOS A	0.4	2.8	0.34	0.90	58.8
12	R2	43	0.0	0.104	11.0	LOS B	0.4	2.8	0.34	0.90	57.7
Approach		79	0.0	0.104	9.9	LOS A	0.4	2.8	0.34	0.90	58.4
All Vehicles		495	0.0	0.104	4.1	NA	0.4	2.8	0.11	0.39	59.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02AM2018FU - CONSTRUCTION]

R27 (TR 77/1) & TR 85/1
Future AM Peak Traffic for the Plant Construction Phase
2018
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	186	0.0	0.100	5.6	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	147	0.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		333	0.0	0.100	3.1	NA	0.0	0.0	0.00	0.32	59.2
North: R27 (TR 77/1)											
8	T1	77	0.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	194	0.0	0.187	7.1	LOS A	0.8	5.6	0.43	0.67	59.0
Approach		271	0.0	0.187	5.1	NA	0.8	5.6	0.31	0.48	59.2
West: TR 85/1											
10	L2	152	0.0	0.328	9.0	LOS A	1.5	10.5	0.39	0.92	58.7
12	R2	88	0.0	0.328	14.6	LOS B	1.5	10.5	0.39	0.92	57.5
Approach		240	0.0	0.328	11.1	LOS B	1.5	10.5	0.39	0.92	58.4
All Vehicles		844	0.0	0.328	6.0	NA	1.5	10.5	0.21	0.54	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02AM2019FU - CONSTRUCTION]

R27 (TR 77/1) & TR 85/1
Future AM Peak Traffic for the Plant Construction Phase
2019
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	192	0.0	0.103	5.6	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	153	0.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		345	0.0	0.103	3.1	NA	0.0	0.0	0.00	0.32	59.2
North: R27 (TR 77/1)											
8	T1	80	0.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	198	0.0	0.193	7.1	LOS A	0.8	5.8	0.44	0.68	59.0
Approach		278	0.0	0.193	5.1	NA	0.8	5.8	0.32	0.48	59.2
West: TR 85/1											
10	L2	154	0.0	0.340	9.2	LOS A	1.6	11.4	0.41	0.92	58.7
12	R2	90	0.0	0.340	15.0	LOS C	1.6	11.4	0.41	0.92	57.5
Approach		244	0.0	0.340	11.3	LOS B	1.6	11.4	0.41	0.92	58.4
All Vehicles		867	0.0	0.340	6.1	NA	1.6	11.4	0.22	0.54	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02AM2020FU - OPERATIONAL]

R27 (TR 77/1) & TR 85/1
Future AM Peak Traffic for the Plant Operational Phase
2020
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	165	0.0	0.089	5.5	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	159	0.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		324	0.0	0.089	2.8	NA	0.0	0.0	0.00	0.29	59.3
North: R27 (TR 77/1)											
8	T1	83	0.0	0.043	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	111	0.0	0.106	6.9	LOS A	0.4	3.0	0.40	0.65	59.0
Approach		194	0.0	0.106	3.9	NA	0.4	3.0	0.23	0.37	59.3
West: TR 85/1											
10	L2	66	0.0	0.173	8.9	LOS A	0.7	4.8	0.38	0.91	58.8
12	R2	59	0.0	0.173	12.4	LOS B	0.7	4.8	0.38	0.91	57.6
Approach		125	0.0	0.173	10.5	LOS B	0.7	4.8	0.38	0.91	58.4
All Vehicles		643	0.0	0.173	4.7	NA	0.7	4.8	0.14	0.44	59.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02PM2016EX]

R27 (TR 77/1) & TR 85/1
Existing AM Peak Traffic
2016
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	91	0.0	0.049	5.5	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	135	0.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		226	0.0	0.069	2.2	NA	0.0	0.0	0.00	0.23	59.4
North: R27 (TR 77/1)											
8	T1	73	0.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	66	0.0	0.057	6.3	LOS A	0.2	1.6	0.32	0.60	59.0
Approach		139	0.0	0.057	3.0	NA	0.2	1.6	0.15	0.28	59.4
West: TR 85/1											
10	L2	39	0.0	0.142	8.7	LOS A	0.6	3.9	0.37	0.90	58.8
12	R2	68	0.0	0.142	10.8	LOS B	0.6	3.9	0.37	0.90	57.7
Approach		107	0.0	0.142	10.0	LOS B	0.6	3.9	0.37	0.90	58.3
All Vehicles		472	0.0	0.142	4.2	NA	0.6	3.9	0.13	0.40	59.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02PM2018FU - CONSTRUCTION]

