DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 5

This chapter provides a description of the environment that may be affected by the proposed Power Station Conversion and Transmission Integration Project. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be affected by, or could affect the proposed development have been described. This information has been sourced largely from existing information available for the area, and aims to provide the overall context within which this environmental impact assessment process is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist reports contained within Appendices E – M.

5.1. Location of the Study Area and Property Description

The study area is located within the Koeberg and Blaauwberg sub-councils of the City of Cape Town Metropolitan Municipality in the Western Cape Province. The existing Ankerlig OCGT Power Station is located in the Atlantis Industrial Township (refer to Figure 5.1), which is located ~40 km from the Cape Town city centre. According to 2006 Municipal Demarcation, Atlantis falls between Ward 29 (north-west) and Ward 32 (south-east) of the Koeberg sub-council. Regardless of the alignment selected, the proposed transmission power line would pass through Ward 23 of the Blaauwberg sub-council, through the Klein Zoute River Agricultural Holdings, in the vicinity of the residential areas of Melkbosstrand, Van Riebeeckstrand and Duynefontein.

The Ankerlig Power Station is located within the western portion of the existing proclaimed Industrial Area of Atlantis on the Farm No 1183 and a Portion of Farm Witzand 2, Atlantis, Cape Town, both of which are owned by Eskom. Infrastructure associated with CCGT units will be developed on the site of the existing Ankerlig Power Station, and will not require any additional land take outside of the existing power station boundaries.

The power station site is far removed from major centres, tourist attractions and major roads. It is located next to the R307 (Dassenberg Road) that functions as the primary access route to Atlantis and Mamre (north of Atlantis) from Cape Town. The closest major road is the R27 (about 5 km from the site). The R27 functions as the primary connector between Cape Town, Saldanha and the West Coast National Park.

