This Chapter describes the assessment of potential biophysical and socio-economic impacts from the Project, and presents the results of the assessment in terms of the significance of the impacts. The EIA process and impact assessment methodology is outlined in Chapter 3. The following specialist studies have been relied upon for various impacts assessed.

- Air Quality Impact Assessment (Draculoudies and Xu, 2014)
- Contaminated Site Assessment (ERM, 2014)
- Quantitative Risk Assessment (ERM, 2014)
- Traffic Impact Assessment (Kantey and Templer, 2014)
- Economic Specialist Study (van Zyl and Leiman, 2014)

8.1 BIOPHYSICAL IMPACT ASSESSMENT

8.1.1 Air Quality

Construction Phase

There exist potential adverse impacts on the ambient air quality during the construction phase of the Project from the following sources:

- Air emissions will occur from diesel generators used to power construction equipment and vehicles used for construction activities;
- Fugitive dust as a result of the removal of vegetation, excavation of land, access road construction, temporary road construction, and construction of the new storage infrastructure;
- Fugitive dust from construction traffic on untarred areas of the site;
- Fugitive dust from the concrete batching; and
- Dust generated in work areas.

Windblown particulate matter (PM) (dust) from exposed areas around the site and emissions from various port activities, including ship exhausts, are the likely sources of air pollution in the area. There will be a direct deterioration of ambient air quality during Project construction. However, the impacts will largely be reversible.

Air Emissions:
The following constitute common emissions from vehicles and equipment that will be used for construction activities (1):

• NOx (Mono-nitrogen oxides NO and NO2)
• Volatile Organic Compounds (VOCs)
• Ozone (O3)
• Carbon monoxide (CO)
• Carbon dioxide (CO2)
• Sulphur dioxide (SO2)
• Toxins (eg Benzene and Formaldehyde)
• Lead
• Particulate matter (PM10 and PM2.5)
• Hydrocarbons

The above listed emissions pose human health threats from prolonged exposure such as respiratory problems (including lowered blood-oxygen exchange functioning, asthma, lung tissue damage, coughing and chest pain) and cancer (such as leukaemia and lung cancer).

Particulate Matter (Dust):
The significance of dust impact depends heavily on wind direction, rainfall, and distance from source, with the impact from fugitive dust emissions generally decreasing linearly with distance from that source. In dry soil conditions, at wind speeds above around 3 to 4m/s, dust particles may become airborne and be transported from their initial source. Of the particles that do become airborne, for a typical mean wind speed of 4m/s, particles larger than 100μm diameter are likely to settle within 6 to 10m of the source and those between 30 and 100μm diameters are likely to settle within 100m of the source. Beyond 250m, properties are unlikely to be significantly affected.

The generation of particulate matter (PM) (dust) will be from the following sources:

• Increased construction traffic from along new and temporary construction roads;
• Entrainment in haul truck wheels during transportation of equipment and waste;
• Wind dispersion from open loads on haul trucks;
• Concrete mixing and foundations construction; and
• Wind dispersion from soil dumps, stockpiles, roads and other bare areas.

PM10 (dust) may settle in the lungs of nearby receptors. PM10 has been linked to a range of serious respiratory and cardiovascular health problems. The key effects associated with exposure to ambient particulate matter include: premature mortality, aggravation of respiratory and cardiovascular disease, aggravated asthma, acute respiratory symptoms, chronic bronchitis, decreased lung function, and increased risk of heart attack (USEPA, 1996).
Inhalable dust particles fall into the following general size fractions (USEPA, 1996):

- PM$_{10}$ (generally defined as all particles equal to and less than 10 microns in aerodynamic diameter; particles larger than this are not generally deposited in the lung);

- PM$_{2.5}$, also known as fine fraction particles (generally defined as those particles with an aerodynamic diameter of 2.5 microns or less);

- PM$_{10-2.5}$, also known as coarse fraction particles (generally defined as those particles with an aerodynamic diameter greater than 2.5 microns, but equal to or less than a nominal 10 microns); and

- Ultra-fine particles generally defined as those less than 0.1 microns.

The identified sensitive receptors in the study area are shown in Table 8.1 below. On-site sensitive receptors would include employees of nearby facilities and construction workers.

<table>
<thead>
<tr>
<th>Table 8.1 Sensitive Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Receptors</strong></td>
</tr>
<tr>
<td>V &amp; A Waterfront</td>
</tr>
<tr>
<td>Somerset hospital</td>
</tr>
<tr>
<td>CTICC</td>
</tr>
<tr>
<td>CPUT campus</td>
</tr>
<tr>
<td>Royal Cape Yacht Club</td>
</tr>
<tr>
<td>Woodstock residential area</td>
</tr>
<tr>
<td>Paarden Eiland light industrial area</td>
</tr>
</tbody>
</table>

Source: DDA, 2014.

Wind data show that the most predominant wind in the area is from the south easterly direction. The second predominant wind is from the north westerly direction. The occurrence of south easterly wind was approximately 28 percent of the time for all hours. Therefore of the off-site identified sensitive receptors only the V & A Waterfront would possibly be affected, due to the predominant wind conditions and its position north west of the site. However, given the fact that all off-site identified sensitive receptors are located more than one kilometre from the site, any impact is considered unlikely.

Wind speed frequency distributions for all hours, daytime and night-time show that the majority of winds were with speeds of between 0.5 m/s and 8.8 m/s for all hours. Calm conditions and strong winds (>8.8 m/s) accounted for 3.2 percent and 6.9 percent of the time for night-time and daytime respectively. Wind speeds are generally higher during the day. The average wind speeds during daytime and night-time were 4.4 m/s and 4.0 m/s respectively. Therefore it is likely that on-site PM (dust) will have an impact on air quality, as wind speeds will be high enough to cause PM to be airborne.
The generation of emissions and PM (dust) during construction will have a **direct negative** impact on air quality. The extent of the impact will be **local** as air quality will be affected beyond the Project site, but will not impact air quality beyond the Port of Cape Town. The duration of the impact will be **short-term**, confined to the construction phase, about 18 months, and will be reversible. The intensity of the impact will be **low**, given the relatively low volumes of emissions and PM (dust) generated. Taking the local extent, short-term duration and low intensity into consideration, the impact magnitude is considered to be **low**. Given the **definite** likelihood, the overall pre-mitigation impact significance is considered **Minor (-ve)**. Box 8.1 below gives a summary of the construction impact on air quality.

**Box 8.1 Construction Impact: Air Quality**

**Nature:** Construction activities that increase emissions and dust particulate matter in the atmosphere would result in a **direct negative** impact on air quality.

**Impact Magnitude – Low**
- **Extent:** The extent of the impact is **local** as the potential impact will be beyond the Project Site, but only affect the Port of Cape Town area.
- **Duration:** The duration would be **short-term** for approximately 18 months.
- **Intensity:** The intensity is likely to be **low** given that the scale of the construction activities.

**Likelihood:** There is a **definite** likelihood of increased dust and emissions.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is **high**.

**Operations Phase**

**Emissions Volume Modelling:**
The site will be used to store and distribute petrol (ULP), diesel (AGO), ethanol and bio fame. *Table 8.2* below shows the proposed number of storage tanks and fuel throughput per tank.

**Table 8.2 Tankages and Fuel Quantities**

<table>
<thead>
<tr>
<th>Tank</th>
<th>Quantity</th>
<th>Nominal Capacity (m³)</th>
<th>Product</th>
<th>Throughput (m³/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrol (ULP) - Internal Floating Roof Tank</td>
<td>3</td>
<td>9,000</td>
<td>Petrol</td>
<td>181,500</td>
</tr>
<tr>
<td>Diesel (AGO) (Small) - Vertical Fixed Roof Tank</td>
<td>3</td>
<td>9,000</td>
<td>AGO</td>
<td>143,017</td>
</tr>
<tr>
<td>Diesel (AGO) (Large) - Vertical Fixed Roof Tank</td>
<td>4</td>
<td>13,000</td>
<td>AGO</td>
<td>275,441</td>
</tr>
<tr>
<td>Ethanol - Vertical Fixed Roof Tank</td>
<td>1</td>
<td>1,700</td>
<td>Ethanol</td>
<td>9,075</td>
</tr>
<tr>
<td>BioFame - Vertical Fixed Roof Tank</td>
<td>1</td>
<td>1,700</td>
<td>BioFAME</td>
<td>12,554</td>
</tr>
</tbody>
</table>

*Source: DDA, 2014.*

The emission inventory was based on the *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources (AP-42), Section 7.1, Organic...*
Liquid Storage Tanks (US-EPA, 2006 in DDA, 2014) and the US-EPA emissions inventory model TANKS 4.0.9d (US-EPA, 2006) was utilised. Site-specific information regarding fuel quantities, the storage tanks (dimensions, tank type, paint condition, tank fittings, etc.), the fuel contents (chemical components and liquid temperature), and meteorological data (ambient minimum and maximum temperatures, atmospheric pressure, etc.) were utilised as inputs into the model. Detailed input and output reports for all the tanks and the detailed model input parameters for the site operations and tank characteristics are presented in Annex F. Based on the input data and the throughput for each tank, the emission quantities for each of the selected compounds were estimated with the use of the TANKS 4.0.9d model. In addition to the fugitive emissions from fuel storage, emissions from the loading of the road tankers at the gantries were estimated (see Annex F). The estimated component fractions and their annual total emissions are shown in Table 8.3 below.

**Table 8.3**  
**Annual Emissions Per Component**

<table>
<thead>
<tr>
<th>Component</th>
<th>Speciation (%)</th>
<th>Emission (kg/yr)</th>
<th>Petrol/ Ethanol</th>
<th>AGO/ BioFame</th>
<th>Petrol (ULP)</th>
<th>Diesel (AGO)</th>
<th>Ethanol</th>
<th>BioFame</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total VOCs fraction</td>
<td>100%</td>
<td>100%</td>
<td>13,813</td>
<td>4,492</td>
<td>2,424</td>
<td>125</td>
<td>20,854</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexane (-n)</td>
<td>0.55%</td>
<td>0.03%</td>
<td>76</td>
<td>1</td>
<td>13</td>
<td>0</td>
<td>91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>0.74%</td>
<td>0.14%</td>
<td>102</td>
<td>6</td>
<td>18</td>
<td>0</td>
<td>127</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isooctane</td>
<td>0.72%</td>
<td>-</td>
<td>99</td>
<td>-</td>
<td>17</td>
<td>-</td>
<td>117</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td>0.73%</td>
<td>1.63%</td>
<td>101</td>
<td>73</td>
<td>18</td>
<td>2</td>
<td>194</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>0.06%</td>
<td>0.22%</td>
<td>8</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylene (-m)</td>
<td>0.25%</td>
<td>4.11%</td>
<td>35</td>
<td>185</td>
<td>6</td>
<td>5</td>
<td>230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isopropyl benzene</td>
<td>0.01%</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>0.04%</td>
<td>3.27%</td>
<td>6</td>
<td>147</td>
<td>1</td>
<td>4</td>
<td>157</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>0.08%</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified Components</td>
<td>96.80%</td>
<td>90.60%</td>
<td>13,371</td>
<td>4,070</td>
<td>2,347</td>
<td>113</td>
<td>19,900</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: DDA, 2014.

**Table 8.4** below gives the summarised modelled annual output of emissions for each fuel type.
<table>
<thead>
<tr>
<th>Tank</th>
<th>Quantity</th>
<th>Nominal Capacity (m³)</th>
<th>Throughput</th>
<th>Emissions</th>
<th>Total Loss</th>
<th>Loading Loss</th>
<th>Total VOCs Concentration at VRU Stack</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tankage (m³/yr)</td>
<td>Loadrack (kg/yr/tank)</td>
<td>VRU Stack (kg/yr)</td>
<td>Total (kg/yr)</td>
<td>(w/w%)</td>
</tr>
<tr>
<td>Petrol (ULP) - Internal Floating Roof Tank</td>
<td>3</td>
<td>9,000</td>
<td>181,500</td>
<td>2,476</td>
<td>7,428</td>
<td>5,366</td>
<td>1,019</td>
</tr>
<tr>
<td>Diesel (AGO) (Small) - Vertical Fixed Roof Tank</td>
<td>3</td>
<td>9,000</td>
<td>143,017</td>
<td>508</td>
<td>1,523</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>Diesel (AGO) (Large) - Vertical Fixed Roof Tank</td>
<td>4</td>
<td>13,000</td>
<td>275,441</td>
<td>733</td>
<td>2,933</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ethanol - Vertical Fixed Roof Tank</td>
<td>1</td>
<td>1,700</td>
<td>9,075</td>
<td>2,106</td>
<td>2,106</td>
<td>268</td>
<td>51</td>
</tr>
<tr>
<td>BioFame - Vertical Fixed Roof Tank</td>
<td>1</td>
<td>1,700</td>
<td>12,554</td>
<td>106</td>
<td>106</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>EU Guideline (w/w%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SA Emission Limit (mg/Nm³)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

a. Total annual loss and loading loss was calculated for petrol and ethanol only. The densities utilised to calculate the yearly throughput in kg/yr were 720 kg/m³ and 789 kg/m³ for petrol and ethanol respectively.

b. Loading losses were calculated by taking into consideration of the losses at the loadrack and the VRU stack.

c. Total VOCs concentration at the VRU stack was calculated by taking into consideration of the petrol and ethanol emissions only. The product temperature was assumed to be the same as the average ambient temperature, which is 16.7°C.

Source: DDA, 2014
Dispersion Modelling:
Resulting ground-level concentrations due to emissions were estimated with the use of a Gaussian dispersion model. The latest version of the US-EPA approved air quality model AERMOD (version 13350) was used for the study. The basis of this model is the straight-line, steady-state Gaussian plume equation, which is used for the simulation of emissions from stacks, isolated and multiple vents, liquid tanks, waste sites, storage piles and conveyor belts.

The maximum ambient concentrations of the VOCs over five years of meteorological data were calculated and are presented as concentration isopleths below in Figure 8.1 to Figure 8.3, as well as the maximum concentrations expected at the various receptors in Table 8.5.

Figure 8.1 shows the maximum annual average benzene concentrations around the site. As can be seen, the maximum levels are well below the annual guideline of 5 µg/m³. These maximum benzene concentrations were also used for the calculation of the carcinogenic risk. A risk in excess of 1x10⁻⁴ is generally considered unacceptable and below 1x10⁻⁶ is considered negligible. From Figure 8.2 it is evident that the risk around the site is well below 1x10⁻⁶. This indicates that the cancer risk in the Project area due to the proposed operations with the VRU mitigation in place is negligible.

In addition, the modelled annual concentrations of all the identified VOCs (shown in the emissions Table 8.4) were used for the calculation of the cumulative long-term health risk index. The cumulative long-term health risk index is the sum of the fractions of all the compounds’ concentrations divided by their respective guidelines. Figure 8.3 shows the cumulative long-term health risk index contours. It can be seen that the cumulative index did not exceed the value of one (1) at any of the locations in the Project area.