R27 (TR 77/1) & TR 85/1
Future PM Peak Traffic for the Plant Construction Phase
2018
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	140	0.0	0.075	5.5	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	146	0.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		286	0.0	0.075	2.7	NA	0.0	0.0	0.00	0.28	59.3
North: R27 (TR 77/1)											
8	T1	79	0.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	185	0.0	0.170	6.8	LOS A	0.7	5.1	0.40	0.65	59.0
Approach		264	0.0	0.170	4.8	NA	0.7	5.1	0.28	0.45	59.2
West: TR 85/1											
10	L2	155	0.0	0.376	9.4	LOS A	2.0	14.1	0.42	0.94	58.6
12	R2	115	0.0	0.376	14.6	LOS B	2.0	14.1	0.42	0.94	57.4
Approach		270	0.0	0.376	11.6	LOS B	2.0	14.1	0.42	0.94	58.3
All Vehicles		820	0.0	0.376	6.3	NA	2.0	14.1	0.23	0.55	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02PM2019FU - CONSTRUCTION]

R27 (TR 77/1) & TR 85/1
Future PM Peak Traffic for the Plant Operational Phase
2019
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	144	0.0	0.078	5.5	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	152	0.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		296	0.0	0.078	2.7	NA	0.0	0.0	0.00	0.28	59.3
North: R27 (TR 77/1)											
8	T1	82	0.0	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	188	0.0	0.174	6.8	LOS A	0.7	5.2	0.41	0.65	59.0
Approach		270	0.0	0.174	4.8	NA	0.7	5.2	0.28	0.45	59.2
West: TR 85/1											
10	L2	157	0.0	0.389	9.6	LOS A	2.2	15.2	0.43	0.95	58.6
12	R2	118	0.0	0.389	15.1	LOS C	2.2	15.2	0.43	0.95	57.4
Approach		275	0.0	0.389	11.9	LOS B	2.2	15.2	0.43	0.95	58.3
All Vehicles		841	0.0	0.389	6.4	NA	2.2	15.2	0.23	0.55	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02PM2020FU - OPERATIONAL]

R27 (TR 77/1) & TR 85/1
Future PM Peak Traffic for the Plant Operational Phase
2020
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: R27 (TR 77/1)											
1	L2	115	0.0	0.062	5.5	LOS A	0.0	0.0	0.00	0.58	58.5
2	T1	158	0.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		273	0.0	0.081	2.3	NA	0.0	0.0	0.00	0.24	59.4
North: R27 (TR 77/1)											
8	T1	85	0.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	101	0.0	0.091	6.6	LOS A	0.4	2.6	0.37	0.62	59.0
Approach		186	0.0	0.091	3.6	NA	0.4	2.6	0.20	0.34	59.3
West: TR 85/1											
10	L2	69	0.0	0.221	8.9	LOS A	0.9	6.3	0.41	0.92	58.7
12	R2	88	0.0	0.221	12.1	LOS B	0.9	6.3	0.41	0.92	57.6
Approach		157	0.0	0.221	10.7	LOS B	0.9	6.3	0.41	0.92	58.3
All Vehicles		616	0.0	0.221	4.8	NA	0.9	6.3	0.17	0.44	59.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 03 [03AM2018FU - CONSTRUCTION]