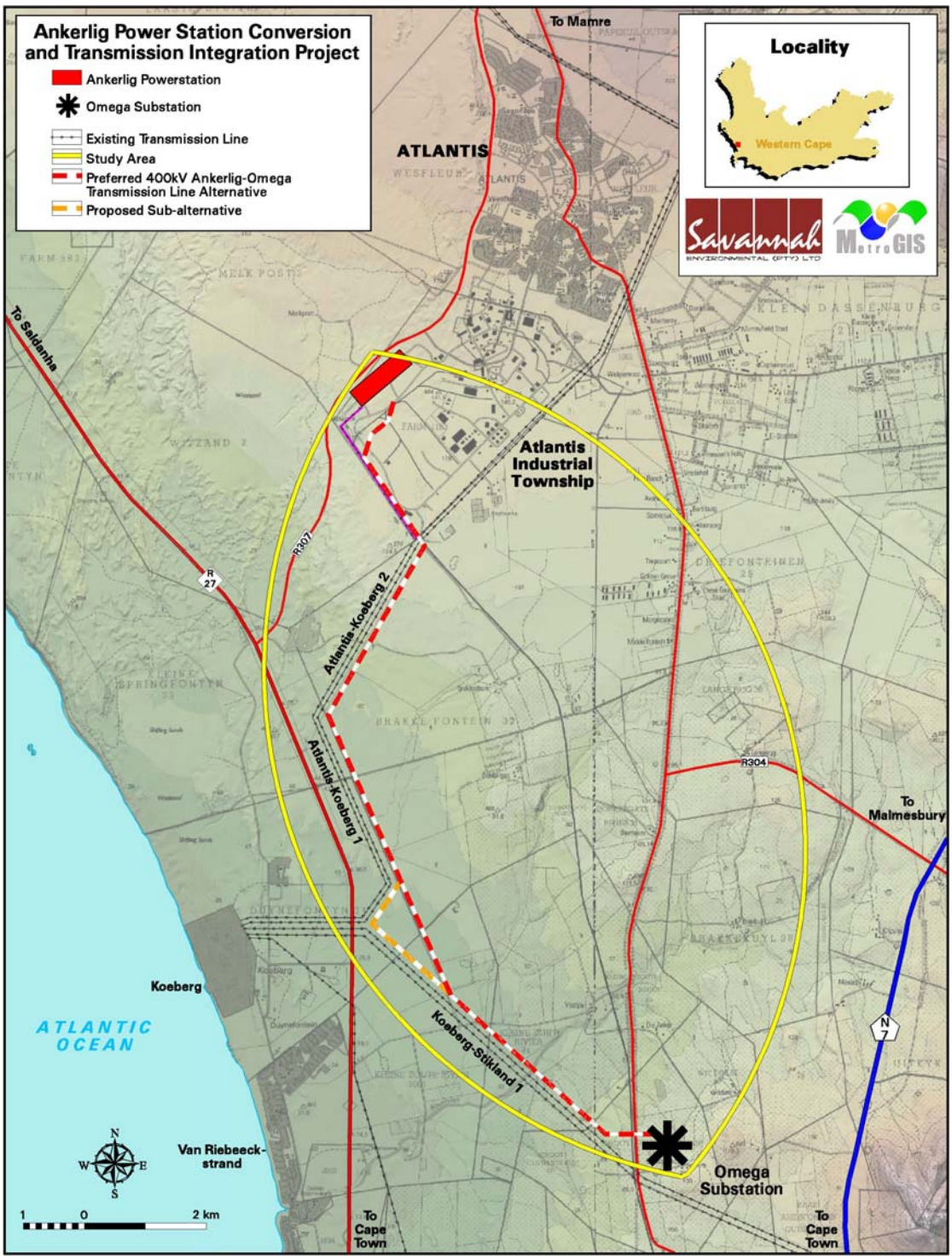

Figure 5.1: Locality map showing the location of the existing Ankerlig Power Station, the study area and the proposed transmission power line corridor alternatives between Ankerlig and Omega Substation identified for investigation in the EIA phase

5.2. Social Characteristics of the Study Area

Atlantis Industria and its adjoining residential suburb Wesfleur are located 7 km inland on the Cape West Coast, some 40 km north of Cape Town. Significant

landmarks in the wider area are the existing Ankerlig Power Station, Koeberg Nuclear Power Station located ~9 km to the south-west, and the town of Mamre located ~3 km to the north. Arterial access to the area is provided by the West Coast road (R27) and the N7 national road, and locally by the R307.

The Atlantis Industrial Zone was established as an industrial growth point in the mid-1970s and set up with adequate infrastructure and services to support future growth in the area. The Atlantis industrial area is already served by a tarred industrial road network and essential services (including stormwater, municipal sewer and water supply services and street lighting) which support most of the industrial area. A railway spur is located south of the Ankerlig Power Station site. This railway line is currently not in use.

The residential townships of Atlantis and the informal settlement of Witzand are located between 3-6 km to the north-east and approximately 1 km south of the Ankerlig Power Station site respectively (refer to Figure 5.2). Open farmlands are present to the north, south and east of the site. The area surrounding the power station site is visually dominated by the presence of various types of industrial stacks and buildings located within the surrounding industrial area, and the existing transmission power lines associated with the Ankerlig and Koeberg power stations. The power station site is zoned for industrial use.

The population potentially affected by the proposed power station conversion and transmission integration project include:

- Residents of Atlantis, particularly the suburbs of Avondale, Wesfleur, Protea Park, Beacon Hill and Robinvale, and the nearby informal settlement of Witzand, situated in close proximity to the industrial area.
- Residents of Atlantis non-urban[11]
- Residents of Melkbosstrand, Duynefontein and Van Riebeeckstrand

- Users of land which could be affected by the proposed power line, including:
  - Users of the Delta 200 Airstrip (used as a drop zone for members of the sky diving club)
  - Residents of Klein Zoute River Agricultural Holdings
  - Landowners of farms situated immediately south of the Atlantis Industrial Area and along the R27.

[11] Comprised of the rural area surrounding Atlantis to the north, south, east and west stretching South to include the Klein Zoute Rivier and Morning Star Agricultural Holdings, as well as the regions indicated as 'Malmesbury non-urban' and 'Koeberg' on the City of Cape Town Census suburb map.

