

## EIA FOR THE PROPOSED PIPELINE FROM THE TEMANE LIQUIDS PROCESSING FACILITY TO A FLOATING, STORAGE & OFFLOADING UNIT IN INHAMBANE PROVINCE, MOZAMBIQUE

### **PURPOSE OF THIS DOCUMENT**

This document provides a summary of the Draft Scoping Report for the Sasol Pipeline and FSO Project, which includes a description of the proposed Project and the associated EIA process. It aims to help stakeholders understand the proposed Project and provides guidance on how stakeholders can register and be involved in the EIA Process.

### **PROJECT BACKGROUND**

Sasol Petroleum Mozambique Limitada (Sasol) has obtained approval from the Mozambique Council of Ministers for the Production Sharing Agreement's (PSA) Field Development Plan (FDP) that will see further hydrocarbon resources developed to support the economic growth of Mozambique.

At present, the Central Processing Facility (CPF) in Temane is supplied by 24 onshore production wells, 12 in the Temane Field and 12 in the Pande Field. Production at the CPF is currently around 197 Gigajoules of gas per annum and 250 m<sup>3</sup> per day of condensate of condensate (a low-density mixture of hydrocarbon liquids that are present as gaseous components).

Sasol is committed to the phased evaluation and development of additional oil and gas resources within its concession areas.

In 2014, detailed technical and environmental work on the PSA Development and Liquid Petroleum Gas (LPG) Project was started, which involves the expansion of the CPF and the development of a new Liquids Processing Facility (LPF) adjacent to the CPF, in order to process additional PSA gas, condensate and light oil Figure 1.

#### **What is The Production Sharing Agreement (PSA)?**

Sasol Petroleum Mozambique (SPM) has a Production Sharing Agreement (PSA) with the Government of Mozambique and ENH (Empresa Nacional de Hidrocarbonetos). In turn, a Petroleum Production Agreement (PPA) has been entered into between Sasol Petroleum Temane (SPT) and its partners [Companhia Moçambicana de Hidrocarbonetos (CMH) and the International Finance Corporation (IFC)] and the Government of Mozambique which covers the currently- producing assets of the Temane and Pande fields.

The PPA and PSA licences overlap each other in both Pande and Temane. The PPA licence applies to specific hydrocarbon bearing formations within these areas.

The PSA licence covers all other formations in Temane and Pande for which a Field Development Plan has been approved for development, and also includes other fields and prospects where exploration and appraisal wells have been drilled but have not as yet been declared commercial.

The proposed PSA Development and LPG Project will include a facility to produce LPG to replace much of the LPG currently imported at significant cost to Mozambique.

Due to uncertainty about the quantity of light oil that will be produced, Sasol wishes to license two transport options in order to provide flexibility in later planning once liquid volumes are confirmed:

- 1) Road transport; and
- 2) Pipeline / offshore storage.

Road transport will be undertaken if the volumes are relatively low. The second transport option suited to larger volumes is to pump the light oil via an onshore and offshore pipeline to an offshore Floating, Storage and Offloading unit (FSO), where it can be collected by shuttle tankers. It is also possible that road transportation would be preferred initially, followed by the pipeline / offshore storage option as volumes start to increase. The latter option, known as *the Sasol Pipeline and FSO Project* for the exportation of stabilised light oil, is the subject of the current Draft Scoping Report.

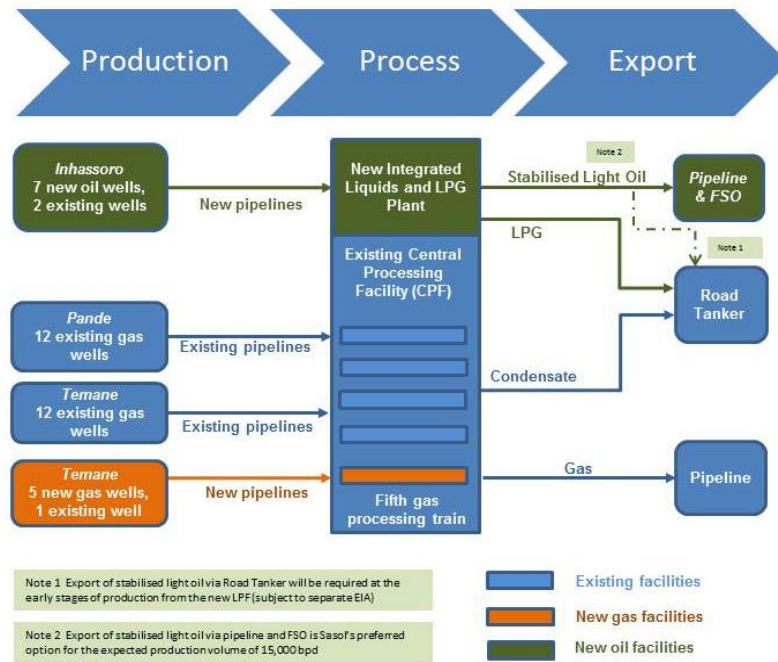


Figure 1 Conceptual Overview of the PSA Development and LPG Project Including Transport Options

## PROJECT DESCRIPTION

Sasol is planning to develop a pipeline and offshore FSO in Inhambane Province, subject to the satisfactory outcomes of the initial PSA drilling campaign (in 2016).