TR 85/1 & OP 7644
Future AM Peak Traffic for the Plant Construction Phase
2018
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: OP 7644											
1	L2	10	0.0	0.338	10.2	LOS B	1.7	11.7	0.60	1.03	48.3
2	T1	1	0.0	0.338	13.9	LOS B	1.7	11.7	0.60	1.03	48.3
3	R2	155	0.0	0.338	14.5	LOS B	1.7	11.7	0.60	1.03	57.0
Approach		166	0.0	0.338	14.3	LOS B	1.7	11.7	0.60	1.03	56.8
East: TR 81/1											
4	L2	155	0.0	0.199	5.7	LOS A	0.0	0.0	0.00	0.24	59.1
5	T1	226	0.0	0.199	0.2	LOS A	0.0	0.0	0.00	0.24	59.5
6	R2	1	0.0	0.001	5.7	LOS A	0.0	0.0	0.18	0.52	58.3
Approach		382	0.0	0.199	2.4	NA	0.0	0.0	0.00	0.24	59.3
North: OP 7641											
7	L2	1	0.0	0.005	8.4	LOS A	0.0	0.1	0.32	0.86	57.6
8	T1	1	0.0	0.005	13.0	LOS B	0.0	0.1	0.32	0.86	50.2
9	R2	1	0.0	0.005	11.2	LOS B	0.0	0.1	0.32	0.86	50.0
Approach		3	0.0	0.005	10.8	LOS B	0.0	0.1	0.32	0.86	55.1
West: TR 85/1											
10	L2	1	0.0	0.044	5.5	LOS A	0.0	0.0	0.00	0.01	58.3
11	T1	85	0.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.01	60.0
12	R2	10	0.0	0.008	6.7	LOS A	0.0	0.2	0.42	0.58	52.0
Approach		96	0.0	0.044	0.8	NA	0.0	0.2	0.04	0.07	59.8
All Vehicles		647	0.0	0.338	5.3	NA	1.7	11.7	0.16	0.42	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 03 [03AM2019FU - CONSTRUCTION]

TR 85/1 & OP 7644
Future AM Peak Traffic for the Plant Construction Phase
2019
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: OP 7644											
1	L2	10	0.0	0.346	10.3	LOS B	1.7	12.1	0.61	1.04	48.0
2	T1	1	0.0	0.346	14.2	LOS B	1.7	12.1	0.61	1.04	48.1
3	R2	155	0.0	0.346	14.9	LOS B	1.7	12.1	0.61	1.04	56.9
Approach		166	0.0	0.346	14.6	LOS B	1.7	12.1	0.61	1.04	56.8
East: TR 81/1											
4	L2	155	0.0	0.204	5.7	LOS A	0.0	0.0	0.00	0.24	59.2
5	T1	235	0.0	0.204	0.2	LOS A	0.0	0.0	0.00	0.24	59.5
6	R2	1	0.0	0.001	5.7	LOS A	0.0	0.0	0.18	0.52	58.3
Approach		391	0.0	0.204	2.4	NA	0.0	0.0	0.00	0.24	59.4
North: OP 7641											
7	L2	1	0.0	0.005	8.4	LOS A	0.0	0.1	0.33	0.85	57.6
8	T1	1	0.0	0.005	13.2	LOS B	0.0	0.1	0.33	0.85	50.1
9	R2	1	0.0	0.005	11.4	LOS B	0.0	0.1	0.33	0.85	49.9
Approach		3	0.0	0.005	11.0	LOS B	0.0	0.1	0.33	0.85	55.1
West: TR 85/1											
10	L2	1	0.0	0.046	5.5	LOS A	0.0	0.0	0.00	0.01	58.3
11	T1	89	0.0	0.046	0.0	LOS A	0.0	0.0	0.00	0.01	60.0
12	R2	10	0.0	0.008	6.7	LOS A	0.0	0.2	0.43	0.59	52.0
Approach		100	0.0	0.046	0.7	NA	0.0	0.2	0.04	0.06	59.8
All Vehicles		660	0.0	0.346	5.3	NA	1.7	12.1	0.16	0.41	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 03 [03AM2020FU - OPERATIONAL]