Maximum concentrations for each compound, including the carcinogenic risk and cumulative health index, are presented in Table 8.5 for each of the identified receptors around the site. All of the maximum concentrations for every compound and receptor are below their respective guidelines, including the carcinogenic risk and cumulative health index.
Figure 8.1  Maximum Annual Benzene Ground Level Concentrations (Guideline: 5 µg/m³, applicable in year 2015)

Source: DDA, 2014.
Figure 8.2  Carcinogenic Health Risk (Guideline: 1x10^{-6})

Source: DDA, 2014.
Figure 8.3  Long-term Health Risk Index (Guideline: 1)

Source: DDA, 2014.
### Table 8.5 Estimated Maximum Concentrations at Receptors Around the Terminal

<table>
<thead>
<tr>
<th>Co-ordinates (UTM)</th>
<th>Hexane (-n)</th>
<th>Isooctane</th>
<th>Benzene</th>
<th>Toluene</th>
<th>Ethylbenzene</th>
<th>Xylene (-m)</th>
<th>Isopropyl Benzene</th>
<th>1,2,4-Trimethyl benzene</th>
<th>Cyclohexane</th>
<th>Carcinogenic Risk (x10^4)</th>
<th>Long-term Health Risk Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td>(µg/m^3)</td>
<td></td>
</tr>
<tr>
<td>V &amp; A Waterfront</td>
<td>261481</td>
<td>1.34E-03</td>
<td>2.57E-07</td>
<td>1.88E-03</td>
<td>2.87E-03</td>
<td>3.41E-03</td>
<td>2.41E-05</td>
<td>2.33E-03</td>
<td>1.92E-04</td>
<td>1.41E-02</td>
<td>4.65E-04</td>
</tr>
<tr>
<td>Somerset hospital</td>
<td>261166</td>
<td>9.58E-04</td>
<td>1.83E-07</td>
<td>1.34E-03</td>
<td>2.05E-03</td>
<td>2.10E-03</td>
<td>2.43E-03</td>
<td>1.71E-05</td>
<td>1.66E-03</td>
<td>1.37E-04</td>
<td>1.00E-02</td>
</tr>
<tr>
<td>CTICCC</td>
<td>262194</td>
<td>5.19E-04</td>
<td>9.94E-08</td>
<td>7.24E-04</td>
<td>1.11E-03</td>
<td>1.14E-04</td>
<td>1.32E-03</td>
<td>9.29E-06</td>
<td>9.01E-04</td>
<td>7.43E-05</td>
<td>5.43E-03</td>
</tr>
<tr>
<td>Royal cape yacht club</td>
<td>263658</td>
<td>4.45E-03</td>
<td>8.52E-07</td>
<td>6.21E-03</td>
<td>9.51E-03</td>
<td>9.77E-04</td>
<td>1.13E-02</td>
<td>7.97E-05</td>
<td>7.73E-03</td>
<td>6.37E-04</td>
<td>4.66E-02</td>
</tr>
<tr>
<td>Woodstock residential area</td>
<td>263370</td>
<td>1.01E-03</td>
<td>1.94E-07</td>
<td>1.41E-03</td>
<td>2.16E-03</td>
<td>2.22E-04</td>
<td>2.57E-03</td>
<td>1.81E-05</td>
<td>1.76E-03</td>
<td>1.45E-04</td>
<td>1.06E-02</td>
</tr>
<tr>
<td>Paarden Eiland light industrial area</td>
<td>265191</td>
<td>3.21E-03</td>
<td>6.15E-07</td>
<td>4.48E-03</td>
<td>6.86E-03</td>
<td>7.05E-04</td>
<td>8.16E-03</td>
<td>5.75E-05</td>
<td>5.58E-03</td>
<td>4.60E-04</td>
<td>3.36E-02</td>
</tr>
<tr>
<td>Guideline</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1 x10^-6</td>
</tr>
</tbody>
</table>

Source: DDA, 2014.
Based on the dispersion simulation of the fugitive emissions from the storage and loading operations proposed for the site, the following can be concluded regarding air quality:

- The operation of the VRU is expected to have a significant mitigation effect on the emitted quantities from the site;
- The benzene concentrations around the site are within the South African annual ambient guideline threshold; and
- The carcinogenic risk and long-term human health risk arising from the site are considered negligible.

The increased emissions during the operations phase will result in a **direct negative** impact on air quality. The extent of the impact is considered **local** as the impact will be beyond the Project site, but confined to the immediate area around the Eastern Mole. The duration will be **long-term**, lasting for as long as there is fuel product stored at the facility. The intensity is considered **low** as all of the emissions volumes have been modelled to be below the guideline thresholds. Considering the local extent, long-term duration and low intensity the overall magnitude is **low**. With a low magnitude and **definite** likelihood of occurring, the overall pre-mitigation impact significance is **Minor (-ve)**. Box 8.2 below provides a summary of the impact.

**Box 8.2 Operation Impact: Air Quality**

<table>
<thead>
<tr>
<th>Nature:</th>
<th>Operational activities would result in a <strong>direct negative</strong> impact on existing ambient air quality in the surrounding areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact Magnitude – Low</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Extent</strong>: The extent of the impact is <strong>local</strong> as the potential impact will be beyond the Project site, but only affect the Port of Cape Town area.</td>
<td></td>
</tr>
<tr>
<td><strong>Duration</strong>: The duration would be <strong>long-term</strong>.</td>
<td></td>
</tr>
<tr>
<td><strong>Intensity</strong>: The intensity is likely to be <strong>low</strong> given that emissions volumes fall under the guideline thresholds.</td>
<td></td>
</tr>
<tr>
<td><strong>Likelihood</strong>: There is a <strong>definite</strong> likelihood of increased emissions.</td>
<td></td>
</tr>
<tr>
<td><strong>IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Degree of Confidence</strong>: The degree of confidence is <strong>high</strong>.</td>
<td></td>
</tr>
</tbody>
</table>

**Mitigation**

**Construction:**
- Vehicles and machinery such as generators will be operated as per original manufacturer’s specification and undergo regular checks and preventive maintenance regimes to ensure efficient fuel combustion. Original emissions control equipment is to be maintained.
• Dust suppression techniques will be implemented where necessary to minimise dust impacts. These will include techniques such as:
  
  o Clearing vegetation at the latest possible stage before the immediate area is required for construction.
  
  o Applying water to reduce emissions from temporary dust sources.
  
  o All vehicles to not exceed the mandated speed limits of 30 km/h.
  
  o Stockpiles of soil or sedimentary material to be covered by wind-impervious fabric.
  
• No fires will be lit on site, and no toxic materials will be burned.

• Audit reports will be produced to ensure regular checks and maintenance are carried out for vehicles and machinery.

• Where possible and available, low-sulphur diesel (0.1 percent sulphur) will be used for vehicles to minimise emissions.

• The construction activities will be managed in accordance with the National Dust Control regulations R827 dated 1 November 2013 promulgated in terms of the National Environmental Management: Air Quality Act, 2004.

• A Dust Management Plan will be developed as part of the detailed environmental management plan for the Project.

Operation:

• Vehicles and machinery such as generators will be operated as per original manufacturer’s specification and undergo regular checks and preventive maintenance regimes to ensure efficient fuel combustion. Original emissions control equipment is to be maintained.

• No fires will be lit on site, and no toxic materials will be burned.

• Audit reports will be produced to ensure regular checks and maintenance are carried out for vehicles and machinery.

• Where possible and available, low-sulphur diesel (0.1 percent sulphur) will be used for vehicles to minimise emissions.

• All vehicles to not exceed the mandated speed limits of 30 km/h.

• With the completion of the Project and after installation of the VRU, collection efficiency tests should be performed via measurements before
and after the unit is installed, in order to confirm the assumed efficiency values.

- A Fenceline Passive Survey Monitoring Program will be undertaken to validate the findings of the dispersion model.

**Residual**

If the above stipulated mitigation measures are implemented, the residual impact significance will be reduced to *Negligible* for the construction and operational phases (*Table 8.6*).

**Table 8.6  Pre- and Post- Mitigation Significance: Air Quality**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR (-VE)</td>
<td>NEGLIGIBLE</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-VE)</td>
<td>NEGLIGIBLE</td>
</tr>
</tbody>
</table>

**8.1.2  Soils and Groundwater**

**Construction**

The construction of the facility may result in the following impacts relevant to the contamination of soil and groundwater resources:

- Leaking of fuels or lubricants from construction machinery into the soil or groundwater (sea water);
- Runoff of rainwater from hydrocarbon-stained machinery leaching into soil or groundwater; and
- Spills of bitumen, sealants and other substances used in the construction of the facility.
- Waste and effluent.

All wastes generated from the project will be categorised as either *non-hazardous* or *hazardous* following an assessment of the hazard potentials of the material in line with South African legislative requirements.

The construction of the facility will produce a variety of waste products. The initial solid waste generated on site will be the cleared vegetation (although sparse) and soil overburden from levelling and grading of areas of the site. Some building rubble will be produced throughout the construction phase from activities such as the construction of buildings and concrete pouring. Packaging material will be accumulated from unpacking of facility components.
The main sources of waste will result from the construction and decommissioning activities. These wastes will be produced daily and comprise of the following:

- Domestic type waste;
  - residual packaging and food wastes
  - metal cans (from food and drinks)
  - plastics drinks bottles
  - glass jars and bottles
- Wooden pallets and cartons;
- Scrap metal;
- Concrete waste;
- Paper and cardboard;
- Grey water - from ablutions; and
- Food wastes.

The following hazardous wastes may also be produced from construction activities.

- Batteries (including large lead acid type);
- Medical/clinical wastes;
- Oily rags and absorbents;
- Used oil and oil filters - from generators or vehicle maintenance;
- Contaminated water - slops and oily water from drip trays; and
- Sewage from toilets.

All wastes produced from Project activities on site will be transferred to designated temporary storage areas and where necessary into secure containers. Solid wastes will be segregated to facilitate reuse and recycling of specific materials. All wastes that can be recycled will be collected and taken to an appropriate recycling facility. All wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and disposal.

Hazardous Wastes:
The construction phase will require the use of hazardous materials such as fuels and greases to fuel equipment and vehicles and maintain equipment. These substances will be stored on-site in temporary aboveground storage tanks. All fuels storage tanks will be locked, and fuels on site in drums will be stored in a locked container within a fenced and secure temporary staging area. Trucks and construction vehicles will be serviced off-site. The use, storage, transport and disposal of hazardous materials used for the Project will be carried out in accordance with all applicable South African regulations. Material Safety Data Sheets for all applicable materials present on site will be readily available to on-site personnel. It is proposed that the construction contracting company supply the required temporary ablution facilities and be responsible for the removal and treatment thereof. Burgan Oil will be responsible to ensure that the contracting company is accredited and has the
necessary permits to remove the sewage. The sewage will be treated in accordance with the municipal sewage works policies and guidelines. There is potential for waste, effluent and sewerage stored on site to leach into the soil causing harm.

Non-hazardous Wastes:
Construction waste will most likely consist of concrete (from buildings, bunds and foundations) and scrap metal. All concrete mixing will be undertaken on impermeable plastic lining to prevent contamination of the soils and surrounding areas. The management of construction solid waste is detailed in the Environmental Management Programme (EMPr) and will incorporate reduction, recycling and re-use principles.

All construction debris will be placed in appropriate on-site skips and periodically disposed of by a licensed waste contractor in accordance with applicable South African regulations. The construction contractor will remove refuse collected from the designated waste storage areas at the site at least once a week. All rubble generated during the construction phase will be removed from the site regularly to a licensed landfill site.

The nature of the impact will be direct negative. The extent will be on-site, as leaks and spills would largely be confined to the site area. The duration will be long-term, as impacts could last many months for clean up or rehabilitation. The intensity is considered medium given the scale of the potential impact. Considering the on-site extent, long-term duration and medium intensity, the impact magnitude is considered Medium. The impact is likely to occur, therefore the overall pre-mitigation impact significance is considered Moderate (-ve). Box 8.3 below provides a summary of the impact.

Box 8.3  Construction impact: Soil or groundwater contamination

Nature: Construction activities could result in a direct negative impact on existing soil and groundwater conditions on the site.

Impact Magnitude: Medium
- Extent: The extent of the impact to the soil will likely be confined to on-site, unless operations (e.g.: loading, refuelling etc.) involving hydrocarbons or other potential contaminants are conducted outside of the site.
- Duration: The duration of the impact would be long-term.
- Intensity: The intensity is likely to be medium.

Likelihood: The likelihood of this impact occurring is possible/likely.

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE (-VE)

Degree of Confidence: The degree of confidence is high.

Operations

The operation of the facility may result in the following impacts relevant to the contamination of soil and water resources.
• Minor spills or leaks of hydrocarbons may occur due numerous reasons, including:
  
  o Pipeline leak  
  o Decoupling of filler points  
  o Faulty valves  
  o Vehicles or equipment colliding with fuel equipment  
  o Failure of emergency shut-off equipment  

• Waste and effluent

Major spill events are discussed in Section 8.3 below.

The drainage system on site will consist of:
• Storm water  
• Oily water  
• Sewer

A Site Drainage System has been designed by K&T Consulting Engineers (1), with the purpose of providing an understandable overall site drainage philosophy. The proposed drainage systems are discussed in more detail in Chapter 4.

The site has been separated into three portions:

• Land Portion A includes the offices, road gantry, fire pump room, fully welded pipeline and water reservoir;  
• Land Portion B includes the bulk storage tanks, import manifold, export manifold, export pumps with associated spill slabs, fully welded pipeline, bundwalls and bund floor sealing; and  
• Land Portion C which includes the overnight road tanker parking area.

It is proposed that two oily water separators will be installed at the development. One of the oily water separators will be located at the main storage area, and the second separator will be located within the road gantry area.

The separators would be installed to treat contaminated surface runoff and unintentionally contaminated water from the fuel storage terminal more specifically the bund area. This is to ensure to that contaminant concentrations are within the limits for disposal to the sewer. It is anticipated that the throughput capacity of the separator would be no more than 15 000m³ per annum and approximately 9m³ per day per separator.

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The contaminated water (oily water) would be received from the areas where spills can easily occur such as the road loading gantry, pump bay and VRU spill slab. The oily water will then be collected via a separate drainage system and discharged to a three chamber oily water separator. The location of the two separators is illustrated in Chapter 4. Areas that might be subject to minor contamination such as the concrete hard standing area within the fenced area will be pumped to the First Flush Basin (FFB) and after a storm event will be pumped to the site separator.

The flow rate through the separator will be designed to drain the bund within 12 hours after a 1:10 year storm (for duration of 60 minutes). The separator has also been designed to allow a discharge of treated oily water in the Eastern Mole Sewer system of 280m³ from portion B and a discharge of 145m³ from portion C after a 1:10 year storm for a duration of 60 minutes. Portion B and C are land parcels on the Eastern Mole where the Bulk storage tanks will be located.