The objective of the Project is to export stabilised light oil through a pipeline from the new LPP, which is adjacent to the Temane CPF, to an offshore FSO north of the Bazaruto Archipelago. The FSO will have the capacity to store up to 500 000 barrels of stabilised light oil onboard and to offload 300 000 barrels within 24 hours.

### Useful Definitions

**FSO** - is a permanently moored floating vessel for storage and offloading of stabilised light oil.

**Shuttle tanker** - is a floating vessel for the exportation of oil.

## PIPELINE ROUTE AND FSO LOCATION

The pipeline route and FSO location is shown in Figure 2. The onshore pipeline will start at the LPP and will follow the existing Pande trunkline corridor northward, for 32 km. The pipeline then turns north eastward and crosses the EN1 national road and utilities (approximately 8 km from the pipeline turn), before crossing the Govuro River and its floodplain (approximately 10 km from the EN1). Approximately 6 km east of the Govuro River the onshore pipeline terminates at a beach valve station approximately 20 km north of Inhassoro. The proposed offshore pipeline route to the FSO extends approximately 50 km northeast of the shore crossing. The FSO will be located within a 2 x 2 km block, approximately 52 km north east of the Bazaruto Archipelago National Park (BANP), at a water depth of approximately 50 m.

The Project Area will include the Administrative Posts of Inhassoro and Bazaruto, in Inhambane province. The nearest settlements to the onshore pipeline are Temane, Masadge, Catine, Pere, Chinhocane and Chibo, with Temane and Chibo being the closest.

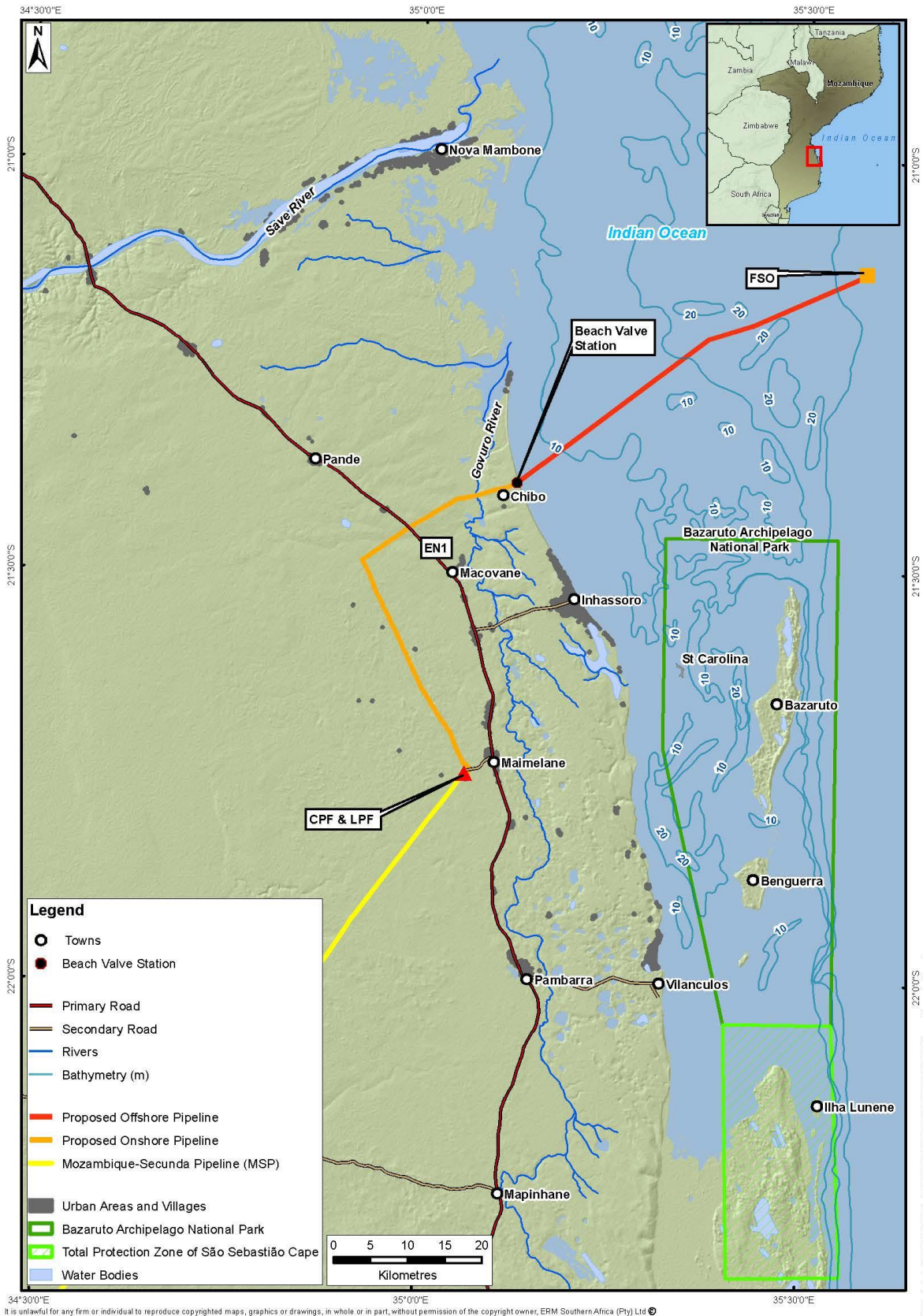


Figure 2: Project Location and Layout



**PROJECT INFRASTRUCTURE, FACILITIES AND ACTIVITIES**

The key Project features are described below.