TR 85/1 & OP 7644
Future AM Peak Traffic for the Plant Operational Phase
2020
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: OP 7644											
1	L2	2	0.0	0.066	9.3	LOS A	0.2	1.7	0.50	0.91	49.8
2	T1	1	0.0	0.066	11.6	LOS B	0.2	1.7	0.50	0.91	49.8
3	R2	32	0.0	0.066	11.9	LOS B	0.2	1.7	0.50	0.91	57.4
Approach		35	0.0	0.066	11.8	LOS B	0.2	1.7	0.50	0.91	57.3
East: TR 81/1											
4	L2	32	0.0	0.143	5.7	LOS A	0.0	0.0	0.00	0.07	59.5
5	T1	245	0.0	0.143	0.1	LOS A	0.0	0.0	0.00	0.07	59.8
6	R2	1	0.0	0.001	5.7	LOS A	0.0	0.0	0.19	0.52	58.3
Approach		278	0.0	0.143	0.8	NA	0.0	0.0	0.00	0.07	59.8
North: OP 7641											
7	L2	1	0.0	0.004	8.4	LOS A	0.0	0.1	0.32	0.85	57.7
8	T1	1	0.0	0.004	11.5	LOS B	0.0	0.1	0.32	0.85	50.5
9	R2	1	0.0	0.004	11.3	LOS B	0.0	0.1	0.32	0.85	50.3
Approach		3	0.0	0.004	10.4	LOS B	0.0	0.1	0.32	0.85	55.3
West: TR 85/1											
10	L2	1	0.0	0.048	5.5	LOS A	0.0	0.0	0.00	0.01	58.3
11	T1	92	0.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.01	60.0
12	R2	2	0.0	0.001	6.3	LOS A	0.0	0.0	0.35	0.53	52.2
Approach		95	0.0	0.048	0.2	NA	0.0	0.0	0.01	0.02	59.9
All Vehicles		411	0.0	0.143	1.6	NA	0.2	1.7	0.05	0.14	59.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 03 [03PM2018FU - CONSTRUCTION]

TR 85/1 & OP 7644
Future PM Peak Traffic for the Plant Construction Phase
2018
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: OP 7644											
1	L2	10	0.0	0.322	9.6	LOS A	1.6	10.9	0.57	1.01	48.7
2	T1	1	0.0	0.322	13.2	LOS B	1.6	10.9	0.57	1.01	48.8
3	R2	155	0.0	0.322	13.7	LOS B	1.6	10.9	0.57	1.01	57.1
Approach		166	0.0	0.322	13.5	LOS B	1.6	10.9	0.57	1.01	57.0
East: TR 81/1											
4	L2	155	0.0	0.171	5.7	LOS A	0.0	0.0	0.00	0.28	59.1
5	T1	170	0.0	0.171	0.1	LOS A	0.0	0.0	0.00	0.28	59.4
6	R2	1	0.0	0.001	5.8	LOS A	0.0	0.0	0.22	0.52	58.3
Approach		326	0.0	0.171	2.8	NA	0.0	0.0	0.00	0.28	59.2
North: OP 7641											
7	L2	1	0.0	0.005	8.5	LOS A	0.0	0.1	0.36	0.84	57.7
8	T1	1	0.0	0.005	12.6	LOS B	0.0	0.1	0.36	0.84	50.4
9	R2	1	0.0	0.005	10.8	LOS B	0.0	0.1	0.36	0.84	50.2
Approach		3	0.0	0.005	10.6	LOS B	0.0	0.1	0.36	0.84	55.2
West: TR 85/1											
10	L2	1	0.0	0.060	5.5	LOS A	0.0	0.0	0.00	0.01	58.3
11	T1	116	0.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.01	60.0
12	R2	10	0.0	0.008	6.5	LOS A	0.0	0.2	0.39	0.57	52.1
Approach		127	0.0	0.060	0.6	NA	0.0	0.2	0.03	0.05	59.8
All Vehicles		622	0.0	0.322	5.2	NA	1.6	10.9	0.16	0.43	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 03 [03PM2019FU - CONSTRUCTION]