The impact will be direct negative in nature. The extent will on on-site as minor spills would be confined to the site. The duration will be long-term as some spills may take months to rehabilitate and clean-up. The intensity is considered medium due to the potential scale of the spill and the toxic nature of the hydrocarbons. Given the on-site extent, long-term duration and medium intensity the overall impact magnitude is considered Medium-Low. The impact is likely to occur and therefore the overall pre-mitigation impact significance is considered Moderate-Minor (-ve). Box 8.4 below provides a summary of the impact.

**Box 8.4**

*Operations impact: Soil or groundwater contamination*

**Nature:** Operations could lead to minor fuel or oil spills resulting in a direct negative impact to the soil on the site, and groundwater (sea water).

**Impact Magnitude: Medium-Low**
- **Extent:** The extent of the impact on the soil is on-site.
- **Duration:** The duration of the effect of soil and/or groundwater contamination would be long-term as the remediation of the oil spill may take months to effect, and may have limited success leaving lasting (residual) impacts.
- **Intensity:** The intensity of soil or groundwater contamination would be medium.

**Likelihood:** It is likely that minor spills of petroleum hydrocarbons will occur.

**IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE-MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is high.

**Mitigation**

**Construction Phase:**
- It is recommended that additional soil sampling be conducted and water samples be taken from surface to water below by means of drilling. This should be conducted prior to construction to form part of the baseline.
for the site. Following the construction of the facilities, monitoring wells should be installed to allow regular sampling of the sea water below site.

**Odex Drilling for Soil and Water Sampling:**

Overview:
In order to complete a more comprehensive contamination baseline for the site of the proposed Burgan Oil facilities, it is recommended that drilling be conducted in order to obtain samples of the fill material down to water level as well as to obtain water samples from below the site. It is proposed that six holes be drilled on the larger northwestern portion of the site, and three or four on the smaller southeastern portion.

Drilling and Sampling Specifications:
Given the partially consolidated and highly variable nature of the backfill material which includes concrete, bricks and sand, boreholes are likely to collapse during drilling and retard sampling. It is therefore recommended that percussion drilling using the Odex method should be used. The Odex drill method involves the insertion of temporary metal casing as the drill bit advances, thereby keeping the borehole open. Once the required borehole depth is reached, the drill stem is retracted through the casing allowing water at the base of the hole to be sampled. After sampling, the casing is retracted and the borehole filled up or allowed to collapse.

During drilling, individual soil samples should be taken from each meter to obtain a vertical profile through the site. A water sample should be taken from the base of each borehole once it has reached the required depth. Given that sea level is ~3m below, it is recommended that boreholes be advanced to 4m.

Laboratory Analyses:
Soil and water samples should be submitted to Eurofins Analytico (Barneveld) for the same analyses conducted on the samples taken during this phase of work, viz. metals and hydrocarbons. The latter includes analyses for mono aromatic hydrocarbons (BTEXN), total petroleum hydrocarbons (TPH), and TPH volatiles.

- All fuel storage equipment (e.g. tanks) should meet appropriate internationally-recognised standards for structural design and integrity, (e.g. American Petroleum Institute (API) standards 650, 652, 653 and 2610).
- All fuel storage tanks will be fitted with leak detection technology.
- Install shutdown valves (e.g. automatic pressure-activated values, to shut down or isolate ruptured tanks and pipes).
• Impermeable bunds with a capacity of 110 percent of the tank(s) which they enclose will be constructed.

• Ensure that staff are adequately trained in spill prevention, containment and response.

• Design and install an appropriate stormwater catchment system to prevent hydrocarbon-contaminated water from leaving site.

• A suitable area for the temporary waste storage areas and secure waste skips must be selected, away from drainage lines.

• A Waste Management Plan (WMP) for the Project will be developed. This will follow the principles of waste minimisation at source, segregation for reuse, recycling, treatment or disposal.

• Construction waste management will be governed by an EMP and will incorporate reduction, recycling and re-use principles.

• Material Safety Data Sheets for all applicable materials present on site will be readily available to on-site personnel.

• All wastes produced from Project activities on site will be transferred to designated temporary storage areas and where possible into secure containers.

• Solid wastes will be segregated to facilitate reuse and recycling of specific materials.

• All wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and disposal.

• Effluent from the washing-down of concrete mixing and handling equipment will be contained within a bunded area of 110 percent capacity of the stored material. This effluent will then be treated as hazardous waste and disposed of by a licensed contractor.

• All hazardous and liquid waste materials e.g. fuel for generators, including any contaminated soils will be stored in a bunded area of 110 percent of the stored material’s capacity and disposed of by a licensed contractor.

• Fuels on site in drums will be stored in a locked container within a fenced and secure temporary staging area.

• Trucks and construction vehicles will be serviced off-site.
• Effluent and stormwater run-off will be discharged away from any identified drainage lines.

• All concrete mixing be undertaken on impermeable plastic lining to prevent contamination of the soils and surrounding areas.

• All construction debris will be placed in appropriate on-site storage containers and periodically disposed of by a licensed waste contractor in accordance with applicable South African regulations.

• The construction contractor will remove refuse collected from the designated waste storage areas at the site at least once a week.

• All rubble generated during the construction phase will be removed from the site regularly to a licensed landfill site.

**Operational Phase:**

• Regular and precise wet stock inventories will be conducted to timeously identify discrepancies and potential leaks.

• A spill response plan will be prepared to quickly react to and contain as far as possible any spills emanating from fuel infrastructure on site. This should be risk-based and include all necessary equipment, appropriate training prerequisites for staff and critical checks.

• Infrastructure and equipment using or storing hydrocarbons will be routinely maintained and regularly inspected through a Preventative Maintenance Programme in order to minimise the chance of hydrocarbon spills.

• Warning signs and appropriate barricading will be placed around vulnerable fuel-carrying infrastructure.

• Operation waste management will be governed by an EMPr and will incorporate reduction, recycling and re-use principles.

• Material Safety Data Sheets for all applicable materials present on site will be readily available to on-site personnel.

• All wastes produced from Project activities on site will be transferred to designated temporary storage areas and where possible into secure containers.

• Solid wastes will be segregated to facilitate reuse and recycling of specific materials.
All wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and disposal.

A network of simple groundwater monitoring wells should be installed across the site including the tank farm and dispensing areas. These wells should be located where they can be used to determine the potential for contaminants to migrate onto or off of the site, i.e. by installing these close to the site boundaries, and where they can facilitate in the identification of potential unknown releases of product from tanks or piping, i.e. by installing these adjacent to the tanks/piping. Wells adjacent to tanks should be located outside of but as close as possible to bund walls. The installation of wells prior to construction is not advised given the propensity for wells to be destroyed by heavy construction equipment.

**Monitoring well installation:**
Based on information currently available, including the present layout designs, the following is recommended:

- Install between 9 and 12 groundwater monitoring wells around the tank farm and on the perimeter of the site to a depth of 4m below ground level by means of rotary air percussion drilling.

- Wells should be equipped with 63mm PVC casing, screened across the water table with a sufficient screened interval above and below the water level to allow for tidal variation.

- The well annulus should be filled with filter pack material to above the screened interval and then back grouted to near the surface level.

- A bentonite seal should be placed within 0.2m of the surface, followed by concrete slurry.

- Wells should be equipped with a hot dip galvanised steel stand pipe with a welded table D flange, gasket and blank flange for sealing within bund areas.

- Wells should be developed to remove fine sediments from the casing and to develop the filter pack. Waste water generated during purging will be removed from the site and disposed of in an environmentally responsible manner. Should the oil water separator be constructed by the time well development take place, the waste water could be discharged through the separator.
Monitoring well sampling:
Monitoring wells should be sampled after a rest period of seven days following drilling, to allow the well to equilibrate with ambient conditions within the aquifer. During sampling, the depth to groundwater and the thickness of Phase Separated Hydrocarbons (PSH), where present, should be measured using an interface meter.

The monitoring wells not containing PSH should be purged (purge water recovered from monitoring wells should be collected and disposed of via the onsite separator, or removed off site and disposed of in an environmentally responsible manner) and well-head parameters (pH, electrical conductivity (EC), dissolved oxygen (DO), Eh and temperature) should be monitored with a YSI flow-through cell until they stabilise.

Groundwater samples should be recovered, directly into laboratory supplied bottles, using a peristaltic pump in accordance with in-house protocols based on United States Environmental Protection Agency (USEPA) methods.

Groundwater samples should be taken from each monitoring well and submitted to Analytico Milieu Laboratories in the Netherlands for the following analyses:

- Total Petroleum Hydrocarbons (TPH) with carbon banding and aliphatic/aromatic splits (TPHCWG);
- Benzene, Toluene, Ethyl benzene and Xylenes (BTEX); and
- Basic Heavy Metal Suite Analysis.

Quality Assurance/Quality Control:
Samples should be collected following strict procedures to avoid cross-contamination. The samples should be collected into laboratory-supplied sample bottles and be adequately sealed and packed on ice to maintain a temperature of approximately 4 - 5 °C. Samples should be shipped with the appropriate Chain-of-Custody documentation to the laboratory for analysis on a standard 5 working day turnaround from receipt of the samples.

During sampling and decontamination activities, disposable nitrile gloves should be worn to minimise transfer of contaminants. Any disposable equipment, such as gloves and bailers, should be dedicated to each sampling location and disposed of after use.

For QA/QC purposes the following quality samples should be included:

- 3 x Trip blank for BTEX (1 sample per container – assume 3 containers); and
- 1 x Blind duplicate for all analyses – (10 percent sample duplicates).
On completion of the field works, the factual Phase I and II report will be updated to include the completed Phase III works. The additional sections of the report will include a discussion on the analytical results of the collected water samples and provide an updated site conceptual model which will provide an overview of the subsurface conditions and baseline of soil and groundwater quality prior to operation of the facility.

**Residual**

Should the recommended mitigation measures listed above be implemented, the residual impact significance from the construction and operational phases will be reduced to from Moderate (-ve) to Minor (-ve). Table 8.7 below compares the pre-mitigation and residual impact significances.

**Table 8.7 Pre- and post-mitigation significance: Soil or Groundwater Contamination Impacts from Fuel or Oil Spill**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
<tr>
<td>Operational</td>
<td>MODERATE-MINOR (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
</tbody>
</table>

**8.2 SOCIO-ECONOMIC IMPACT ASSESSMENT**

**8.2.1 Traffic**

The facility will make use of the road based distribution network during each phase of the Project, with the majority of the road usage taking place during the operational phase, where product is distributed via road-based tanker trucks. The impacts from each phase of the project on the Port of Cape Town, and in particular the key intersection (Container Road and Marine Drive), are discussed in the following sections.

**Construction**

During the construction phase of the facility there will be an increase in vehicle movement to and from the site. This has the potential to impact on traffic within the Port of Cape Town, and at the key intersection of Container Road and Marine Drive. An increase in traffic flow is related to the transportation of construction workers to and from the site, as well as the delivery of construction material and equipment into the area.

The increase in traffic could create noise, dust and safety impacts for other road users and people working within close proximity to the roads on the selected transport route. In addition, the increased volume of traffic along the transport route will increase the wear and tear on these roads and possibly lead to deterioration in road conditions. The construction equipment will be procured in South Africa where available, or from an international manufacturer when sourcing from within the country is not possible. It is
expected that these components will be delivered to site via road in small trucks (1), however the final route to be taken to transport these components to the facility will be finalized at a later stage. It is also anticipated that there will not be a concrete batching plant on site, therefore, concrete trucks will make multiple, frequent deliveries to the site when the tank and road loading gantry foundations are being laid.

Affected sensitive receptors include road users, business owners and port users. The construction phase of the Project will take place in a phased approach, with the installation of the full Project taking up to one year and six months to complete, with components arriving throughout this period.

The impact on traffic during construction would be direct negative in nature. The extent would be local, as the Port of Cape Town area and key intersections would be affected. The duration would be short-term, lasting the duration of the construction period. The intensity would be medium given the level of increased traffic anticipated for the size of construction required. Given the local extent, short-term duration and the medium intensity, the magnitude of the impact is considered Low. The impact will definitely occur, therefore the overall pre-mitigation impact significance is considered Minor (-ve). Box 8.5 below provides a summary of the construction impact.

Box 8.5  
**Construction Impact: Traffic**

<table>
<thead>
<tr>
<th>Nature: Construction activities that increase traffic would result in a direct negative impact on existing traffic volumes and road quality.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact Magnitude – Low</strong></td>
</tr>
<tr>
<td>• <strong>Extent:</strong> The extent of the impact is local as the potential impact will only affect the Port of Cape Town and key intersections.</td>
</tr>
<tr>
<td>• <strong>Duration:</strong> The duration would be short-term for the duration of construction activities.</td>
</tr>
<tr>
<td>• <strong>Intensity:</strong> The intensity is likely to be medium given that the increases in traffic will temporarily create a nuisance and impact on the safety of other road users.</td>
</tr>
<tr>
<td><strong>Likelihood:</strong> There is a definite likelihood of increased traffic.</td>
</tr>
</tbody>
</table>

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is high.

**Operation**

Once constructed, the facility will make use of road tankers to distribute product via the road distribution network. The additional traffic resulting from the operational phase of the facility will increase pressure on the existing road distribution network, and particularly on the key entry point to the Port of Cape Town (Intersection of Container Road and Marine Drive) (Figure 8.4) The road tankers would then negotiate the harbour perimeter security, as well

(1) Should abnormal loads be required, the relevant permits will be sought from the relevant traffic authorities prior to transportation.
as the security to the Eastern Mole of the Port of Cape Town, between Duncan Dock and the Ben Schoeman Dock. The route to the site is via Duncan Road, Titan Road, Ocean Road, Monument Road and the new road alignment (Parallel to Portside Road) to the circle at the end of the Eastern Mole. This road provides flexibility of movement on the Eastern Mole and should thus ensure congestion-free movement of internal traffic.

Figure 8.4  Existing Road Geometry in the Vicinity of Container Road and Marine Drive

Based on the current design specifications the facility will have a throughput of approximately 75 road tankers during normal operation, and a maximum of up to 120 tanker trucks per day in a 24-hr period. The impact of this is approximately 10% in the peak hour (10 tankers) which translates to approximately ten inbound and ten outbound trips per hour (Table 8.8). The information used in this impact assessment is based on background traffic information obtained from traffic counts taken on 28 March 2012. The key intersection was the focus of the study and assessed existing traffic movement during typical weekday peak commuter periods.
Table 8.8  Trip Generation Rates

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Amount</th>
<th>Trip Generation Rate / (Split)</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>Daily Load</td>
<td>75 tankers/day</td>
<td></td>
<td>50:50</td>
<td>50:50</td>
</tr>
<tr>
<td>Max Load</td>
<td>10 tanker/hr.</td>
<td></td>
<td>50:50</td>
<td>50:50</td>
</tr>
</tbody>
</table>

Source: Kantey and Templer, 2014

The traffic impacts were analysed using the Signalized and Unsignalized Intersection Design and Research Aid software package (1) (SIDRA), which determines the existing and future operational Levels of Service (LOS) and expected average delays at the key intersection with and without the additional traffic from the proposed facility. The LOS is a qualitative measure of a number of factors which affect traffic conditions, such as speed, safety, travel time, traffic interruptions, manoeuvrability, driving comfort and convenience. This is typically measured quantitatively by describing vehicular delay within a scale that ranges from LOS A to LOS F. LOS A indicates free-flow conditions while LOS F represents over-capacity conditions with substantial congestion and delay. Table 8.9 shows the link between average control delay per vehicle and LOS for signalized intersections, roundabouts and stop and yield controls.