**Onshore infrastructure**

Light oil export facilities (pumps and pipeline servicing infrastructure), located inside the new LPF site.

A buried onshore pipeline, from the LPF to the beach valve station, of approximately 57 km. The pipeline includes safety valves at the Govuro River crossing and a beach valve station in order to safely isolate the pipeline in the event of an oil leak.

The beach valve station will be located on the coast approximately 20 km north of Inhassoro set inland from the shoreline cliffs and occupying a footprint of 30 m x 30 m. It will include pipeline servicing, testing, safety and maintenance systems.

**Offshore**

An offshore pipeline (buried beneath the seafloor in water depths of up to 10 m) from the beach valve station to approximately 50 km offshore. The offshore pipeline will be designed to allow inspection and cleaning.

Pipeline support structure (riser base, safety valve, riser and umbilical), located on the seabed, approximately 50 km offshore. The riser base and safety valve will connect the pipeline from the shore to the FSO through a flexible pipeline or riser and provide a safety mechanism for isolating the flow of oil to the FSO in the event of an emergency. An umbilical from the riser base will provide hydraulic power and controls to the FSO.

**FSO**

The FSO will be permanently moored (stationed) for operation in 50 m water depth using a turret mooring system (tower like structure attached to the FSO). The FSO's mooring system will be installed at the forward end while the offloading platform will be installed at the rear end. The FSO will be

approximately 234 m long and 42 m wide with an operating draft of 7 to 15 m (below the water line). The FSO will be designed for a 15 year continuous service life without dry docking.

The FSO will accommodate a maximum of 50 personnel allowing for high manning periods such as the initial hook-up and the commissioning phase.



Figure 3: Turret Moored FSO

**Beira**

The marine supply base will be located at the Port of Beira in Mozambique on previously developed land. The supply base will provide all the supplies, support vessel and services to the FSO.

Support vessels will include supply boats for water and food supplies, waste removal and crew changes, and a vessel to provide operational support to the FSO including emergency response.

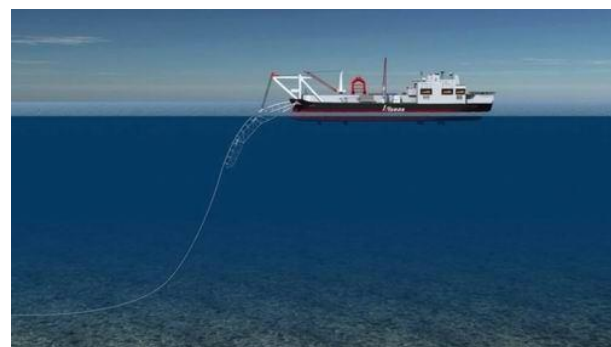


Figure 4: Typical Offshore Pipelay Vessel

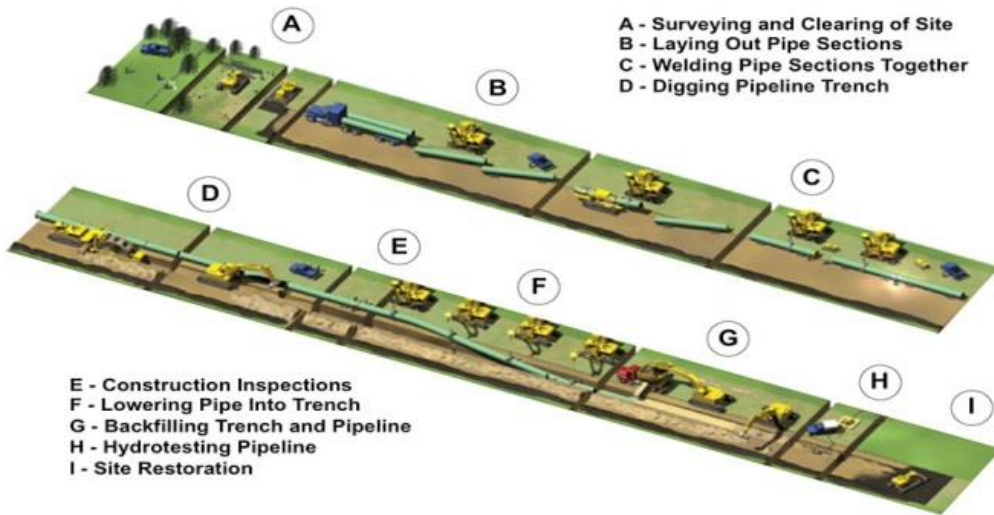
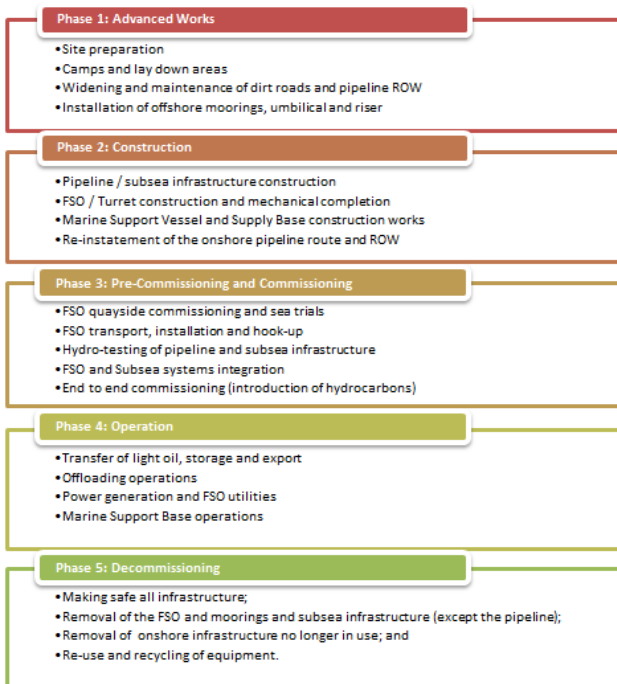