TR 85/1 & OP 7644
Future PM Peak Traffic for the Plant Construction Phase
2019
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: OP 7644											
1	L2	10	0.0	0.328	9.7	LOS A	1.6	11.2	0.58	1.02	48.6
2	T1	1	0.0	0.328	13.5	LOS B	1.6	11.2	0.58	1.02	48.6
3	R2	155	0.0	0.328	14.0	LOS B	1.6	11.2	0.58	1.02	57.1
Approach		166	0.0	0.328	13.8	LOS B	1.6	11.2	0.58	1.02	56.9
East: TR 81/1											
4	L2	155	0.0	0.174	5.7	LOS A	0.0	0.0	0.00	0.28	59.1
5	T1	177	0.0	0.174	0.1	LOS A	0.0	0.0	0.00	0.28	59.4
6	R2	1	0.0	0.001	5.8	LOS A	0.0	0.0	0.22	0.52	58.3
Approach		333	0.0	0.174	2.7	NA	0.0	0.0	0.00	0.28	59.3
North: OP 7641											
7	L2	1	0.0	0.005	8.5	LOS A	0.0	0.1	0.36	0.84	57.6
8	T1	1	0.0	0.005	12.7	LOS B	0.0	0.1	0.36	0.84	50.4
9	R2	1	0.0	0.005	11.0	LOS B	0.0	0.1	0.36	0.84	50.1
Approach		3	0.0	0.005	10.7	LOS B	0.0	0.1	0.36	0.84	55.2
West: TR 85/1											
10	L2	1	0.0	0.062	5.5	LOS A	0.0	0.0	0.00	0.00	58.3
11	T1	120	0.0	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	10	0.0	0.008	6.5	LOS A	0.0	0.2	0.39	0.57	52.1
Approach		131	0.0	0.062	0.5	NA	0.0	0.2	0.03	0.05	59.8
All Vehicles		633	0.0	0.328	5.2	NA	1.6	11.2	0.16	0.43	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 03 [03PM2020FU - OPERATIONAL]

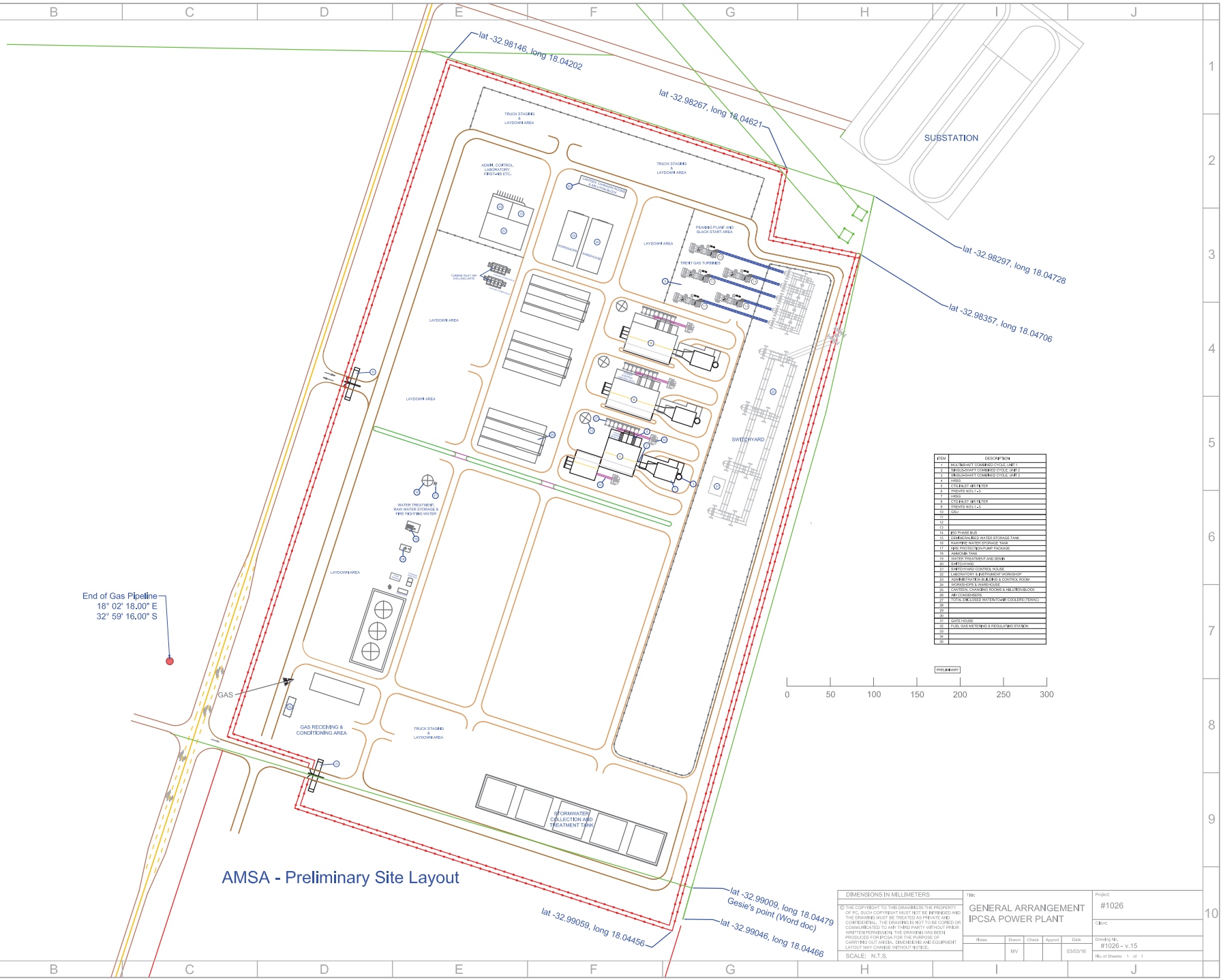
TR 85/1 & OP 7644
Future PM Peak Traffic for the Plant Operation Phase
2020
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: OP 7644											
1	L2	2	0.0	0.063	8.9	LOS A	0.2	1.6	0.47	0.90	50.1
2	T1	1	0.0	0.063	11.2	LOS B	0.2	1.6	0.47	0.90	50.1
3	R2	32	0.0	0.063	11.4	LOS B	0.2	1.6	0.47	0.90	57.5
Approach		35	0.0	0.063	11.3	LOS B	0.2	1.6	0.47	0.90	57.3
East: TR 81/1											
4	L2	32	0.0	0.112	5.6	LOS A	0.0	0.0	0.00	0.09	59.5
5	T1	184	0.0	0.112	0.1	LOS A	0.0	0.0	0.00	0.09	59.8
6	R2	1	0.0	0.001	5.8	LOS A	0.0	0.0	0.22	0.52	58.3
Approach		217	0.0	0.112	0.9	NA	0.0	0.0	0.00	0.09	59.7
North: OP 7641											
7	L2	1	0.0	0.004	8.5	LOS A	0.0	0.1	0.35	0.83	57.7
8	T1	1	0.0	0.004	11.1	LOS B	0.0	0.1	0.35	0.83	50.7
9	R2	1	0.0	0.004	10.9	LOS B	0.0	0.1	0.35	0.83	50.5
Approach		3	0.0	0.004	10.2	LOS B	0.0	0.1	0.35	0.83	55.4
West: TR 85/1											
10	L2	1	0.0	0.065	5.5	LOS A	0.0	0.0	0.00	0.00	58.3
11	T1	125	0.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	2	0.0	0.001	6.0	LOS A	0.0	0.0	0.31	0.53	52.3
Approach		128	0.0	0.065	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		383	0.0	0.112	1.7	NA	0.2	1.6	0.05	0.14	59.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C