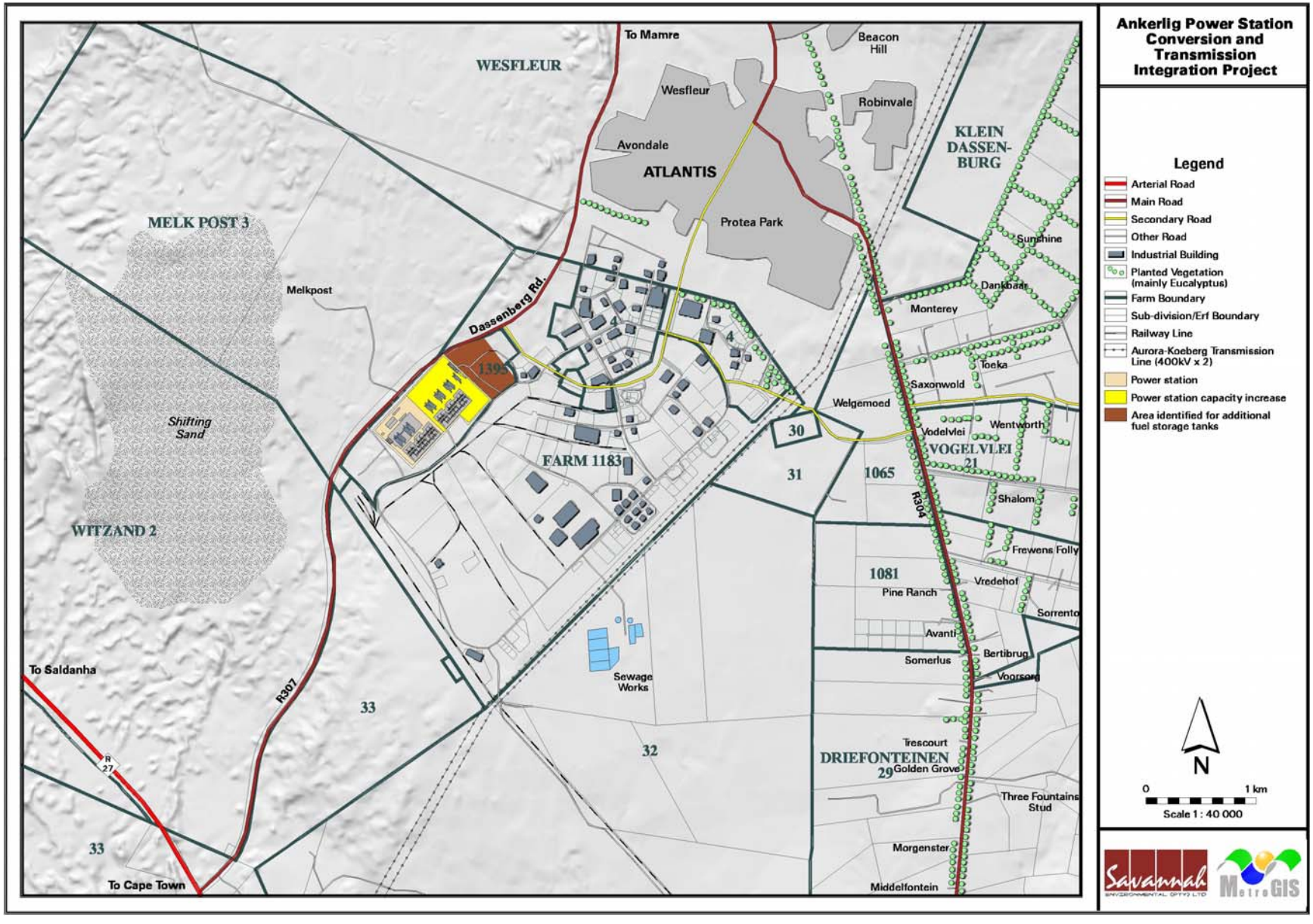

Figure 5.2: Map showing Ankerlig Power Station and surrounding areas

The existing noise environment in the Atlantis communities is typical of a suburban residential area next to an industrial zone. The noise environment is affected by localised vehicular traffic, human activities and the industrial activities in the Atlantis Industrial Zone. There is, however, an adequate buffer zone between the industries and the Atlantis communities in order to maintain the noise levels within the recommended guidelines for suburban residential areas.

5.2.1 Demographic Profile

According to the 2001 Census, the total population of the City of Cape Town was approximately 2.9 million. Within the study area, the Atlantis population comprised of just under 55 000 people, while the surrounding non-urban areas (Atlantis non-urban according to suburb profiles) housed just over 4 000 people, and just under 6 500 people resided in the Melkbosstrand area.