Table 8.9  Level of Service Definitions Based on Delay

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Control delay per vehicle in seconds (d) (including geometric delay)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signals and Roundabouts</td>
</tr>
<tr>
<td>A</td>
<td>Good progression, few stops, short cycle lengths</td>
</tr>
<tr>
<td>B</td>
<td>Good progression and/or short cycle lengths, more vehicle stops</td>
</tr>
<tr>
<td>C</td>
<td>Fair progression, significant proportion of vehicles must stop</td>
</tr>
<tr>
<td>D</td>
<td>Congestion becomes noticeable, longer delays, high v/c ratio</td>
</tr>
<tr>
<td>E</td>
<td>At or beyond acceptable delay, poor progression, long queues</td>
</tr>
<tr>
<td>F</td>
<td>Unacceptable to drivers. Arrival volumes greater than discharge capacity, unstable and unpredictable flows.</td>
</tr>
</tbody>
</table>

Source: Kantey and Templer, 2014

The trip distribution adopted for facility is based on the anticipated travel to and from the site with the assumption that 40 percent of the trips will originate from the south, 35 percent from the north and 25 percent from the

Based on outputs from the SIDRA software package, the additional traffic generated by the facility is unlikely to have a significant impact on the functioning of the key intersections of the study area (Table 8.10). The 2013 and 2018 scenarios were created by adding 4 percent to the total traffic volumes per annum. From the Table 8.10, it is evident that neither scenario presents a problem to the existing road network.

**Table 8.10 Intersection Operations**

<table>
<thead>
<tr>
<th>Measures of Effectiveness</th>
<th>Existing 2012 Scenario</th>
<th>Future 2013 Scenario</th>
<th>Future 2018 Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak</td>
<td>PM Peak</td>
<td>AM Peak</td>
</tr>
<tr>
<td>Levels of Service (LOs)</td>
<td>C</td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>Delay (Sec) Overall</td>
<td>33.1</td>
<td>46.9</td>
<td>34.2</td>
</tr>
<tr>
<td>V/C Ratio</td>
<td>0.650</td>
<td>0.962</td>
<td>0.677</td>
</tr>
<tr>
<td>95th Percentile Queue</td>
<td>27.7</td>
<td>35.8</td>
<td>29.6</td>
</tr>
</tbody>
</table>

Source: Kantey and Templer, 2014

The impact from the increase in traffic during the operations phase will be **direct negative** in nature. The extent will be **local**, as the Port of Cape Town and key intersections will be affected. The duration of the impact would be **long-term**, lasting the duration of the operations phase. The intensity would be **medium** given the increased volume of road tankers on the road network. Given the local extent, long-term duration and medium intensity the impact magnitude is considered **low**. As the impact will definitely occur, the overall pre-mitigation impact significance is considered Minor (-ve). **Box 8.6** below provides a summary of the impact.

**Box 8.6 Operational Impact: Traffic**

**Nature**: The operational phase will result in a **direct negative** impact on road users, business owners and pedestrians within the Port of Cape Town and at the key intersections.

**Impact Magnitude – Low**
- **Extent**: The extent of the impact is **local** as the potential impact will only affect the Port of Cape Town and key intersections.
- **Duration**: The duration would be **long-term** for the duration of operations.
- **Intensity**: The intensity is likely to be **medium** given that the increases in traffic will create a nuisance and impact on the safety of other road users.

**Likelihood** – There is a **definite** likelihood of increased traffic.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)**

**Degree of Confidence**: The degree of confidence is **high**.
Mitigation

Construction and Operations:

- A Driver Code of Conduct will be implemented stipulating and governing safe driving behaviour, which will include no use of cell phones whilst driving.

- All vehicles to not exceed the mandated speed limits of 30km/h.

- A Traffic Management Plan will be developed and implemented, with at least the following provisions included:
  
  o All drivers will be sensitised to potential accident risks.
  o All drivers will be periodically checked for alcohol consumption.
  o All vehicles will be regularly checked and maintained in good condition.
  o Vehicles will be correctly and safely loaded to avoid accidents, and all loads are secured and covered where they pose a risk of windblown dust or material spillage.

- If required, alternative arrangements and routes for abnormal loads will be agreed in advance with the relevant authorities and the appropriate permits will be obtained for the use of public roads.

Residual

If mitigation measures are implemented, the overall significance will be reduced to Minor (-ve) for construction and operations. The pre- and post-mitigation impacts are compared in Table 8.11.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR (-VE)</td>
<td>NEGLIGIBLE</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-VE)</td>
<td>NEGLIGIBLE</td>
</tr>
</tbody>
</table>

8.2.2 Noise

Construction Phase

Construction activities and vehicles associated with the Project will increase the ambient noise levels during the construction phase, which may be a nuisance to the surrounding businesses and facilities. The generation of noise can also be a health and safety risk to the Project workforce if not appropriately managed.

The facility is located in an industrialised port setting where there are regular sources of noise, which may act to mask the noise emanating from the Project site construction activities. In trying to interpret the potential noise impact
associated with the Project, it is useful to compare typical construction noise to other environmental noise sources (see Table 8.12).

**Table 8.12 Indicative Noise Levels from Various Sources***

<table>
<thead>
<tr>
<th>Source/Activity</th>
<th>Indicative noise level dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold of pain</td>
<td>140</td>
</tr>
<tr>
<td>Jet aircraft at 250m</td>
<td>105</td>
</tr>
<tr>
<td>Pneumatic drill at 7m</td>
<td>95</td>
</tr>
<tr>
<td>Truck at ± 48 km/hr at 100m</td>
<td>65</td>
</tr>
<tr>
<td>Busy general office</td>
<td>60</td>
</tr>
<tr>
<td>Car at ± 65 km/hr at 100m</td>
<td>55</td>
</tr>
<tr>
<td>Quiet bedroom</td>
<td>35</td>
</tr>
<tr>
<td>Rural night-time background</td>
<td>20 - 40</td>
</tr>
<tr>
<td>Threshold of hearing</td>
<td>0</td>
</tr>
</tbody>
</table>

*These indicative noise levels were taken from the Scottish Government Planning Advice Note 45 on Renewable Energy Technologies, 2002

The Project site is located on the Eastern Mole in the Port of Cape Town, and the nearest sensitive receptors are located adjacent the Project site, approximately 20m from areas where construction activities will occur. The ambient noise levels are considered to be frequently between 60 – 65dBA, given the industrial nature of the Port of Cape Town, with frequent truck passing by. Noise generated by construction activities or vehicles is likely to decrease rapidly from the source. The frequency of the construction vehicles travelling up and down the road, together with other construction activities causing noise is unknown, as such it cannot be predicted how the nuisance linked to noise generated by the construction vehicles will affect sensitive receptors (mainly employees of adjacent businesses).

For the workforce, exposure to noise will be managed through the use of appropriate Personal Protection Equipment (PPE) when required. The construction activities will be managed according to best practice to ensure the health and safety of the workforce involved.

The increase ambient noise levels will be a potential **direct negative** impact. The impact will affect receptors (people working in the area) beyond the Project site; as such the impact extent is predicted as **localised**. The duration of the impact will be **short-term** for the extent of the construction phase. The intensity of the impact will be **medium** as the change in ambient noise levels will be noticeable due to the frequency of the noise linked to vehicle and construction noise. Given the local extent, short-term duration and the medium intensity, the magnitude of the impact is considered **low**, as the impact will affect a relatively small number of receptors. With a **definite** likelihood of the impact occurring, the overall pre-mitigation impact significance is considered **Minor (-ve)**. **Box 8.7** below gives a summary of the construction impact on ambient noise levels.
Box 8.7  Construction Impact: Noise

**Nature:** Construction activities would result in a direct negative impact on ambient noise levels.

**Impact Magnitude – Low**
- **Extent:** The extent of the impact is local as the potential impact will be beyond the Project Site, but only affect the Port of Cape Town area transport routes.
- **Duration:** The duration would be short-term for approximately 18 months.
- **Intensity:** The intensity is likely to be medium given that the scale of the construction activities.

**Likelihood:** There is a definite likelihood of increased ambient noise levels.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is high.

*Operations Phase*

Ambient noise levels may be affected by the on-going use of road tankers to transport oil and fuel from the site. It is estimated that an average of 75 road tankers will be used, seven days a week, 24 hours a day, with a peak of 120 road tankers in a day five or six times in the year. As seen in Table 8.12 above road tankers are estimated to produce 65dBA noise levels, which would be on the near the upper limit of the expected current ambient noise levels of 70dBA in an industrial complex.\(^1\)

Increased ambient noise levels due to the on-going use of road tankers would be a direct negative impact, but mainly confined to the offices adjacent the facility and some offices along the entrance and exit routes of the Port of Cape Town. The extent of the impact would be local, as transport routes beyond the site would be affected. The duration of the impact would be long-term, lasting as long as the facility is operational. The intensity of the impact is considered low, as there would be an average of 75 road tankers moving in and out of the site each day. Given the local extent, long-term duration and the medium intensity, the magnitude for the impact is considered low. With a definite likelihood of occurrence, the overall pre-mitigation significance is considered Minor (-ve). Box 8.8 below gives a summary of the construction impact on ambient noise levels.

---

(1) SANS 10103, 2008.
Box 8.8  
**Operations Impact: Noise**

**Nature:** The on-going use of road tankers would result in a **direct negative** impact on ambient noise levels.

**Impact Magnitude – Low**
- **Extent:** The extent of the impact is **local** as the potential impact will be beyond the Project Site, but only affect the Port of Cape Town area transport routes.
- **Duration:** The duration would be **long-term** lasting for as long as the facility is operational.
- **Intensity:** The intensity is likely to be **low** given number of road tankers moving in and out of the site each day.

**Likelihood:** There is a **definite** likelihood of increased ambient noise levels.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is **high**.

**Mitigation**

**Construction:**
- Burgan Oil and its Contractor(s) will consider using acoustic screening if unacceptable noise impacts are predicted to shield receptors.

- Burgan Oil and its Contractor(s) will ensure that the noise level of audible warning devices will be kept to the minimum necessary for the health and safety of employees.

- Burgan Oil and its Contractor(s) will ensure that all on-site workers will have appropriate ear plugs as standard personal protection equipment (PPE).

- Burgan Oil and its Contractor(s) will ensure mobile machinery/equipment (e.g. compressors, generators) and other noisy construction machinery/equipment are located as far from the nearest potential sensitive receptors as possible.

- Burgan Oil and its Contractor(s) will ensure equipment and vehicles are regularly maintained in accordance with manufacturers specifications.

**Operations:**
- Burgan Oil and its Contractor(s) will ensure equipment and vehicles are regularly maintained in accordance with manufacturers specifications.

- Burgan Oil and its Contractor(s) will consider using acoustic screening if unacceptable noise impacts are predicted to shield receptors.

**Residual**

The implementation of the above mitigation measures would mean that the impact significance for construction and operation will remain **Minor (-ve)**
significance. The pre- and post-mitigation impacts are compared in Table 8.13 below.

**Table 8.13**  
*Pre- and Post- Mitigation Significance: Increase Ambient Noise*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
</tbody>
</table>

8.2.3 **Visual**

**Study Area Landscape Character**

The landscape character of the broader study area is dominated by the following key features (see Figure 8.5):

- Port of Cape Town (including Duncan Dock and Ben Schoeman Dock)
- Victoria and Alfred Waterfront
- Lower Cape Town central business district (CBD)
- Suburb of Woodstock
- Table Mountain

To the north of the Project site the visual landscape is dominated by the open water of Table Bay. The Project site is located within the Port of Cape Town, which constitutes an industrial area visually, being comprised of docks (including Ben Schoeman Dock and Duncan Dock), shipping berths, warehousing, offices, storage and distribution facilities, container cranes, stacks of containers and other bulk oil and fuel storage facilities. To the north west of the Project site lies the Victoria and Alfred Waterfront, being a large scale retail and accommodation complex. To the south and south west of the Project site lies the lower end of the Cape Town CBD and the suburb of Woodstock, with the associated large scale road transport routes. Further to the south west lies Table Mountain which is a dominant feature on the south west facing skyline. Therefore the broader visual landscape is comprised of industrial facilities and infrastructure, open waters of the ocean, the high rise building of the CBD and Table Mountain as the backdrop for the south west skyline.
Project Site Landscape Character

Both Berth 1 and Berth 2 are located on the south western side of the Eastern Mole. The winch cable storage building is located at the end of the Eastern Mole, between Berth 1 and the proposed storage tanks in Bund B. Also located on the Eastern Mole is the FFS Refiners (Pty) Ltd (FFS) site which is situated between the proposed Burgan Oil storage site and road loading gantry bays. FFS is located on the south west side of the Eastern Mole with part of the FFS storage located between the proposed gantry bay and Berth 2. The main view sheds are from the N2 national highway leading into Cape Town CBD, from Table Mountain and from Signal Hill.

Key visual features of the Project site include:

- Container cranes
- Container stacks
- Large ships and oil rigs
- Shipping Berths 1 and 2
- Open area with sparse vegetation of the Project site
- The FFS storage facility
- Open ocean of Table Bay
Additional photographs of the Project site are appended in Annex B.

Operations

The most prominently visible aspects of the facility will be the large storage tanks and bunding infrastructure, and the six gantry loading bays. However, given the industrial nature of the Port of Cape Town and the fact that the FSS facility with large storage tanks already exists at the Project site, the Project infrastructure will not be introducing new visual aspects to the landscape.

The operation of the facility will have a direct negative impact on the visual landscape. The extent of the impact will be local, as sensitive receptors would be able to see the construction activities from beyond the site, but construction activities would be hardly visible beyond the Port of Cape Town. The duration of the impact during construction will be short-term, lasting as long as the construction phase, while it will be long-term during the operational phase. The intensity of the impact is estimated to be low, given the already industrial nature of the surrounding landscape. Given the local extent, short-term duration and the medium intensity, the overall magnitude of the impact is considered low. As the impact is likely to occur, and the magnitude is medium-low, the overall pre-mitigation significance of the impact is considered Minor (-ve). Box 8.9 below gives a summary of the visual impact during construction and operations.

**Box 8.9**

Operations Impact: Visual

<table>
<thead>
<tr>
<th>Nature:</th>
<th>Operations would result in a direct negative impact on the visual landscape in the area surrounding the site.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Magnitude: Low</td>
<td></td>
</tr>
<tr>
<td><strong>Extent:</strong></td>
<td>The extent of the impact is local, as the construction activities will be hardly visible beyond the Port of Cape Town.</td>
</tr>
<tr>
<td><strong>Duration:</strong></td>
<td>The duration would be short-term since it will occur during the construction phase, about 18 months, and long-term during the operations phase.</td>
</tr>
<tr>
<td><strong>Intensity:</strong></td>
<td>The intensity will be low, given the already industrial nature of the surrounding landscape.</td>
</tr>
</tbody>
</table>

Likelihood – It is likely that this impact will occur.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is high.