PRELIMINARY SITE LAYOUT PLAN


lat -32.98146, long 18.04202
lat -32.98267, long 18.04621
lat -32.98297, long 18.04728
lat -32.98357, long 18.04706
SUBSTATION
TRUCK STAGING & LAYDOWN AREA
ADMIN, CONTROL, LABORATORY, FIRST-AID ETC.
CANTEEN, CHANGING ROOMS & ABLUTION BLOCK
PEAKING PLANT AND BLACK START AREA
TRENT GAS TURBINES
LAYDOWN AREA
SWITCHYARD
WATER TREATMENT, RAW WATER STORAGE & FIRE FIGHTING WATER
End of Gas Pipeline
18° 02' 18.00" E
32° 59' 16.00" S
GAS
GAS RECEIVING & CONDITIONING AREA
STORMWATER COLLECTION AND TREATMENT TANK
lat -32.99009, long 18.04479
Gesie's point (Word doc)
lat -32.99046, long 18.04466
lat -32.99059, long 18.04456
ITEM
DESCRIPTION
MULTI-SHAFT COMBINED CYCLE, UNIT 1
SINGLE-SHAFT COMBINED CYCLE, UNIT 2
SINGLE-SHAFT COMBINED CYCLE, UNIT 3
HRSG
CTG INLET AIR FILTER
TRENTS NO's 1 - 5
HRSG
CTG INLET AIR FILTER
TRENTS NO's 1 - 5
GSU
132 PHASE BUS
DEMINERALISED WATER STORAGE TANK
RAW/FIRE WATER STORAGE TANK
FIRE PROTECTION PUMP PACKAGE
AMMONIA TANK
WATER TREATMENT AND DEMIN
SWITCHYARD
SWITCHYARD CONTROL HOUSE
LABORATORY & INSTRUMENT WORKSHOP
ADMINISTRATION BUILDING & CONTROL ROOM
WORKSHOPS & WAREHOUSE
CANTEEN, CHANGING ROOMS & ABLUTION BLOCK
AIR CONDENSERS
TOTAL ENCLOSED WATER-TO-AIR COOLERS (TEWAC)
GATE HOUSE
FUEL GAS METERING & REGULATING STATION
PRELIMINARY
0
50
100
150
200
250
300
AMSA - Preliminary Site Layout
DIMENSIONS IN MILLIMETERS
SCALE: N.T.S.
GENERAL ARRANGEMENT
IPCSA POWER PLANT
#1026
#1026 - v.15
MV
03/03/16