Figure 5: Onshore Pipeline Laying

**PROJECT PHASES AND SCHEDULE**

Advanced works and construction activities on the project are planned to start in the third quarter of 2019, and be ready for operation in the third quarter of 2021. The planned activities for the Project are summarised as follows:



**THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS**

The Project will require an Environmental License from the Ministry of Land, Environment and Rural Development (MITADER), in compliance with the National Environmental Law (*Law No 20/1997*), considering both the Decree regulating

Environmental Impact Assessment (*Decree No. 45/2004* amended by *Decree 42/2008*) and the Decree on Environmental Regulation of Oil Operations (*Decree 56/2010*).

Sasol has registered the Project with MITADER as required by the *Decree 45/2004*. The Project has been classified as 'Category A', Reference Number *90/180/DGA/DPTADER/16*. Licensing of *Category A Projects* must be supported by an Environmental Impact Report (EIR), which must include a public participation process in accordance with the Mozambican environmental regulatory requirements.

Environmental Resources Management International Services Ltd (ERM) and Impacto Lda have been appointed by Sasol to undertake the Environmental Impact Assessment (EIA) and public participation process for this Project.

Sasol has committed that its governance of environmental and social issues will comply with relevant Mozambican regulations and laws as well as relevant international good practice, specifically the International Finance Corporation's Performance Standards (IFC PS) and Environmental and Health and Safety (EHS) Guidelines.

The EIA process and stakeholder engagement opportunities for this Project are illustrated in *Figure 7*.

### Scoping Phase

The purpose of the Scoping Phase (this phase) of an EIA is to identify possible positive and negative impacts, Project alternatives, and determine the terms of reference for specialist studies to be conducted in the EIA phase. These findings are then shared with stakeholders for their review and input via a Draft Scoping Report (EPDA). The Draft Scoping Report is now available for review and comment and a series of Focus Group and Public Meetings are scheduled to be held in the Project Area and Maputo (see below). As part of the scoping activities the EIA team developed an initial biophysical and socio-economic baseline and identified key issues for further consideration in the EIA as summarised below:

**Note:** New regulations for governing the Environmental Impact Assessment process in Mozambique have been published in *Decree No 54/2015* which took effect on 30 March 2016. However, this Project was registered under *Decree No 45/2004* and will be conducted in accordance with the requirements of this legislation. The applicability of the new requirements on an on-going Project will be discussed with MITADER as part of the submission of this Scoping Report.

Biophysical Environment	
Climate	<ul style="list-style-type: none"> <li>The Mozambican climate can be described as highly variable and is vulnerable to climatic events such as floods, droughts and cyclones as well as climate change.</li> <li>Mozambique is currently experiencing the effects of climate change manifesting in coastal erosion and extended drought.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Onshore air quality measured at the boundary of the CPF meets requirements of the CPF Operational EMP and Mozambique and IFC air quality standards.</li> <li>Onshore air quality in the rural areas is mainly impacted by the seasonal burning of woodland and grassland, as well as localised burning of waste and fuels.</li> <li>Offshore air quality is generally good as the only source of air pollution is from vessels travelling along shipping lanes, including those involved in oil and gas operations in the area.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Onshore industrial noise measured at the boundary of the CPF reach 60 dB(A), which is equivalent to the night time limit in industrial areas for Mozambique. Households nearest to the CPF are not materially affected by noise from the plant.</li> <li>Onshore rural noise is largely unaffected by noisy activities except traffic noise along transport routes.</li> <li>Offshore rural noise is influenced largely by ambient natural noise sources (water movement and weather events) with contributions from existing vessel traffic in the shipping lanes (above surface and underwater noise).</li> </ul>
Water Quality	<ul style="list-style-type: none"> <li>The water quality of the Govuro River is generally good, with the water mainly fresh and clear (low turbidity) and having low but variable salinity levels as the lower reaches of the river exhibits tidal influence.</li> <li>Groundwater salinity generally increases towards the coast.</li> <li>The physico-chemical characteristics of the water masses of Bazaruto Bay and the nearshore areas north of the Bay exhibit spatial and temporal variability.</li> </ul>
Geology, Soils and Seabed Sediments	<ul style="list-style-type: none"> <li>In the coastal areas of Inhassoro District, the soils are variable but are generally sandy and of low arable potential. West of the Govuro River the soils have generally higher agricultural capability.</li> <li>The seabed sediment characteristics in the Project Area are currently unknown but are expected to be predominantly sandy.</li> </ul>
Topography and Seabed Bathymetry	<ul style="list-style-type: none"> <li>The terrain along the proposed pipeline route between the CPF and the shore crossing is relatively flat to slightly rolling and intersected by the south to north draining Govuro River and floodplain.</li> <li>The proposed shore crossing area is characterised by a gently sloping beach leading from the sea up to 10 to 35 m high cliffs.</li> <li>The offshore pipeline route shows an approximate one meter drop in sea level every kilometer from the nearshore shallow water (average water depth of 10 m) to the proposed FSO location (approximately 50 m deep).</li> </ul>