5.2.2. Population Groups

The Atlantis population is predominantly Coloured (92.6%), with a small percentage (6.6%) being Black African and less than 1% respectively White and Indian. It is worth noting that population projections for the Western Cape show significantly larger growth amongst the Black African population than other groups (Romanovsky 2006). It can therefore be expected that this group may have increased proportionately within Atlantis and surrounding areas.

The population of Atlantis non-urban[12] is also predominantly Coloured (68%) according to the 2001 census, with a significantly greater percentage of Whites (22%) and slightly more Black African (10%). By contrast Melkbosstrand is predominantly White (89%).

Afrikaans is the most common language spoken in Atlantis (87%), Atlantis non-urban (78%) and to a somewhat lesser extent Melkbosstrand (58%). English is the first language of 38% of Melkbosstrand residents, 16% of those in Atlantis non-urban, and less than 10% of the Atlantis community.

5.2.3. Age and Gender Distribution

Gender distribution is reasonably equal across the study area, with slightly more females than males in all areas except Atlantis non-urban, where males predominate by a slight margin. This could indicate this area to have more male (possibly migrant) employees working on farms.

[12] Comprised of the rural area surrounding Atlantis to the north, south, east and west stretching South to include the Klein Zoute Rivier and Morning Star Agricultural Holdings, as well as the regions indicated as 'Malmesbury non-urban' and 'Koeberg' on the City of Cape Town Census suburb map.

The age distribution in Atlantis is slightly younger than the average for the City of Cape Town, with a larger percentage (just under 40%) aged under 17. The corresponding percentage in Melkbosstrand is significantly lower at only 24%. By contrast the percentage of older people in the age categories above 35 is significantly higher in Melkbosstrand (~55%) than in the broader Cape Town (~35%) or Atlantis (28%) and surrounding non-urban areas (37%). Almost a third of the population in Atlantis is between the ages of 18 and 34, while a quarter is aged 35 to 54. These age groups may be considered as the potential labour force, together comprising about 55% of the Atlantis population, and 57% of Atlantis non-urban.

5.2.4. Educational Profile

Approximately 20% of Atlantis residents aged over 20 had completed matric in 2001, and of these less than 4% had attained any further levels of education (the majority (3%) being a certificate or diploma with less than 0.5% citing any types of degrees). The percentage with 'no schooling' was slightly higher in Atlantis non-urban at 9%, compared to 4% in Atlantis (similar to that for Cape Town as a whole). By contrast Melkbosstrand had less than 2% with no education, over three quarters had completed matric, and just under a third had attained some level of tertiary education, about half of which certificates, with the other half being various levels of degrees.

5.2.5. Employment and Income

The labour force, or economically active population[13] comprised of about 46% of City of Cape Town residents aged between 15 and 65 in 2001. Figures for the study area are similar, though slightly lower for Atlantis at 44%, and higher for Melkbosstrand (48%). Of those indicated as economically active, who can be considered the actual and potential labour force, 31% in Atlantis are unemployed, slightly higher than the average for the City of Cape Town as a whole. Corresponding percentages are much lower for Atlantis non-urban (13%), and Melkbosstrand (7%).

Of the economically active residents of Atlantis that are employed, approximately 12% commute to jobs outside Atlantis. Another 25% are employed by local industries, and 5% are employed by small- medium- and micro-enterprises (SMMEs). A significant number of jobs in Atlantis (2700) are held by outsiders who commute to the area. These jobs generally fall in the educational and other professional occupational categories (Afrosearch 2005).

[13] A person of working age (15–65 years) who is available for work, and is either employed or unemployed.

Over half of those employed in Atlantis, and 62% in Atlantis non-urban earned less than R1 600 per month in 2001, with almost all the remainder (45% in Atlantis and 32% in Atlantis non-urban) earning between R1 600 and R6 400 per month. Income of Melkbosstrand residents was notably higher, with about half earning over R6 400 per month.

5.2.6. Housing

Atlantis has experienced land invasions and the growth of informal settlements, especially in the area that has become known as Witzand. These informal settlements are home to locals who have lost their homes as a result of rising unemployment, farm labourers who are no longer able to secure work and accommodation on the surrounding farms and smallholdings, and job seekers attracted to the area by the prospect of finding work (Afrosearch 2005).