Mitigation

No mitigation measures are required.
Residual

The overall impact significance will remain **Minor (-ve)** during operational phase. The pre- and post-mitigation impacts are compared in Table 8.14 below.

**Table 8.14**  **Pre- and Post-Mitigation Significance: Visual**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>MINOR (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
</tbody>
</table>

**8.2.4 Improved Security of Supply and Flexibility of Fuel to the Western Cape**

*Operations*

Improved security of supply and associated flexibility are key economic imperatives and policy goals as discussed in more detail in Chapter 2. The introduction of new facilities to store and distribute fuels at an efficient location in the Port should therefore contribute to enhance security of supply levels in the region. It would allow for greater flexibility in storage, importation and further distribution at times and in circumstances where this is desirable (and is in keeping with relevant fuel industry regulations). This would include the facilitation of direct imports to Cape Town instead of having to first import larger shipments into Durban, then break bulking them for further shipment in smaller quantities to Cape Town thereby increasing logistics costs.

The Fuels Sector Specialist Assessment provides further assessment of impacts on security of supply (see Annex I). This assessment found that the proposed Burgan facility would have a positive impact on security of supply in Cape Town and the Western Cape particularly in the following unplanned circumstances (Buley, 2014, pg 5):

- “A harbour incident involving a vessel at either of the existing bulk liquid berths.
- A refinery incident (fire, critical equipment failure, industrial action) which causes an unplanned outage or slowdown of more than 6 weeks.
- Damage to or failure of Chevron’s 20km white oil pipeline linking the refinery to the harbour.
- An urgent demand by Eskom for diesel as a result of county wide power shortages (Eskom gas turbines at Atlantis are estimated to be capable of consuming more than twice the daily diesel demand of the supply area (based on data supplied by ESKOM in the FSSTT study).

In addition, if constructed, the facility will enable the following benefits to be achieved:

- Making imported petrol50 and diesel50 available to all motorists whose vehicles require these grades and bridging the supply gap due to the likely delay in meeting the target date of July 2017 for refineries to upgrade to produce these fuels.
- Provide storage for Clean Fuel strategic stock holding requirements.”
The impact will be **direct positive** in nature. The extent will be **regional** at its broadest level with the impact moving beyond the City of Cape Town. The duration will be **long-term**, lasting the duration of the operations phase. The intensity is considered **medium**, with notable changes to the economy.

Considering the regional extent, long-term duration and the medium intensity the impact magnitude is considered **Medium**. The impact will definitely occur, and therefore with a medium magnitude the overall significance is considered **Moderate (+ve)**.

A summary of the impact findings is presented in the **Box 8.10** below.

**Box 8.10 Operations Impact: Improved Security of Supply and Flexibility**

**Nature**: The introduction of new facilities to store and distribute fuels should contribute to enhance security of supply levels in the region. It would allow for greater flexibility in storage, importation and further distribution.

**Impact Magnitude – Medium**
- **Extent**: The extent of the impact is **local** and **regional**
- **Duration**: The expected impact will be **long-term** for the life of the facility
- **Intensity**: The impact will result in **medium**, notable changes to the receptor (i.e. the economy)

**Likelihood**: Impacts from expenditure will **definitely** occur in the economy.

**IMPACT SIGNIFICANCE (WITHOUT AND WITH MITIGATION) – MODERATE (+VE)**

**Degree of Confidence**: The degree of confidence is **medium**.

**Mitigation**

No mitigation measures are recommended.

**Residual**

As there is no mitigation the overall impact significance will remain **Moderate (+ve)** during operational phase. The pre- and post-mitigation impacts are compared in **Table 8.15** below.

**Table 8.15 Pre- and Post-Mitigation Significance: Improved Security of Supply and Flexibility**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td><strong>MODERATE (+VE)</strong></td>
<td><strong>MODERATE (+VE)</strong></td>
</tr>
</tbody>
</table>


8.2.5 Increased Opportunities for Competition

Operations

One of the basic tenets of market driven economies such as South Africa’s is the desirability of competition given its benefits in terms of fostering greater choice, better service and lower costs. These benefits are viewed as important and, as such, are recognised in legislation primarily through the Competition Act 1998 (Act No. 89 of 1998) and associated Competition Commission. The stated purpose of the Competition Act is to promote and maintain competition in South Africa in order to achieve the following objectives:

- To promote the efficiency, adaptability and development of the economy;
- To provide consumers with competitive prices and product choices;
- To promote employment and advance the social and economic welfare of South Africans;
- To expand opportunities for South African participation in world markets and recognize the role of foreign competition in the Republic;
- To ensure that small and medium-sized enterprises have an equitable opportunity to participate in the economy; and
- To promote a greater spread of ownership, in particular to increase the ownership stakes of historically disadvantaged persons.

While it is recognised that greater competition is not desirable in every situation, given the above and taking sound economic principles into account, it is generally accepted that the onus is on those who argue against competition to, (1) comprehensively prove the merits of their case and (2) show that a given course of action or policy intervention to restrict competition would better serve to limit the negative impacts or un-intended consequences of a development. Notwithstanding the unique structure of the petroleum industry, attempts to restrict competition thus need to be treated with caution both conceptually and with reference to the mechanism through which competition is to be restricted, if at all.

At present, Chevron’s competitors have to use infrastructure owned by Chevron when importing fuels. While this arrangement may be functional, it cannot be considered ideal from a competition perspective (i.e. having only one facility does not foster competition). Aside from the potential positive impacts of introducing a competing facility as such, the overall competitiveness and robustness of the industry should also be enhanced by the introduction of a new entrant that is independent of the existing petroleum suppliers. From a competition perspective, this makes it superior to the construction of a new facility by one of the other existing petroleum producer/suppliers (1).

(1) Note that government preference for this type of arrangement if possible is outlined in the Liquid Fuels Energy Security Master Plan.
In summary, the Project presents an opportunity to facilitate competition in the market for storage and distribution. Despite the present fuel pricing system, this should be viewed as a positive impact as it increases choice and the likelihood that costs would remain as low as possible.

The impact will be **direct positive** in nature. The extent will be **regional** affecting an area beyond the City of Cape Town. The duration will be **long-term**, lasting the duration of the operations phase. The intensity will be **medium**. With a regional extent, long-term duration and medium intensity the impact magnitude is considered **Medium**. The impact will definitely occur and therefore with a medium magnitude, the overall impact significance is considered **Moderate (+ve)**. A summary of the impact is given in **Box 8.11** below.

**Box 8.11** *Operations Impact: Increased Opportunities for Competition*

**Nature:** The project presents an opportunity to facilitate competition in the market for storage and distribution.

**Impact Magnitude – Medium**
- **Extent:** The extent of the impact is **local and regional**
- **Duration:** The expected impact will be **long-term** for the life of the facility
- **Intensity:** The impact will result in **medium**, notable changes to the receptor (i.e. the economy)

**Likelihood:** Impacts from expenditure will **definitely** occur in the economy

**IMPACT SIGNIFICANCE (WITHOUT AND WITH MITIGATION) – MODERATE (+VE)**

**Degree of Confidence:** The degree of confidence is **medium**.

**Mitigation**

No mitigation measures are recommended.

**Residual**

As there is no mitigation the overall impact significance will remain **Moderate (+ve)** during operational phase. The pre- and post-mitigation impacts are compared in **Table 8.16** below.

**Table 8.16** *Pre- and Post-Mitigation Significance: Increased Opportunities for Competition*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>MODERATE (+VE)</td>
<td>MODERATE (+VE)</td>
</tr>
</tbody>
</table>
Impacts on Competitors

Chevron has raised concerns regarding the proposed project primarily on the basis that it would introduce a threat to the viability of its refinery through the facilitation of fuel imports (see Annex C). Specifically, the key concern is that significant volumes of fuel would be imported through the facility and sold at lower prices that Chevron would not be able to match.

In this regard it is important to bear in mind that the proposed facility would be multi-purpose in nature and could be used for the storage and distribution of both locally produced fuels and imported fuels. It is thus specifically only one aspect of the facility (i.e. its potential to be used to facilitate imports) that is of concern to the Chevron Refinery. Focusing on this, it is important to understand that the facility would provide the infrastructure that would facilitate or allow for fuel imports in competition with Chevron’s local production. The companies that would pay Burgan Oil to use the facility (i.e. Burgan’s tenants) would, however, be those engaging in the importation, not Burgan Oil. In addition, it is important to bear in mind that facilities already exist for the importation of fuel in the Port of Cape Town and that the major oil companies currently engage in importation when they are permitted to do so. This has important implications for potential mitigation measures on the impacts on Chevron; authorities who have the primary mandate for the economic regulation of the liquid fuels sector including the regulation of fuel imports may only permit fuel importation where fuel cannot be supplied locally.

In terms of volumes, the maximum throughput of the facility under safe operating conditions, estimated by Burgan Oil, is approximately 805,000 m³/yr. At current production levels, this is equivalent to between 21 percent and 23 percent of the current total petrol and diesel production of the Chevron Refinery (i.e. 3.5 - 3.8 million m³/yr).

The Fuels Sector Specialist Report provides the primary assessment of impacts on the continued viability of the Chevron Refinery (see Buley, 2014 in Annex I). This assessment constructs likely future fuel supply and demand balances for the Cape Town supply area. It also considers the current situation in which imports of fuel into Cape Town are already occurring along with the implications of the BFP for potential importers (bearing in mind that the BFP is designed to provide ‘international equivalent’ or import parity pricing thereby limiting the financial incentive to import). Given inherent uncertainties associated with the need for forecasts, impacts on the Chevron Refinery are assessed by the fuels sector specialist using a worst case and a most likely case scenario.

Findings for the worst case scenario are as follows (Buley, 2014):

“Should tenants of Burgan Oil focus solely on the importation of fuels through the facility, once the refinery is Clean Fuel 2 compliant, it would be likely to have a negative impact on the Chevron Refinery amounting to an estimated loss ~$5.8 million per year or $0.21 per barrel of crude oil, which is overshadowed by the daily variations in crude and product pricing and therefore is unlikely to impact the
financial viability of the Refinery. It could be addressed by cost cutting and revenue enhancement initiatives. As noted, it would be highly probable that tenants using the Burgan facility would choose to buy product from the refinery as opposed to importing which has not apparently been economically viable to date. For this reason, this scenario is considered highly unlikely – i.e. Chevron’s concern of fully importing 805 Mlpa makes little financial sense.”

Findings for the most likely scenario were as follows (Buley, 2014):

“Under this scenario, Burgan Oil will provide more than 50% of its storage facility to an anchor tenant in the form of a major oil company and as explained, this agreement has now been signed. As discussed under the Adversarial Scenario (i.e. worst case), it is considered most likely that the anchor tenant would source petrol500 and diesel500 from the Chevron Refinery prior to the refinery being Clean Fuels 2 compliant. Should the facility be used for a storage facility for strategic stocks and imports of petrol50 and diesel50, then it is highly unlikely to have any negative impact on Chevron. The conclusion is therefore that this scenario will result in a negligible impact on Chevron.”

As per the findings of the fuels sector specialist, the keys risks associated with the Project should not present a threat to the overall viability of the Chevron Refinery particularly when one considers the mitigation available. Importantly, it is not anticipated that the Chevron Refinery would be forced to shut down as a direct result of the Project. This should ensure that Chevron staff, sub-contractors and suppliers are to a large extent not adversely affected thereby limiting socio-economic risks. There would, however, be risks associated with manageable cost cutting and/or profit reduction particularly in the worst case scenario. This may result in socio-economic impacts such as slightly less expenditure on sub-contractors and/or suppliers or limited reductions in staff. Alternatively, it may also be possible for Chevron to retain staff and accept lower profits. Much will depend on market conditions and the willingness of Chevron to adapt and manage potential changes.

The findings outlined above imply that the risk of significant negative socio-economic impacts flowing from impacts on Chevron are low to moderate without mitigation. An assessment of the significance of these impacts without mitigation based on the findings above is presented in Box 8.12 below.
Box 8.12  

**Operations Impact: Impacts on Competitors including associated socio-economic impacts**

**Nature:** The Project may entail risks to the financial viability of the Chevron Refinery which would imply indirect socio-economic impacts particularly if the refinery scales back or closes.

**Impact Magnitude: Low-Medium**
- **Extent:** The extent of the impact is primarily **local and regional**.
- **Duration:** The expected impact will be **long-term for the life of the facility**.
- **Intensity:** The intensity will be **low-medium**, given the likely potential relative market share loss for Chevron Refinery.

**Likelihood** – It is highly **likely** that this impact will occur.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) MODERATE-MINOR (-VE)**

**Degree of Confidence:** The degree of confidence is **medium**.

**Mitigation**

Mitigation would need to focus on directly addressing the issue of concern – i.e. the importing of fuel at times when it is undesirable. This would require the targeting of fuel importers (i.e. tenants of the facility) and therefore the involvement of other regulatory authorities. The regulatory authorities that govern fuel imports (i.e. DoE) have a number of applicable mitigation measures that they could apply should they wish to restrict imports through the proposed facility (or any other similar facility for that matter). Chief among these are existing measures that are part of the current regulatory environment in which the DoE only grants permission to import fuels when local shortages can be proven (as outlined in Chapter 7 and as emphasised in the Fuels Sector Specialist in Annex I). Other additional measures that could also be implemented, but are less likely to be necessary assuming the implementation of existing measures, include the following (Buley, 2014):

- “**Linkage of the Burgan facility into the Refinery white oil line to enable product to be moved from the refinery.** Burgan has already raised this with Chevron.
- **Control of the consumption of petrol50 and diesel50 in vehicles that are capable of using petrol500 and diesel500 through the Demand Side Management Levy mechanism.**
- **The reformulation of the BFP sourcing model and calculations to reflect the correct landed cost of refined products.** The oil industry has already initiated this with Department of Energy.”

If appropriately crafted and implemented, the above existing and potential additional measures would be preferable for the following reasons:

- They would address the imports issue directly and could be tailored to appropriate time periods, bearing in mind that the desirability of imports is likely to fluctuate.
• They could be designed and implemented by the appropriate authorities in keeping with their mandates specifically with respect to fuel import regulation.

• They would be in keeping with the current DoE regulatory framework in which any party wishing to import fuel is also obliged to first enquire whether other local fuel producers have stock available in the country. The DoE then has the opportunity to assess the situation and only grant permission to import once it can be confirmed that stock is not available locally (see Chapter 7 for further details).

• They could be designed in a way that ensures that they have minimal impact on the availability of the Burgan facility to augment security of supply (i.e. any concerns around imports could be dealt with whilst not foregoing the other strategic benefits of the project as outlined in Sections 8.2.4 and 8.2.5).

• They are likely to be a more equitable way of restricting imports should this be found desirable as they could be applied to importers using existing facilities and importers using the proposed facility.