<b>Physical Oceanography</b>	<ul style="list-style-type: none"> <li>The circulation of the open ocean adjacent to Bazaruto Archipelago is governed by the Mozambique Channel circulation system which comprises a series of intermittent large-scale eddies drifting southward.</li> </ul>
<b>Onshore Biological Environment</b>	<ul style="list-style-type: none"> <li>Vegetation along the pipeline corridor comprises a mosaic of woodland and thicket for most of the route and the Govuro River floodplain wetland systems. Mangroves and estuarine habitats occur in the lower Govuro River system north of the pipeline route.</li> <li>A number of plant species occur, some of which are of conservation concern, either as they are IUCN red listed species with a high risk of extinction or because they are endemic species with localised distribution. Threatened species include a critically endangered subspecies of cycad.</li> <li>The fauna found in habitats along the onshore pipeline route are expected to be more diverse in the more remote areas where human presence is lower and may include various medium to large mammals and a high diversity of birds.</li> <li>Sensitive coastal habitats include vegetated sand dunes, sandy beaches, wetlands and pans, estuaries and mangroves.</li> </ul>
<b>Offshore Biological Environment</b>	<ul style="list-style-type: none"> <li>Marine fauna comprises phytoplankton and zooplankton, large invertebrates, seabirds, marine mammals (whales, dolphins, dugongs and seals), marine turtles and fish.</li> <li>The marine mammals (dolphins, whales, dugongs and seals) present in the Project Area are considered protected species in Mozambique.</li> <li>The dugong population present in the Project Area are of conservation importance as they are the last remaining viable population along the Western Indian Ocean coastline and they are on the IUCN list as Vulnerable to extinction.</li> <li>All sea turtles (green, loggerhead, olive-ridley, leatherback and hawksbill) present in the Project Area are considered protected species in Mozambique and are all on the IUCN list as threatened and therefore are of conservation importance.</li> <li>Sensitive marine habitats comprise seagrass meadows, coral and coral reefs as well as channels that funnel tidal water moving into and out of the area between the islands and the mainland.</li> <li>Protected Areas present in the Project Area include Bazaruto Archipelago National Park (BANP) and the Cabo São Sebastião. These areas are important conservation areas for marine specifically dugongs and sea turtles.</li> </ul>

<b>Socio-Economic Environment</b>	
<b>Administrative Structure</b>	<ul style="list-style-type: none"> <li>The Project is located in the southern region of Mozambique in Inhambane Province.</li> <li>The onshore pipeline will pass through Inhassoro District and Inhassoro and Bazaruto Administrative Posts.</li> <li>The nearest settlements to the onshore pipeline are Temane, Masadge, Catine, Pere, Chinhocane and Chibo.</li> </ul>
<b>Demographics</b>	<ul style="list-style-type: none"> <li>There are 1 402 245 people in Inhambane Province (2011), approximately 6.1 percent of the population of Mozambique.</li> <li>Inhassoro District comprises 3.8 percent of the Provinces population and is predominantly rural.</li> <li>The main religions practiced are Catholicism (45.9 percent), Protestant / Evangelical (23 percent) and Zionism (5.4 percent).</li> <li>The predominant local language is Xitswa.</li> </ul>