The percentage of households residing in a 'house or brick structure on a separate stand or yard' is higher across the study area than in the City of Cape Town as a whole, but most so in Melkbosstrand (80%), followed by Atlantis at 75%, and least in Atlantis non-urban (68%). Atlantis non-urban has the greatest percentage residing in traditional dwellings (12%), while Atlantis and Melkbosstrand both have around 9% residing in flats. The percentage in informal dwellings is lower than that for the broader Cape Town in all parts of the study area, but notably higher in Atlantis non urban (mostly shacks in back yards) and Atlantis (predominantly not in back yards, which would include residents of the Witzand settlement).

The City of Cape Town's Blaauwberg Sub-council has earmarked R1.9 million for a Melkbos Housing Project, while the Koeberg sub-council has earmarked R3 million for Phase 2 of the Witzand Housing Project and R2 million for the Atlantis Housing Project respectively between 2007 and 2010.

5.2.7. Access to Electricity

According to the 2001 Census, 70% of South Africa's population used electricity as primary source of energy for lighting. The corresponding figure in the Western Cape was significantly higher at 88%, with that in the City of Cape Town being 89%.

Within the study area electricity use for lighting is almost universal in Melkbosstrand (98% of households) and only slightly less common in Atlantis (92%) where paraffin is the other form most cited (7%). Atlantis non-urban noted this to be slightly less common at only 64% of households using electricity for lighting, with a 32% relying on candles, and smaller percentages on gas, paraffin and other sources of energy.

5.2.8. Water and Sanitation

Atlantis receives the bulk of its water supply from the Witzand Water Treatment Works which abstract water from the Atlantis aquifer. Access to piped water inside dwellings is higher in Atlantis (83%) and Melkbosstrand (93%) than in the broader Cape Town (69%). This percentage is significantly lower in Atlantis non-urban at only 36%, with 23% citing piped water in the yard, and over 30% piped water on a community stand, mostly over 200 m from the dwelling.

The comparatively lower levels of living prevalent in the Atlantis non-urban area is highlighted in terms of access to sanitation facilities, with only half of all households having access to flush toilets (including both sewerage and septic tanks), compared to over 90% in Atlantis and Melkbosstrand. About 1/5th of Atlantis non-urban households have no sanitation facilities, while 17% rely on bucket latrines. The remainder use chemical toilets and pit latrines.

5.2.8. Road Network

The existing road network is well established in the local area consisting of Provincial Roads (Proclaimed Truck, Main, Divisional and minor roads – in terms of the Roads Ordinance) and many of which that now fall within the "Inner Municipal Area" of the City of Cape Town. The Provincial Government is the controlling authority for the N7 and the R27 while all other roads in the vicinity fall under the City of Cape Town.

» *R27 West Coast Road*
In the vicinity of the site, the R27 is classified as a Class 1 Expressway running from the Northern Suburbs of Cape Town to the Silverstream Road intersection after which is classified a Freeway all the way along the West Coast to Langebaan.

Next to the N7 Highway it is the main road for vehicles travelling up north and shows high traffic volumes on weekends or in holiday times as well as a higher number of heavy vehicles.

Photograph 5.1: R27 West Coast Road

» *R307 Dassenberg Road*

Dassenberg Road (R307) is classified as a Class 2 Primary Distributor. This road links the R27 with the town centre of Atlantis and further with the R304 in a north-east direction. The R307 is a two-way single carriageway with wide tarred shoulders.

Photograph 5.2: R307 Dassenberg Road

» *Neil Hare Road*

Neil Hare Road can be classified as a Class 4 Local Distributor. This road is a two-way single carriageway with gravel shoulders. Neil Hare Road intersects with Charel Uys Drive at a four-way stop to the north-east and with the R307 to the south-west. The Ankerlig Power Station gains access from Neil Hare Road.

Photograph 5.3: Neil Hare Road

» *Charel Uys Drive*

Charel Uys Drive (R304) is defined as a Class 3 Secondary Arterial. It carries medium traffic in both peak periods. It is an important link through Atlantis Industrial to Dassenberg Road (R307) in the west and to the Atlantis Town Centre to the north.