The applicant should also be required to assist with mitigation by committing to the transparent provision of data to the relevant authorities on fuel movements through their facility. This could, for example, include data on fuel types, volumes and sources per customer.

Residual

Consider the above mitigation measures, the overall significance will be reduced to Minor (-ve). The pre- and post-mitigation impacts are compared in Table 8.11.

Table 8.17 Pre- and Post- Mitigation Significance: Impact on Competitors including Socio-economic Impacts

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>MODERATE-MINOR (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
</tbody>
</table>

Note that this impact is informed by the Economic Specialist Study and the Fuel Sector Specialist Report (see Annex I). In order to determine any further social impact as a result of the impact considered here, the above mentioned studies would be wholly relied upon. Any potential further social impact as a result of the impact in question here would be derived from the Economic Specialist Study and Fuel Sector Specialist Report’s two scenarios and assess the impacts of those. In this case no meaningful separate social specialist report would have resulted, as based on the best (and most likely) case scenario, no jobs are likely to be lost, and on the worst scenario, slightly less expenditure on sub contractors and/or suppliers or limited reductions in staff are expected. Furthermore as it is not possible for a social or economic study
to be able to estimate how many jobs would be lost as a result of possible cost cutting measures (e.g. which jobs, since there is no way of knowing what Chevron's retrenchment strategy would be) it would not have been possible to provide any meaningful additional social impact assessment about the two scenarios.

8.2.7 Impact of Construction and Operational Expenditure

The construction and operational phases of the Project would result in spending injections that would lead to increased economic activity best measured in terms of impacts on employment and associated incomes.

All expenditures would lead to direct, indirect and induced impacts on employment and incomes. Taking employment as an example, impacts would be direct where people are employed directly on the Project in question (e.g. jobs such as construction workers), indirect - where the direct expenditure associated with a Project leads to jobs and incomes in other sectors (e.g. purchasing building materials maintains jobs in that sector) and induced where jobs are created due to the expenditure of employees and other consumers that gained from the project. Direct impacts are the most important of these three categories as they are the largest and more likely to be felt in the local area. Their estimation also involves the lowest level of uncertainty. The quantification of indirect and induced impacts is a far less certain exercise due to uncertainty surrounding accurate multipliers particularly at a local and regional level. This uncertainty makes it inadvisable to quantify indirect employment unless an in-depth analysis of this aspect is absolutely essential to decision making. Potential direct employment and income impacts are consequently quantified here and likely indirect impacts are borne in mind qualitatively when providing overall impact ratings.

Construction Phase

Construction Expenditure/Investment:
Construction expenditure would constitute a positive injection of new investment. The applicant’s preliminary estimates indicate that a total of approximately R460 million to R485 million (all numbers given below are given with a +/-25 percent accuracy) would be spent on all aspects of the construction phase. Note that this spending estimate and other expenditure and employment estimates are preliminary and considered accurate to within 25 percent.

The Project has the potential to have a positive impact on commercial activity in the local area during construction given its size and the expenditure associated with it outlined above. During the construction phase the building construction, civil and other construction and specialist industrial machinery sectors would benefit. The structural metal products, wholesale and retail trade and construction materials sectors would also stand to gain due to indirect linkages. The project would provide an injection for contractors and workers in the local area and region leading to positive impacts.
Employment during Construction:

Table 8.18 outlines the total construction phase employment that is anticipated by the applicant for the Project. Approximately 110 to 130 contract jobs with an average duration of 18 to 22 months would be associated with all construction expenditure. Bear in mind that the estimates are not to be regarded as highly accurate and are meant to give an indication of potential employment impacts.

<table>
<thead>
<tr>
<th>Number of workers</th>
<th>Total Duration of employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly skilled</td>
<td>15 - 20</td>
</tr>
<tr>
<td>Medium skilled</td>
<td>35 - 40</td>
</tr>
<tr>
<td>Low skilled</td>
<td>60 - 70</td>
</tr>
<tr>
<td>Total</td>
<td>110 - 130</td>
</tr>
<tr>
<td>Construction workers (indicative)</td>
<td>18 - 22 months</td>
</tr>
</tbody>
</table>


Indirect Opportunities during Construction:
In addition to the above direct employment and associated income opportunities, additional temporary indirect opportunities would be associated with the Project. These would stem primarily from expenditure by the applicant in the local area and region as well as expenditure by workers hired for the construction phase.

Impact Significance:
The impact would be direct and indirect positive in nature. The extent would be regional at its broadest level, affecting areas beyond the City of Cape Town. The duration would be short-term, lasting only the construction period. The intensity would be medium. Considering the regional extent, short-term duration and medium intensity the impact magnitude is considered Low-Medium. The impact will definitely occur and therefore with a Low-Medium magnitude, the overall pre-mitigation impact significance is considered Minor-Moderate (+ve). A summary of the impact is given in Box 8.13 below.
Box 8.13  

**Construction Impact: Construction Expenditure**

**Nature:** Expenditure on construction would result in a direct and indirect positive impact on the economy, increasing commercial activity, creating jobs and increasing incomes.

**Impact Magnitude – Low-Medium**
- **Extent:** The extent of the impact is local and regional
- **Duration:** The expected impact will be short-term
- **Intensity:** The impact will be medium to the receptor (i.e. the economy)

**Likelihood:** Impacts from expenditure will definitely occur in the economy

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR TO MODERATE (+VE)**

**Degree of Confidence:** The degree of confidence is high.

---

**Operations**

**Expenditure/Investment during Operations:**
The key operational phase impacts associated with the project would flow from expenditure on operations at the facility. Operational costs in the first few years of production have been estimated at between R22 million and R23.5 million and would increase gradually thereafter in line with throughput.

**Employment and Incomes during Operations:**
*Table 8.19* outlines the operational phase employment opportunities that are anticipated by the applicant. Approximately 19 jobs would be created implying total salary payments of approximately R7 million per year. Additional opportunities would also be associated with the outsourcing of some functions such as jetty operator services.

**Table 8.19  Operational Employment**

<table>
<thead>
<tr>
<th>Employment categories</th>
<th>Number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Manager</td>
<td>1</td>
</tr>
<tr>
<td>Finance Administration</td>
<td>1</td>
</tr>
<tr>
<td>Finance Administration and human resources</td>
<td>1</td>
</tr>
<tr>
<td>Operations Manager (incl health and safety)</td>
<td>1</td>
</tr>
<tr>
<td>Shiftleaders</td>
<td>5</td>
</tr>
<tr>
<td>Tankfarm operators</td>
<td>5</td>
</tr>
<tr>
<td>Maintenance &amp; repair Coordinator</td>
<td>1</td>
</tr>
<tr>
<td>Maintenance &amp; repair Technician</td>
<td>1</td>
</tr>
<tr>
<td>Control systems representative</td>
<td>1</td>
</tr>
<tr>
<td>Control systems desk staff</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

Indirect Opportunities during Operations:
In addition to the above direct employment and associated income opportunities, indirect opportunities would be associated with the operational phase of the project. These would stem primarily from increased expenditure by Burgan Oil and its employees in the local area and region.

Impact Significance:
The nature of the impacts will be direct and indirect positive. The extent of the impact will be regional at its broadest level, affecting areas beyond the City of Cape Town. The duration will be long-term, lasting the duration of the operational phase of the Project. The intensity will be medium. Given the regional extent, long-term duration and medium intensity the impact magnitude is considered Low-Medium. Considering the impact will definitely occur, the overall pre-mitigation impact significance is considered Minor-Moderate (+ve). A summary of the impact is given in Box 8.14 below.

Box 8.14 Operations Impact: Operational Expenditure

| Nature: Expenditure on operations would result in a direct and indirect positive impact on the economy, increasing commercial activity, creating jobs and increasing incomes. |
| Impact Magnitude – Low-Medium |
| Extent: The extent of the impact is local and regional |
| Duration: The expected impact will be long-term for the life of the facility |
| Intensity: The impact will be medium to the receptor (i.e. the economy) |
| Likelihood: Impacts from expenditure will definitely occur in the economy |
| IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR TO MODERATE (+VE) |
| Degree of Confidence: The degree of confidence is high. |

Mitigation

Construction:
The objective of mitigation would be to maximise economic benefit from jobs and expenditure particularly at a local and regional scale.

Mitigation measures include:

- Use of local contractors and sub-contractors where possible.
- Setting of targets (in tender documents, for example) for how much local labour should be used during construction and operations.
- Provision of training opportunities where possible.

Operations:
The objective of mitigation is to: maximise economic benefit from jobs and expenditure particularly at a local and regional scale.
Mitigation measures would be the same as for the construction phase focused on local employment and procurement.

Residual

The implementation of the above mitigation measures will result in positive construction and operational phase impacts with a Moderate (+ve) significance. The pre- and post-mitigation impacts are compared in Table 8.20 below.

Table 8.20 Pre- and Post- Mitigation Significance: Impacts Associated with Project Expenditure

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR-MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
</tr>
<tr>
<td>Operations</td>
<td>MINOR-MODERATE (+ve)</td>
<td>MODERATE (+ve)</td>
</tr>
</tbody>
</table>

8.2.8 Increased Social Disturbance Factors

The Project area is located in a predominantly industrial setting, within the Port of Cape Town. The population density of the immediate area is low and the majority of the surrounding land is used for commercial shipping and storage.

The introduction of construction activity into an area can induce social disturbance, dependent on the context and land use of the area. This change is typically linked to the presence of construction workers and machinery and equipment required for construction activities. The presence of workers on a project site can increase levels of crime and place additional pressure on the existing infrastructure and services. However, considering the scale of the construction required, there will be a relatively small workforce (see Section 8.2.7 above) on site given the short construction period and the limited number of employment opportunities. Burgan Oil intend to maximise the employment of local people, specifically into unskilled labour positions. Sensitive receptors in the area would be employees of neighbouring commercial enterprises operating in the Port of Cape Town. Burgan Oil has limited control over the behaviour of job-seekers, and can only enforce its policies on those employed by the Project.

Construction

Burgan Oil has estimated that there will be approximately 110 - 130 people employed during the height of the construction phase. The construction phase will take up to 22 months, although it is not anticipated that there will be 130 construction workers on site for the full duration of the period. It is
intended that the majority of unskilled positions will be filled with residents from the local area, thus limiting the influx of construction workers from outside the area. No construction workers will be housed on the site, as such, the potential for adverse impacts caused by workers on the surrounding area will be limited.

There is a chance that petty crimes (e.g. theft of tools and commercial items) may occur on the site and neighbouring commercial enterprises. With the movement of different construction teams on and off the site, it may be more difficult for business owners and/or workers to differentiate between construction workers and unwanted intruders on the site.

The impact would be direct (as related to construction workers) and indirect (as related to job-seekers) negative in nature. The extent would be local as the impact would be beyond the site, but confined to the Port of Cape Town. The duration would be short-term, lasting the construction period. The intensity would be low given the relative small number of workers and job-seekers anticipated at the site. Given the local extent, short-term duration and the low intensity, the impact magnitude is considered low. With a low magnitude and likely occurrence of the impact, the overall pre-mitigation impact significance is considered Minor (-ve). Box 8.15 describes the construction phase impact as related to an increase in social disturbance factors.

Box 8.15 Construction Impact: Social Disturbance Factors

<table>
<thead>
<tr>
<th>Nature: Increased social disturbance would be regarded as a direct (as related to workers) and an indirect (as related to job-seekers), negative impact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Magnitude – Low</td>
</tr>
<tr>
<td>Extent: It is anticipated that the potential impacts of increased social disturbance factors will have impacts at the local level.</td>
</tr>
<tr>
<td>Duration: The impacts identified are expected to be linked to the construction period and therefore short-term.</td>
</tr>
<tr>
<td>Intensity: The intensity will be low given the numbers of workers and job-seekers is expected to be limited.</td>
</tr>
<tr>
<td>Likelihood – It is likely that this impact will occur during the construction phase.</td>
</tr>
<tr>
<td>IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-VE)</td>
</tr>
<tr>
<td>Degree of Confidence: The degree of confidence is medium given that the extent of the influx of job-seekers is unknown.</td>
</tr>
</tbody>
</table>

Operations

During the operations phase, there will be fewer permanent workers onsite (up to 21 permanent staff). As such, it is likely that the social disturbance factors above will not be experienced to the same extent during the operations phase.
Theft or vandalism of the facility equipment or associated infrastructure may be of some concern during the operation phase. The impact would be direct (as related to construction workers) and indirect (as related to job-seekers) negative in nature. The extent of the impact would be local, moving beyond the site but remaining within the Port of Cape Town. The duration would be long-term, lasting the full operational phase of the facility. The intensity would be negligible given the low numbers of permanent employees. Given the local extent, long-term duration but negligible intensity the impact magnitude is considered negligible. Although the impact is likely to occur, the overall pre-mitigation impact significance is considered Negligible. Box 8.16 describes the operations phase impact of increased social disturbance factors.

**Box 8.16 Operations Impact: Social Disturbance Factors**

<table>
<thead>
<tr>
<th>Nature:</th>
<th>Increased social disturbance would be regarded as a direct (as related to workers) and an indirect (as related to job-seekers), negative impact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Magnitude – Negligible</td>
<td></td>
</tr>
<tr>
<td>Extent:</td>
<td>It is anticipated that the potential impacts of increased social disturbance factors will have impacts at the local level.</td>
</tr>
<tr>
<td>Duration:</td>
<td>The impacts identified are expected to be long-term as they will persist for the life of the Project.</td>
</tr>
<tr>
<td>Intensity:</td>
<td>The intensity will be negligible given the small workforce.</td>
</tr>
<tr>
<td>Likelihood –</td>
<td>It is likely that this impact will occur during the operations phase.</td>
</tr>
</tbody>
</table>

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – NEGLIGIBLE**

**Degree of Confidence:** The degree of confidence is medium.

**Mitigation**

The objectives of mitigation are to limit, where possible, social disturbance factors brought about by the construction and operation of the facility. Furthermore, mitigation should ensure that contractors manage their workers in such a way that the impacts are limited.

**Construction and Operations:**

- Burgan Oil and its appointed contractors will develop an induction programme, including a Code of Conduct, for all workers (including contractors and their workers). A copy of the Code of Conduct to be presented to all workers and signed by each person.

- The Code of Conduct will address the following aspects:

  - respect for local residents/commercial enterprises;
  - respect for surrounding infrastructure and commercial activities;
zero tolerance of illegal activities by construction workers including: theft; unlicensed prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting;

compliance with the Traffic Management Plan and all road regulations; and

description of disciplinary measures for infringement of the Code of Conduct and company rules.

- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary procedures that could result in dismissal. Theft should be noted as a dismissible offence.

- Burgan Oil, together with the appointed contractors must develop a means of monitoring access to the site, prohibiting unauthorised access to the site and ensuring that all visitors report to the site office.

- No employment will take place at the entrance to the site. Only formal channels for employment will be used.

- Burgan Oil will ensure there is adequate security at the site. Security will comply with the above mentioned Code of Conduct.