<p><b>Economic Activities</b></p>	<ul style="list-style-type: none"> <li>• The majority of the population (70.2 percent) of Inhassoro District is engaged in the agriculture, forestry and fisheries sectors.</li> <li>• Fishing is the predominant activity in coastal areas.</li> <li>• Small-scale (artisanal) fishing for subsistence and cash is the predominant type of fishing practiced in the Govuro River estuary and near-shore areas.</li> <li>• The main fishing gear used includes line, seine nets, harpoons, traps and gill nets. Diving (generally for lobster) is also undertaken.</li> <li>• Fish processing and resale is also an important economic activity.</li> <li>• Industrial and semi industrial line fishing is practised east of Bazaruto Archipelago for the supply of fish to national and international markets.</li> <li>• Agriculture is practiced across the District and is mainly ‘rain fed, slash and burn’ shifting agriculture.</li> <li>• Common crops are sorghum, millet, peanuts, beans, cassava and maize.</li> <li>• Agriculture is mainly practised on small (1.8 ha) plots.</li> <li>• Secondary economic activities include hunting, harvest and sale of non-timber forest products and labouring which also form an essential part of households livelihood strategies</li> </ul>
<p><b>Tourism</b></p>	<ul style="list-style-type: none"> <li>• Inhambane Province is one of the main tourism destinations in Mozambique.</li> <li>• The Vilanculos/Bazaruto/Inhassoro cluster is listed as one of the Priority Areas for Tourism Investment (PATI) and is Mozambique’s most developed leisure destination.</li> <li>• Tourist attractions include pristine islands, the BANP, marine-based recreational activities including diving and snorkelling, beaches, recreational fishing, and swimming.</li> <li>• The District is well served by a range of tourism facilities, from affordable lodges to high-end hotels and resorts.</li> <li>• Tourism is the largest formal sector employer in the coastal region of Inhassoro District.</li> </ul>
<p><b>Infrastructure</b></p>	<ul style="list-style-type: none"> <li>• Education facilities are limited in the District with a third of the population having no formal education.</li> <li>• There is no hospital in Inhassoro District; Rural Health Centres are located in the District Headquarters. The main diseases in 2011 comprised malaria, diarrhoea and dysentery, sexually transmitted diseases (including HIV/AIDS), tuberculosis and pneumonia.</li> <li>• The main sources of energy are wood, charcoal, paraffin and kerosene,.</li> <li>• All District roads are unpaved with the exception of the main EN1.</li> </ul>
<p><b>Cultural Heritage</b></p>	<ul style="list-style-type: none"> <li>• Inhassoro District has high archaeological potential due to its strategic setting along the coastal trade routes</li> <li>• Family cemeteries are located near people’s residences and cemeteries for local chiefs with access restrictions are located in each Administrative Post.</li> <li>• Cultural sites such as sacred forests, trees and pools have also been identified in Inhassoro District.</li> </ul>



**POTENTIAL PROJECT IMPACTS ON THE PHYSICAL AND SOCIAL ENVIRONMENT**

**Onshore**

- Loss of habitats and threatened flora due to clearing of the route of the onshore pipeline construction right of way.
- Increased access for harvesting of critically endangered cycads.
- Increased access to remote areas for other natural resources including hardwood harvesting for timber and charcoal, and hunting for bush meat.
- Degradation of the Govuro River and potential loss of aquatic fauna (invertebrates and fish) during and after construction due to increased sedimentation, oil and chemical pollution risks, and altered flow.
- Unplanned events (eg pipeline break / oil spill) impacting on soil, water, the Govuro system, and fish resources.
- Interrupted access, and increased noise and dust affecting nearby residents during construction.
- Loss of land for agriculture and settlements due to the permanent pipeline Right of Way.
- Loss of cultural heritage resources due to clearing of the construction right of way.
- Direct and indirect employment opportunities (positive) during construction and operation.
- Social disruption and health risks caused by presence of construction workers during advanced works and construction activities.
- Increased traffic accidents (both offshore and onshore) during advanced works and construction activities.
- Disruption of tourism activities and tourism potential in the Project Area.

**Offshore**

- Increased noise, vibration and offshore traffic impacts on dugongs and other marine fauna, and tourism activities (eg fishing, diving).
- Exclusion of fishing activities during advanced works and construction activities with impacts on livelihoods.
- Increased risks of pollution to the marine and coastal environment with impacts on Bazaruto archipelago (eg coral reefs, sea grass) and natural resource-based tourism; and
- Visual impacts of infrastructure and support activities on tourism and residents.

**EIA PHASE**

The biophysical and socio-economic environment baseline description and the potential impacts identified in the Draft Scoping Report will be updated, based on comments received during the current phase of public participation.

It is proposed that the following specialist studies are undertaken during the EIA in order to address the issues raised in this report:

- Air Quality;
- Onshore and Offshore Noise;
- Hydrology, Surface and Groundwater Quality;
- Soils and Geology;
- Terrestrial, Aquatic and Nearshore Ecology;
- Marine and Coastal Ecology (including dugongs, turtles and marine mammals);
- Ecosystem Services;
- Community Health;
- Social and Socio-Economic;
- Archaeology and Cultural Heritage;
- Tourism;
- Fisheries;
- Visual Illumination;
- Onshore and Offshore Traffic; and
- Qualitative Risk Assessment.

The possible positive and negative impacts identified in the Final Scoping Report will be assessed in the EIR. The EIR will include Environmental Management Programmes, which will detail management measures to minimise negative impacts and enhance positive impacts. ERM has appointed Peter Tarr of South African Institute for Environmental Assessment (SAIEA) to review this Scoping Report, EIR and the associated specialist reporting and to provide technical support to the Stakeholder Forum that will be created for this Project. The SAIEA is a non-profit Environmental Trust, whose mission is to support sustainable development in Southern Africa through promoting the effective and efficient use of Environmental Assessment as a planning tool.