Photograph 5.4: Charel Uys Drive (R304)

5.2.9. Heritage Profile

Numerous fossil and archaeological sites have been recorded in the broader study area. Fossils are regularly encountered between Woodstock beach, near Cape Town, and Saldanha Bay to the north of Yzerfontein. These include the material excavated from sites such as Elandsfontein, Duinefontein 2 and Langebaanweg. Fossil bones were also seen at Bakoond and Tygerfontein, both to the south of Yzerfontein, and a large collection has been made from an occurrence at Melkbosstrand. Material from the Milnerton beach area has also been recorded.

The fossil site of Duinefontein 2 in the Koeberg Private Nature Reserve contains Early Stone Age (ESA, >200 thousand years ago (kya)) artefacts and similar isolated items are routinely found in ploughed fields across the south-western Cape. Kaplan (1996, 2000b) reports ESA artefacts from farmlands near the study area.

Middle Stone Age (MSA, 200kya – 20kya) artefacts were found in association with the Melkbosstrand fossils indicating at least some MSA presence in the area. MSA artefacts of the Stillbay type have also been collected in the region of Maitland just south of the study area and at a site described as being between Milnerton and Maitland. Artefacts thought to date to the MSA were observed at Groot Oliphantskop to the east of the Melkbosstrand Wastewater Treatment Works (WWTW) and in the region of Vissershok.

In general, Later Stone Age (LSA, <20kya) sites are far more commonly encountered than earlier material. This may be largely due to burial of older sites beneath recent sand. The only formal excavations to have taken place at an LSA site are those in the near coastal dunes of the Atlantic Beach Golf Estate, just northwest of Blaauberg Hill and at Melkbosstrand. LSA artefacts have also been noted from the vicinity of Maitland, the farm Groot Oliphantskop – site of the Omega substation - as well as other farms in the area. Halkett (*pers comm*) reports the presence of Early Stone Age scatters on the farm Vaatjie as well as substantial Late Stone Age open sites on an adjoining property. Early Stone Age material has also been located on the farm Brakkefontein just south of Atlantis.

Two burials were reportedly excavated from the Groot Oliphantskop farm in the mid-20th century. Morris (1992) has catalogued human burials from South Africa and records numerous burials from the Milnerton (13 listed), Blaauwberg (20 listed) and Melkbosstrand (22 listed) areas. Others have also been recorded in recent years and continue to be found at new development sites.

5.3. Biophysical Characteristics of the Study Area

The topography of the Atlantis study area is gently rolling, but generally sloping towards the south. The vegetation of the area is **Cape Flats Dune Strandveld** in the north-western section, **Atlantis Sand Fynbos** on the sandy sections and **Swartland Shale Renosterveld** on the clayey sections (Mucina & Rutherford 2006). Alien plant infestation is considerable and large sections have been transformed.

The climate of Atlantis and the Cape West Coast is similar to Mediterranean countries and is influenced by the effects of the nearby Atlantic Ocean, resulting in warm to hot summers and cool winters. The average daily maximum and minimum temperatures in summer are 27°C and 13°C respectively. In winter, the daily temperatures range between an average maximum of 18°C and an average minimum of 6°C.

Rain occurs predominantly in the winter, and the summer months are generally dry. The average annual rainfall is 466 mm. The month with the highest rainfall is July (with a high of 77 mm), and the driest month is February (with a monthly total of 10 mm).

The predominant wind directions in the area are south-westerly to south-easterly during the spring and summer months, and north-westerly to north-north-westerly during the winter months. The strength of the wind is generally greater during the summer months.

The study area is situated on a coastal plain that comprises unconsolidated Cenozoic sediments (mainly quartz sand) associated with the Sandveld Group. These have been deposited on shale bedrock of the Malmesbury Group. The sand deposits average 25 m in thickness, although a maximum of some 80 m is attained in the southwest. Bedrock outcrops of shale occur sporadically along the coast and inland to the north and south of Atlantis. Granite intrusions associated with the Cape Granite Suite are exposed in the vicinity of Mamre. These reach a maximum elevation of some 418 m above sea level in the form of Kanonkop located about 9 km to the northeast.

The western portion of Atlantis Industria occupies a surface elevation of around 125 m above sea level. The land surface slopes gently from northeast to southwest. A variety of other sandy soil types are also found across the area. The landscape can be loosely divided into residential, agricultural, industrial and Fynbos shrub land.

The site occurs within quaternary catchment G21B (304 km^2 in extent) of the Berg Water Management Area. The area is largely devoid of rivers and streams.