- Burgan Oil must develop and implement an HIV/AIDS Policy and information document for all workers directly related to the Project. All contractors must implement this policy. The information document will address factual health issues as well as behaviour change issues around the transmission and infection of HIV/AIDS. Burgan Oil will make condoms available to employees and all contractor workers.

Residual

The implementation of the above mitigation measures should reduce the construction impacts to **Negligible** significance, and the operations impact will remain of **Negligible** significance. The pre- and post-mitigation impacts are compared in *Table 8.21*.

### Table 8.21 Pre- and Post- Mitigation Significance: Social Disturbance Factors

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR (-VE)</td>
<td>NEGLIGIBLE</td>
</tr>
<tr>
<td>Operation</td>
<td>NEGLIGIBLE</td>
<td>NEGLIGIBLE</td>
</tr>
</tbody>
</table>
8.3 **UNPLANNED EVENTS**

It is important to consider unplanned events when assessing the impacts of a development of this nature. However, due to the low probability of these unplanned events actually taking place, it is not appropriate to follow the impact assessment methodology used for the direct and in-direct impacts. In this section, various scenarios are identified and the consequence of the modelled where possible. This allows for the appropriate positioning of the proposed development within the surrounding land use as well as providing some guidance as to the level of Emergency Response preparedness that may be required.

8.3.1 **Identified Scenarios**

A Quantitative Risk Assessment (QRA) (ERM, 2014) (see Annex H) was undertaken to simulate a number of potential incident scenarios associated with the facility in the Port of Cape Town. Taking the prevailing meteorological conditions for the study area into account, the consequences and frequency of each event was assessed and reported on. The following potential hazards were identified with the operation of the facility:

**Bulk Storage Tank Scenarios**

- Catastrophic failure with release of the entire storage content of the tank. It was assumed that 50 percent of the tank volume would overtop the bund.

- Failure of the tank with release resulting in a quarter of the bund surface (or the intermediate bund where applicable) being covered.

- Failure of the tanks with release resulting in the entire bund being covered with product.

**Buncefield Scenarios**

- Explosion consequences
- Large flash fire consequences
- Small flash fire consequences

**Pipework and Pipeline Scenarios**

- Depending on the diameter of the pipe, release from holes having diameters as indicated in Annex H.

- Pump failure with the failure equivalent to the full bore failure of the outlet pipe.

- Flange failure with the failure equivalent to that of a 13mm diameter hole in the pipe.
Road Tanker Offloading Scenarios

- Catastrophic failure with release of the entire storage contents of the tanker

- Hose connection failures:
  - Guillotine hose breach
  - 15mm hole in the offloading hose
  - 5mm hole in the offloading hose.

- Hard arm connection failures:
  - Hard arm Guillotine
  - Hole in hard arm with diameter equivalent to 10% of hard arm diameter

Road Tanker Loading Scenarios

- Catastrophic failure with release of the entire storage contents of the road tanker

- Guillotine hose breach

- 15mm hole in the offloading hose

- 5mm hole in the offloading hose

The above mentioned scenarios are only assessed for the operations phase. Spill events during the construction phase are assessed in Section 8.1.2 above.

8.3.2 Pool Fires

There is a risk of a potential on-site fire associated with the storage and handling of fuel on-site through the identified scenarios including:

- bulk storage tank scenarios;
- pipework and pipeline scenarios; and
- road tanker loading and offloading scenarios.

The thermal radiation could potentially impact members of public in the surrounding areas and employees on-site.

This assessment estimates the effects of thermal radiation from fires on human beings. The associated harm envelopes for the event scenarios are summarised in Annex H. The meteorological characteristics that govern the extent of the thermal radiation zone are described in Annex H. To account for the presence of kerbs, slopes, drains and other obstacles pool fires were modelled as perfect circles and any unconfined pool diameters are taken to be limited to a maximum of 100m diameter.
Table 8.22 shows the maximum pool fire sizes for several radiation levels associated with failure scenarios at the site.

**Table 8.22 Maximum Pool Fire Consequence Distances**

<table>
<thead>
<tr>
<th>Tank</th>
<th>Scenario and Weather</th>
<th>Radiation Level (kW/m²)</th>
<th>Maximum Downwind distance(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank 8</td>
<td>Catastrophic Failure with 50% bund overtopping (C8)</td>
<td>6.3</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.5</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>37.5</td>
<td>71</td>
</tr>
</tbody>
</table>

The greatest distance to a radiation level of concern from a pool fire, 151m, extends off-site and encompasses the winch cable storage and part of Berth 1. The area encompassed by the largest pool fire is shown in Figure 8.6 below.
Figure 8.6  Areas Enveloped by the Largest Pool Fires
8.3.3 Buncefield (Explosion) Scenarios

Potential Buncefield-type events are only considered for tanks that are over 5m in height and are filled at a rate in excess of 0.0278m³/s with low flash products (such as petrol (ULP)). Taking the above into account, Buncefield scenarios are considered for the tanks listed in Table 8.23.

**Table 8.23 Tanks Falling within the Buncefield Criteria**

<table>
<thead>
<tr>
<th>Tank</th>
<th>Product</th>
<th>Height (m)</th>
<th>Maximum Filling Rate (m³/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Petrol</td>
<td>18.42</td>
<td>0.26</td>
</tr>
<tr>
<td>3</td>
<td>Petrol</td>
<td>18.42</td>
<td>0.26</td>
</tr>
<tr>
<td>5</td>
<td>Petrol</td>
<td>18.42</td>
<td>0.26</td>
</tr>
</tbody>
</table>

**Explosion Overpressure Consequences**

The peak overpressures observed at Buncefield were extremely high, exceeding two bar (200kPa) across much of the site. For the purposes of this assessment, the overpressure in Zone B was taken as 250mbar (25kPa). Information in the explosion mechanism report (Vol 2 B.11) (1) suggests that there was some degree of building damage up to 2km from the site. The overpressure at this distance is estimated to be of the order of 10mbar (1kPa) (2).

For the purposes of this assessment, the harm envelope dimensions that are used for vapour cloud explosions (VCE) associated with the overfilling of the tanks are the same for each tank and are shown in Table 8.24.

**Table 8.24 Distance to Various Overpressures Resulting from a VCE**

<table>
<thead>
<tr>
<th>Overpressure</th>
<th>d</th>
<th>c</th>
<th>S</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bar</td>
<td>250</td>
<td>250</td>
<td>-250</td>
<td>0</td>
</tr>
<tr>
<td>250 mbar</td>
<td>400</td>
<td>400</td>
<td>-400</td>
<td>0</td>
</tr>
</tbody>
</table>

**Large Flash Fire Consequences**

For a large flash fire, the dimensions of the flammable vapour cloud formed at Buncefield are used. These dimensions of the Lower Flammable Limit (LFL) are shown in Table 8.25 below.

**Table 8.25 Distance to Flammability Limits Resulting in a Large Flash Fire**

<table>
<thead>
<tr>
<th>Concentration</th>
<th>d</th>
<th>c</th>
<th>S</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFL</td>
<td>470</td>
<td>135</td>
<td>0</td>
<td>235</td>
</tr>
</tbody>
</table>

(2) TNO Yellow Book
Small Flash Fire Consequences

For small flash fires, it is assumed that 20 percent of the spilled product is vaporised and will disperse. The flammability limits for these clouds are shown in Table 8.26.

<table>
<thead>
<tr>
<th>Concentration</th>
<th>d</th>
<th>c</th>
<th>S</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFL (Calm weather)</td>
<td>29</td>
<td>17</td>
<td>0</td>
<td>81</td>
</tr>
<tr>
<td>0.5LFL (Calm weather)</td>
<td>33</td>
<td>24</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>LFL (Not calm weather)</td>
<td>192</td>
<td>30</td>
<td>0</td>
<td>139</td>
</tr>
<tr>
<td>0.5LFL (Not calm weather)</td>
<td>305</td>
<td>66</td>
<td>0</td>
<td>184</td>
</tr>
</tbody>
</table>

Results for the Buncefield small flash fire scenario associated with overfilling reveals that facilities up to 305m from tanks falling within the Buncefield criteria would be impacted. This includes the majority of the surrounding areas of the Winch Cable Storage, FSS, Berth 1, Berth 2 and ships moored at these berths.

The detailed results of the consequence modelling are provided in Annex H. The largest distances of a Buncefield incident from Tank 3 are plotted over the site in Figure 8.7. Tanks 1 and 5 would produce similar consequences but centred over the respective tanks.
Figure 8.7  Areas Enveloped by the Largest Buncefield Scenarios
8.3.4 Summary

The QRA study has shown that the operations have the potential to adversely affect the health and safety of people working on-site as well as members of the public off-site and other workers on other sites in the area.

The consequence of a pool fire from a catastrophic release from a tank on-site can extend up to 151 m and poses a threat to workers on-site and people off-site. The consequence from a flash fire following a Buncefield type overfilling incident has the potential to extend up to 470 m and poses a threat to workers on-site and people off-site.

For workers on-site the individual risks are found to be below 1000 cpm and therefore tolerable if Burgan Oil Cape Terminal can demonstrate that they are As Low As Reasonably Practicable (ALARP). For workers on other sites, namely FFS Refiners and Chevron JBS, the individual risk is below 100 cpm and therefore not considered intolerable, however the risk is above 1 cpm and therefore considered to be tolerable if ALARP. For the pipeline the risk to the workers in the adjacent facilities does not exceed 100 cpm. Therefore the risks are not considered intolerable according to the assessment criteria of the QRA.

The results of the QRA show that the addition of pipeline option A or B does not increase the risk profile of the Burgan Oil site for individual risk significantly and the conclusions of the assessment do not change. This is likely due to the low frequency of use of the pipeline.

The societal risk profile for the Burgan Oil Cape Terminal site is considered to be broadly acceptable. The individual risks are considered to not be intolerable but only tolerable if proved to be ALARP for members of the public. Burgan Oil must show that actions have been taken to ensure the levels of risk are ALARP for members of the public.

The individual risk of fatality was found to not be intolerable but only tolerable if proved to be ALARP. In accordance with Section (5)(a) of the MHI Regulations shown in Annex H it is the opinion of ERM as an Approved Inspection Authority (AIA) that Burgan Oil have shown a commitment to the reduction of tank overfill events which could potentially result in a Buncefield type incident. This is highlighted in their Operating and Control Philosophy as shown in Annex H and their letter of commitment to this philosophy as shown in Annex H. Further, it is the opinion of ERM that the measures proposed in the Operating and Control Philosophy show a reasonable degree of risk reduction for this stage of the Burgan Oil fuel terminal design process as specific overfill prevention technologies have been accounted for. As such the individual risk of fatality posed by the proposed site can be considered as low as reasonably practicable (ALARP) for this stage of the design process and therefore tolerable. To verify this view, following completion of the Burgan Oil final design, an update of the current MHI risk assessment taking into account the final design overfill prevention measures must be carried out.
It has been shown that the facility falls within the ‘Don’t Advise Against DAA’ category for all three probability of dangerous dose zones. As a result, for the current land-use surrounding the Eastern Mole site, the storage and use of flammable liquids within the site is acceptable in accordance with the HSE land-use planning assessment.

As a result of being declared a MHI, the Requirements of the MHI Regulations must be followed completely to ensure the Burgan Oil Cape Terminal is legally compliant. Copies of this risk assessment must be submitted to the Local Provincial Director of the Department of Labour, the Chief Inspector of the Department of Labour Head Office in Pretoria and the Local Authorities.

8.3.5 Mitigation

Pre-construction Emergency Planning:
The current Burgan Emergency Response Plan (ERP), which was revised during October 2011, is appended in Annex H. Although the existing ERP has been compiled to deal with a number of potential incidents which could occur on-site, this plan will have to be reviewed and where necessary revised to take into account of the findings of this QRA and must comply with the Major Hazardous Installations Regulations, Section 6 – On-site Emergency Plan.

Section 6 of The Major Hazard Installation regulations; outline the requirements for on-site emergency planning. All of these points must be complied with by Burgan Oil within the ERP.

“6.(1) An employer, self-employed person and user shall after submission of the information contemplated in regulation 3 (4) –

a) establish an on-site emergency plan to be followed inside the premises of the installation or part of the installation classified as a major hazard installation in consultation with the relevant health and safety representative or the relevant health and safety committee;

b) discuss the emergency plan with the relevant local government, taking into consideration any comment on the risk related to the health and safety of the public;

c) review the on-site emergency plan and where necessary, update the plan, in consultation with the relevant local government service at least once every three years;

d) sign a copy of the on-site emergency plan in the presence of two witnesses, who shall attest the signature;

e) ensure that the on-site emergency plan is readily available at all times for implementation and use;

f) ensure that all employees are conversant with the on-site emergency plan; and
g) *cause the on-site emergency plan to be tested in practice at least once a year and keep a record of such a test.*

The potential consequences of the incidents identified in this QRA should be discussed with the local Emergency Services, Transnet Port Authorities and the Burgan Oil personnel, with the ERP being revised as a result of the discussions where necessary.

The ERP will be maintained and tested regularly. The Local Emergency Services, Transnet Port Authorities and the adjacent industries will also be kept informed of Burgan Oil emergency plans, and included in future trial emergency drills.

It must be noted that the documents described below are intended to be used for initial fire safety design. This design should be checked and approved by the Local Authority which in this instance is understood to be the Transnet National Ports Authority. Further to this authority the harbour surrounds are within the Cape Town Fire and Rescue Service control.

The following documents should be used to guide the design of the facility’s Fire System:


- Health and Safety Executive Safety and Environmental Standards for Fuel Storage Sites - Final Report.

The SANS 10089-1 (2008) reference document must be purchased from the South African Bureau of Standards. The remaining documents can be found in as follows:

- Overfill Protection for Storage Tanks in Petroleum Facilities (see Annex H).


Burgan Oil has committed to an Operating and Control Philosophy (see Operating and Control Philosophy and commitment letter appended in Annex H) that ERM believes demonstrates that a reasonable degree of risk reduction for this stage of the Burgan Oil fuel terminal design process as specific overfill prevention technologies have been accounted for, based on existing information. A supplementary MHI will need to be done when the EIA is complete and final design information is available.
8.3.6 Impact on Marine Fauna from Oil Spill

There are seven recognisable ecological habitats in Table Bay, which include (SRK Consulting, 2007):

- Sandy beaches, extending from the Salt River mouth north past Blouberg;
- Rocky shores, at Blouberg Rocks and Robben Island and extending south of the harbour past
- Sea Point;
- Artificial surfaces of the harbour itself plus the shore protection extending towards Salt River;
- Subtidal sand substrata;
- Subtidal rock substrata in the bay;
- Water body in Table Bay; and
- Water body in the Port of Cape Town.

The habitats and water upwelling processes of Table Bay support typical biological communities of the west and south coast regions of the Western Cape. These communities include fauna such as pelagic (pilchards and anchovy) and demersal (hake and kingklip) fish species, near shore species (such as various linefish, rock lobster and abalone), mammals (such as seals and whales) and seabirds (such as penguins, gannets and cormorants) (SRK Consulting, 2007).