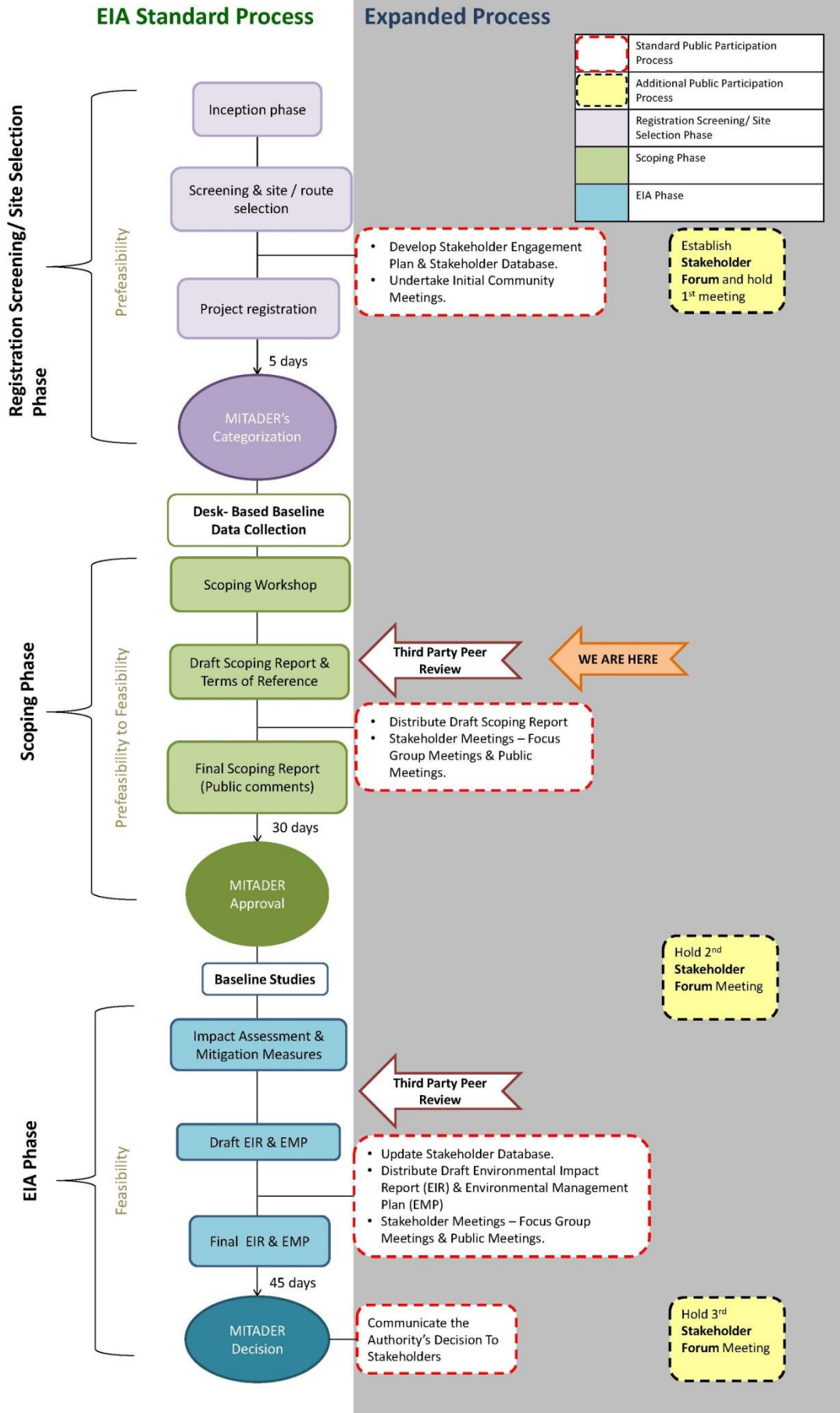
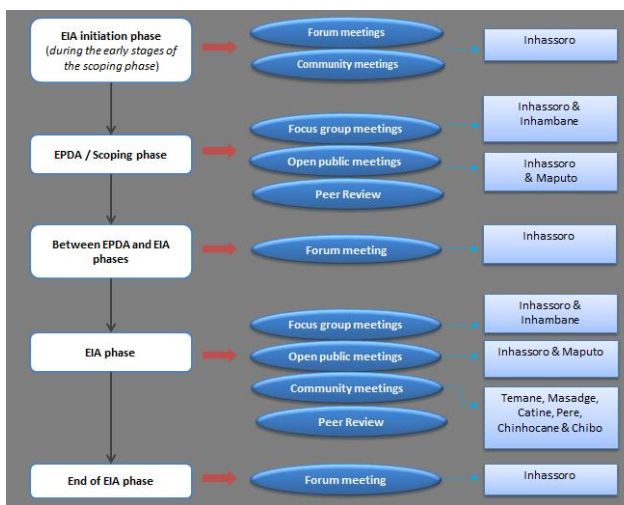


Figure 6: Steps of the Proposed EIA Process for this Category A Project

**PUBLIC PARTICIPATION PROCESS**

Stakeholders play an important role in the EIA process and we encourage you to register as a stakeholder to enable ERM and Impacto to keep you informed. By registering you will be able to engage in discussions on issues, provide comment on the Draft Scoping Report and comment on various reports that will be produced during the EIA process.