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for environmental authorisation National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014

PROJECT TITLE

Environmental Impact Assessment for a Gas-fired Independent Power Plant to Support Saldanha Steel and Other Industries in Saldanha Bay

Specialist:	Traffic and Transportation		
Contact person:	Mr Bertie Phillips		
Postal address:	119 Hertzog Boulevard, Cape Town		
Postal code:	8001	Cell:	082 5091064
Telephone:	021 4059600	Fax:	021 4196774
E-mail:	bertiep@ct.kanteys.co.za		
Professional affiliation(s) (if any)	MIPET, PrTechEng		

Project Consultant:	Environmental Resources Management		
Contact person:	Stephan van den Berg		
Postal address:	ERM Cape Town – 2nd Floor, Great Westerford, 240 Main Road, Rondebosch		
Postal code:	7800	Cell:	
Telephone:	021 681 5400	Fax:	
E-mail:	stephan.vandenberg@erm.com		

4.2 The specialist appointed in terms of the Regulations_

I, Bertie Phillips , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Kantey & Templer (Pty) Ltd
Name of company (if applicable):

11 July 2016
Date:

KANTEY & TEMPLER (PTY) LTD
CONSULTING ENGINEERS
REG NO. 1966/009839/07

K&T Established 1953

Engineering African Development

12 September 2016

Our Ref: 15047R
Your Ref:

3rd Floor Grant Thornton House
119 Hertzog Boulevard
Cape Town, 8001
P O Box 3132
Cape Town, 8000

Tel: +27 21 405 9600
Fax: +27 21 419 6774

ERM Southern Africa (Pty) Ltd
2nd Floor, Great Westerford
240 Main Road,
RONDEBOSCH
7700

Attention: Ms L Bungartz

Dear Lindsey,

ARCELOR MITAL SALDANHA BAY: COMBINED CYCLE GAS TURBINE POWER PLANT: TRAFFIC AND TRANSPORT SPECIALIST STUDY – CUMULATIVE IMPACTS

Cumulative effect of the project with the implementation of further background projects in the Saldanha Bay IDZ were considered and were predicted to have no significant impact on the key intersections in the study area.

The road infrastructure is planned to be expanded with dualling of links as per the plan attached prepared by AECOM. The plan shows the future dualling of the OP7644 and the planned interchange of the TR85/1 and the realigned OP7644. This project will provide additional network capacity in the study area.

The additional capacity provided by the new infrastructure is adequate to accommodate the future travel demands of the site and the surrounding development consisting of the immediate Vredenberg Industrial Development (located between Namaqua Sands and Fossil Park).

The rest of the background projects are more remote from the site and are unlikely to have any significant impact on the traffic in the immediate study area.

The modal split of travel associated with the project is likely to produce a significant number of public transport trips and predominantly MBT and Bus patronage. This in itself is a travel demand measure that will enhance the sustainability index of the project.

In conclusion, the cumulative impacts are unlikely to be significant as the current traffic is fairly light and the planned infrastructure will be robust in order to accommodate the additional traffic from the project in combination with the background projects.

Yours faithfully
KANTEY & TEMPLER

B A PHILLIPS

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AECOM

WESTERN CAPE GOVERNMENT
C975: SALDANHA MUNICIPAL AREA ROAD NETWORK IMPROVEMENTS
FIGURE 2: **TR85/1 (R79) PROPOSED ROAD IMPROVEMENTS**

AECOM DETAIL/FIGURE No.

SCALE 1:7500 mm