It has been noted that Table Bay does not appear to be critically important for marine fauna as either a foraging or breeding area, or for the fishing industry. Exceptions to this are endemic seabirds, such as Bank Cormorants and the African Penguin. These species use Table Bay for feeding and breeding purposes. The Bank Cormorant *Phalacrocorax neglectus* and the African Penguin *Spheniscus demersus* are listed as Endangered according to the International Union for Conservation of Nature (IUCN), while the African Black Oystercatcher *Haematopus moquini* is classified as Near Threatened (SRK Consulting, 2007 and IUCN, 2014).

Table Bay is also used by resident, semi-resident and migrant cetaceans (such as dolphins and whales). The most common cetacean is the Southern Right Whale *Eubalaena australis* which migrates into South African waters between May to October/November. The Southern Right Whale is listed as Least Concern according to IUCN (SRK Consulting, 2007 and IUCN, 2014).

There are four species of seals found around the West Coast. These include the Cape Fur Seal *Arctocephalus pusillus*, Subantarctic Fur Seal *Arctocephalus tropicalis*, the Leopard Seal *Hydrurga leptonyx* and the Southern Elephant Seal *Mirounga leonina*. The Cape Fur Seal is the most common in Table Bay, but has no breeding colonies in the bay (SRK Consulting, 2007).
Large numbers of juvenile rock lobsters have been found on the vertical faces of the outer harbour wall. Encrusting corallines, barnacles, sea urchins, mussels and sponges are other components of the wall community. It has been found that the biofouling community appears to be well-developed at the outer harbour areas (SRK Consulting, 2007).

Previous studies undertaken have shown that further into the harbour the benthic species diversity declines drastically. Barnacles, sea squirts, green algae, the alien anemone *Metridium senile* and the alien European shore crab *Carcinus maenas* were found. The benthos inhabiting the sediments within the harbour appears to be limited or completely absent in the interior of the Victoria and Alfred Basins (SRK Consulting, 2007).

At the time of writing there appears no published information on the communities inhabiting the water column in the Port of Cape Town. However, it is known that *euphausiids* occasionally occur in the port and small shoals of Mullet can be common in the outer harbour area. There is a resident or semi-resident Fur Seal population within the Port of Cape Town (SRK Consulting, 2007).

Seabirds are arguably the most vulnerable to water surface oil. An oil spill occurred in the Port of Cape Town Harbour in May 1998. The result of which was the oiling of over 500 African Penguins *Spheniscus demersus*. These penguins were taken to the SANCCOB Seabird Rescue Centre in Table View, cleaned, treated and eventually released. Of the 547 penguins released, 266 (48.6 percent) had been resighted alive at breeding colonies, of which 12 had attempted breeding, during the first year following the oil spill (Avian Demography Unit, University of Cape Town, 2000). Oil causes a bird’s feathers to mat and separate, resulting in a loss of buoyancy and the ability to regulate body temperature. Contact with oil on the bird’s skin or face can lead to skin and eye lesions. Furthermore, birds need to preen their feathers to keep warm and dry, remove parasites and keep feathers in good condition. It is also possible that birds may ingest oil while preening oiled feathers or by eating contaminated food. Ingestion of oil can lead to ulcers, pneumonia, liver damage, and other life-threatening conditions (NWF, 2014).

The operation of the facility may result in an unplanned event of an oil spill into the Port of Cape Town, having a **direct negative** impact on the marine fauna in the vicinity. The extent of the impact will be **local**, being within Table Bay if the oil spill moved beyond the Port of Cape Town. The duration of the impact during would be **long-term**, with potential marine fauna impacts lasting years. The intensity of the impact would be **high**, given the toxic nature of the oil. Given the local extent, long-term duration and high intensity, the overall magnitude of the impact is considered **high**. As the impact has a **low likelihood** of occurring, and the magnitude is **high**, the overall pre-mitigation significance of the impact is considered **Moderate (-ve)**. Box 8.9 below gives a summary of the impact during operations.
Operations Impact: Impact on Marine Fauna from Oil Spill

**Nature**: An unplanned event could result in a **direct negative** impact on the marine fauna from oil spill.

**Impact Magnitude**: High
- **Extent**: The extent of the impact would be **local**, confined to Table Bay.
- **Duration**: The duration could be **long-term** with impacts on marine fauna lasting years.
- **Intensity**: The intensity would be **high** given the toxic nature of the oil.

**Likelihood** – It is **unlikely** that this impact will occur.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) MODERATE (-VE)**

**Degree of Confidence**: The degree of confidence is **high**.

**Mitigation**

The Burgan Oil Emergency Response Plan must include an oil spill contingency plan, making reference to the Department of Environmental Affairs: Oceans and Coasts oil spill contingency plans and the TNPA oil spill emergency response plans.

**Residual**

The overall impact significance will be reduced to **Moderate-Minor (-ve)** should the below mentioned mitigation be implemented. The pre- and post-mitigation impacts are compared in Table 8.14 below.

**Table 8.27 Pre- and Post-Mitigation Significance: Visual**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>MODERATE (-VE)</td>
<td>MODERATE-MINOR (-VE)</td>
</tr>
</tbody>
</table>

8.4 **DECOMMISSIONING IMPACTS**

As mentioned in Chapter 4, the Project would have a minimum lifespan of at least 20 years. Once the facility reaches the end of its lifespan, the facility will be decommissioned. After this time, the site will be rehabilitated in accordance with best practice at the time of decommissioning. All components would be removed from the site. Components would be recycled as appropriate. The decommissioning and reinstatement of the site would involve many activities that may have some environmental and socio-economic impacts.

It is anticipated that the impacts associated with decommissioning will be similar to those encountered during construction. The generation of waste through the decommissioning activity is anticipated to be high.
The comprehensive decommissioning plan should be developed prior to the decommissioning of the facility to minimise potential negative impacts and enhance positive impacts associated with decommissioning. Appropriate facilities will need to be identified for the disposal and treatment of hazardous and non-hazardous waste material.

8.5 CUMULATIVE IMPACTS

8.5.1 Introduction

Cumulative impacts are a result of effects that act together (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the project under consideration (e.g. the combined effect of other similar projects in the general area). An effect to a resource in itself may not be considered significant, but may become significant when added to the existing and potential effects eventuating from similar or diverse developments in the area.

Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC’s Performance Standards specify that:

“Where the project involves specifically identified physical elements, aspects, and facilities that are likely to generate impacts, environmental and social risks and impacts will be identified in the context of the project’s area of influence. This area of influence encompasses, as appropriate:…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.” (IFC, 2012).

Cumulative effects have been defined as “changes to the environment that are caused by an action in combination with other past, present and future human actions” (Hegmann et al 1999).

The preceding impact assessment chapters have assessed the impacts associated with the Project largely in isolation. As part of legislated requirement, it is important to consider cumulative impacts associated with a proposed development. This chapter examines whether the Project’s potential impacts become more significant when considered in combination with the additional existing infrastructure, including other fuel and oil storage facilities within the area.

These following are existing developments and infrastructure at the Port of Cape Town (1).

- A total of 34 berths, including layby berths.

- The main dry dock, Sturrock Dry Dock, has an overall docking capability of 369.6m length, 45.1m width and depth of 14m. The dock may be divided into two sections of varying lengths.

- The Robinson Dry Dock in the Victoria Basin measures 161.2m in length, 20.7m wide and a depth of 7.9m.

- A synchrolift capable of handling ships up to 61m in length, 15m beam and 1,806 tonnes.

- A repair quay located in the Duncan Dock.

- The Victoria and Alfred Basins have a variety of berths available for ship and boat repair as well as berthing of smaller vessels, including research vessels and visiting naval ships. Port of Cape Town has two main terminals, or business units for cargo handling purposes.

- The Container Terminal contains six deep-sea berths, served by a fleet of post-panamax gantry cranes for the larger container ships. The Multi-purpose Terminal in Duncan Dock handles fruit, steel, paper, maize, wheat, rice, timber, coal, scrap and other general cargo, as well as passenger cruise ships.

- Duncan Dock also has a dedicated cold store for fish products with docking space for up to six vessels and the ability to discharge three simultaneously.

- Grain elevator which has storage for 28,000cm³.

- Rail and road connections inland to other centres.

- There are a number of bunkering points within the Port supplying marine fuel oil, gas oil and blends. The port is serviced by a bunker barge.

- There is also a yacht club, marina and National Sea Rescue Institute (NSRI) base.

As is evident from the above, there is extensive industrial infrastructure that already exists at the Port of Cape Town. Specifically considering bunker storage for fuel and oil, on the Eastern Mole there is currently large scale bunker storage.

In terms of proposed developments, the facility must be placed in the context of the Port of Cape Town Port Development Plan (PDP). The PDP for the Port of Cape Town was developed by Transnet. With regard to expansion the PDP notes that, ‘The port is currently expanding the container terminal to handle larger vessels and increase throughput capacity. Short term plans include a
dedicated two-berth passenger terminal, the expansion of the landside area for ship repair and the development of 160ha of the Culemborg site for back-of-port commercial logistics. Medium term plans include expanding the container stacking seaward and in the long-term building an outer basin for an additional four-berth container terminal, and five extra liquid bulk berths” (Transnet, 2013). The PDP also contains short medium and long term port layout plans. Regarding the liquid bulk areas, the short term layout earmarks the entire Eastern Mole for this purpose and therefore accords with the proposed facility (see Figure 8.8 and Figure 8.9).
Figure 8.8  PDP Short-term Intended Land Uses

Figure 8.9  PDP Long-term Intended Land Uses

In the sections below the potential cumulative impacts are explored in terms of the proposed facility being added to the existing industrial infrastructure and fuel and oil storage facilities in the area. The discussion and associated conclusions must be understood in the context of the uncertainty associated with the proposed and known developments and the qualitative nature of the assessment.

8.5.2 Potential Cumulative Impacts

Air Quality

The installation of a facility that has ongoing emissions throughout the operations phase in an already industrial area could lead to cumulative air quality impacts. However, as assessed in Chapter 7, the proposed fuel and oil storage and distribution facility is expected to have relatively low levels of ongoing emissions (see Table 7.4). Furthermore the site level post-mitigation impact significance for the lifespan of the Project is considered negligible.

Cumulative impact with FFS Refiners:

Atmospheric emissions of volatile organic compounds (VOCs) from the vents of the FSS Refiners storage tanks are expected to be low to negligible. The fuels contained in these tanks are not particularly volatile at ambient temperatures as experienced in Cape Town. Minor fugitive emissions may be present around pumps and valves on the site. FFS Refiners has previously carried out two yearly fence line monitoring of VOC concentrations. The latest available data used passive samplers to measure VOC concentrations over a period of seven days, in two locations at the site. The VOCs monitored included benzene, toluene, ethyl benzene, M+P xylene and O-xylene. The results of the monitoring indicated the following (1):

‘The only current South African ambient standard for hydrocarbons is the annual ambient limit value for benzene, set at 5µg/m³, plus the margin of tolerance (+5µg/m³) (which results in a target figure of 10 µg/m³). The concentrations at the harbour site were well within this threshold at 0.66 and 3.05µg/m³ at the two monitoring locations. The recorded values in the case of benzene show that the site is compliant with the annual ambient Limit Value as proposed in SANS1929:2005. The other VOC results were all considered low and thus do not pose a threat to human health nor to the surrounding environment.’

The conclusion of the monitoring was that the low concentrations exhibited are likely to be as a result of the site’s high dispersion potential due to its location within the Port of Cape Town. The prevailing winds along the Cape Town coast, with diurnal variation in velocity and direction (such as the strong south-easterly) tend to clear Cape Town of its pollutants. Therefore any

pollutants recorded on the FFS Refiners site will not pose a threat to even the nearest receptor (WSP Consultant, 2014).

Therefore given the data recorded for the FFS Refiners site itself indicating a low potential impact on air quality, with the low potential impact on air quality as a result of the Burgan Oil facility and that the Port of Cape Town is already an industrial facility with bulk oil and dual storage, the addition of the Project is unlikely to have a cumulative impact on air quality or human health risks.

Traffic

The addition of road tankers on the roads in the area and in the Port of Cape Town could lead to a cumulative impact on overall traffic volumes. However, given the overall road traffic entering and leaving the Port of Cape Town, the upgrade of a key traffic intersection, the addition of an average of 75 road tankers per day is not likely to result in a significant increase in the cumulative impact, with the Project level traffic impact assessed as negligible (see Chapter 7).

Hazardous Installation Risks

A Quantitative Risk Assessment (QRA) (ERM, 2014) was undertaken to simulate a number of incident scenarios associated with the oil and fuel storage and distribution facility in the Port of Cape Town. Taking the prevailing meteorological conditions for the study area into account, the consequences and frequency of each event was assessed and reported on. Part of the QRA study assessed the Project in relation to other bulk storage of hazardous materials near the site (e.g. FFS bulk storage facility adjacent to the site).

A large portion of the potential risk to the surrounding area is as a result of Buncefield-type explosion scenarios as described in Section 8.3. However, the potential risk of having a Buncefield-type explosion can be reduced by means of investigating ways of reducing the risk of overfilling storage tanks on site and including these into the final site design.

The QRA showed that the oil and fuel storage and distribution facility falls within the ‘Don’t Advise Against DAA’ category for all three probability of dangerous dose zones. As a result, for the current land-use surrounding the Eastern Mole site, the storage and use of flammable liquids within the site is acceptable in accordance with the HSE land-use planning assessment (this includes any potential cumulative impacts).

In summary, the proposed fuel and oil storage and distribution facility is unlikely to result in any cumulative impacts.
8.5.3 Conclusion

In conclusion, the additional of the oil and fuel storage and distribution facility along with existing and possible future activities within the Port of Cape Town, are unlikely to have significant cumulative impacts that warrant additional mitigation measures.

8.6 No-Go Alternative

The no-go alternative is the option of not implementing the activity or executing the proposed development. Assuming that the storage and distribution facility will not be developed at the proposed site, the potential negative environmental impacts assessed above including potential soil and groundwater contamination, increased ambient noise levels, visual impact on landscape, socio-economic impacts on competitors and the unplanned events of fires, Buncefield events or impacts of oil pollution on sensitive marine fauna would not be associated with the site. These residual potential negative environmental impacts are considered Minor (-ve), except the unplanned impact on marine fauna which is considered Moderate-Minor (-ve), and the unplanned MHI events which the risks thereof are considered tolerable.

Likewise, should the storage and distribution facility not be developed at the proposed site, the associated potential positive impacts assessed above including economic impacts from increased security of supply, economic impact from increased opportunities for competition and economic impacts from Project expenditure would not be associated with the site. These potential positive impacts are considered to have a residual significance of Moderate (+ve). Additionally, Cape Town Port would continue to have inadequate fuel storage facilities and the mandate stated by the DoE would not be met. The opportunity to improve the efficiency in the logistical fuel supply chain would be lost and TNPA would also lose the opportunity of maximizing use of this portion of the port. The site is currently unoccupied, and the economic stimulus the proposed development has the potential to create would not occur.