The Public Participation Process (PPP) steps that will be undertaken for this Project are summarised below:



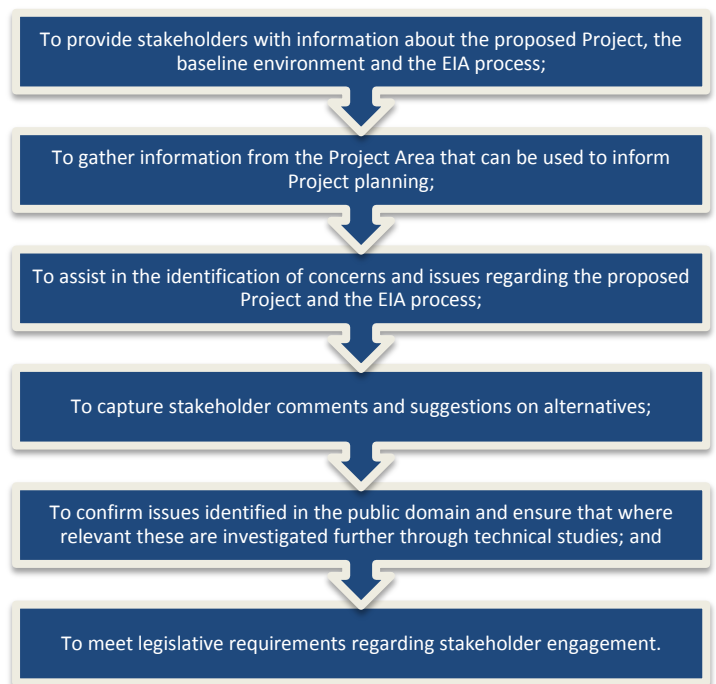
The initial engagement phase was undertaken in February 2016 when the first Stakeholder Forum meeting was held along with a number of community meetings. During these meetings stakeholders were introduced to Sasol, the Project and the EIA Process. The proposed early works, which have since been deferred, were also presented. The stakeholder Forum has been established for the Project to allow for the opportunity for more in depth conversations regarding the EIA Process, technical studies, findings and mitigation measures with nominated representatives of interested and affected parties in the Project Area. This will allow for greater transparency and understanding of the findings.

The stakeholder engagement process and Forum will be peer reviewed by an independent consultant, Magdalena Dray, an environmental consultant with years of relevant experience in Mozambique.

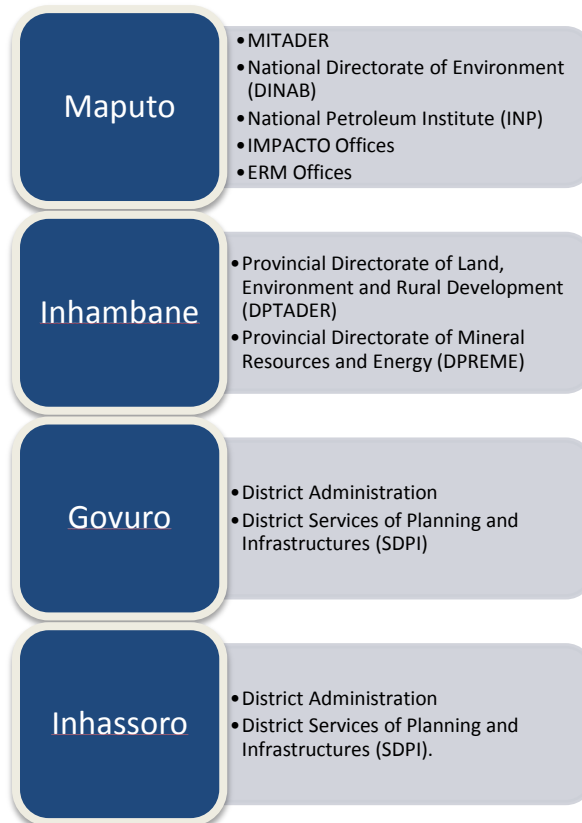
The aim of the peer review is to provide assurance to stakeholders that issues they raise are addressed in the public participation process reports and that their views, opinions and concerns are considered in the development of the EIR.

**What's Next?**

This Non-Technical Summary forms part of the next steps in the EIA process for this Project; and it is being publicly released as part of the materials for the stakeholder engagement process for the Scoping Phase. During disclosure of the Draft Scoping Report, ERM and Impacto will be visiting various communities in the Project Area. The purpose of the visits will be:



The Draft Scoping Report will be made available for stakeholder comment at the following locations:



In addition, an electronic version of the Draft Scoping Report and the Non-Technical Summary will be made available on Impacto's webpage: [www.impacto.co.mz](http://www.impacto.co.mz) and ERM webpage: [www.erm.com/Sasol-Pipeline-FSO-Project](http://www.erm.com/Sasol-Pipeline-FSO-Project).

### **HOW CAN YOU BE INVOLVED?**

If you have any comments or concerns, and would like to register as an interested or affected stakeholder for the proposed Project you can get involved by:

- Attending workshops and public meetings held during the EIA process; or
- Contacting Impacto for further information (see contact details below).

**To register as a stakeholder or for any further information please contact Sandra Fernandes of Impacto.**

**Email: [consulta.publica@impacto.co.mz](mailto:consulta.publica@impacto.co.mz)**

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