The most significant surface water drainage feature is the southwesterly draining Donkergat River located some 6 km to the southeast of the site (Figure 5.1). The Donkergat River itself is a major tributary of the Sout River, which enters the Atlantic Ocean at Melkbosstrand. A much smaller drainage, the Buffels River, occurs in the Silwerstroom area to the northwest (Figure 5.1). All streams in the study area have an ephemeral character.

A high-yielding spring (approximately 30 L/s) is located at Silwerstroom on the coast, and another at Mamre. Both of these features serve as sources of potable water. Silwerstroom is utilised by the City of Cape Town, and the spring at Mamre represents the original source of water for the Mission Station established there in 1808.

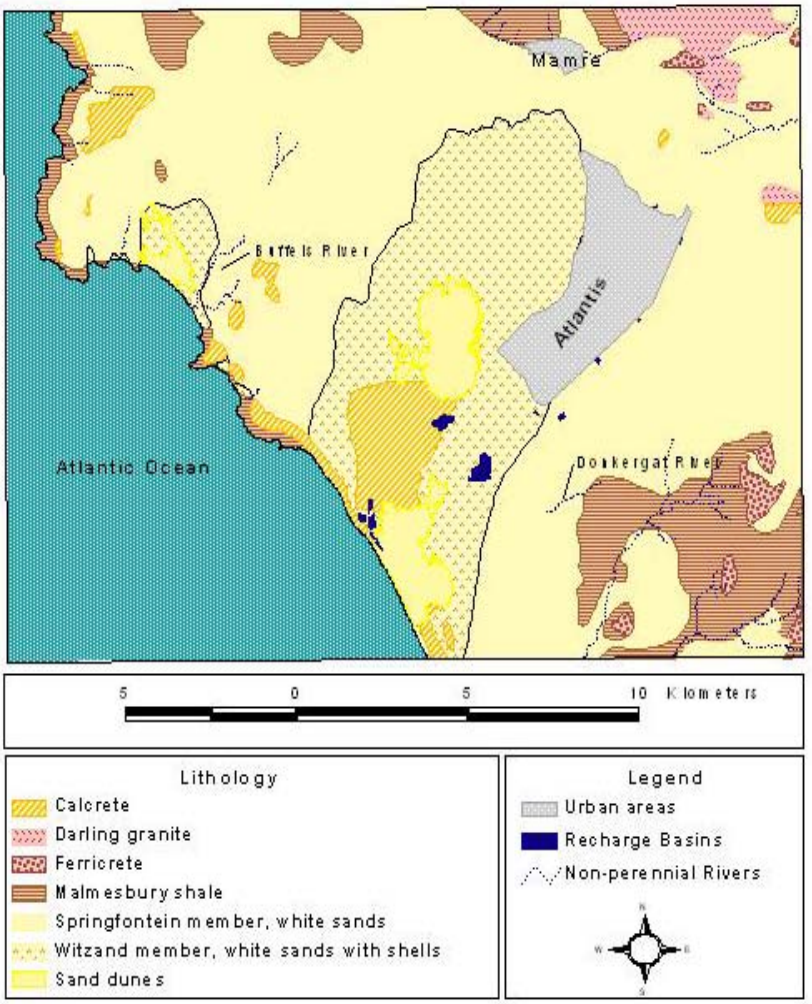

Figure 5.1: Geographical map for Atlantis and its surrounds

The study area is part of the Cape Floristic Region, a renowned botanical hotspot with a very high percentage of endemic plant species (species restricted to that area) and threatened plant species. Almost 85% of the threatened plants found in South Africa are restricted to the Cape Floristic Region. The vegetation of the area is Cape Flats Dune Strandveld in the north-western section, Atlantis Sand Fynbos on the sandy sections and Swartland Shale Renosterveld on the clayey

sections (Mucina & Rutherford 2006). Alien plant infestation is considerable and large sections have been transformed.

The ecology of the power station site has been largely transformed through the construction of the existing Ankerlig Power Station. Small portions of vegetation do, however, still exist in areas not directly impacted by construction. Previous investigations of the vegetation of the power station site (Bohlweki Environmental 2005; 2007) have indicated that the vegetation for a large portion of the site has been substantially modified or disturbed by a variety of factors or combinations thereof. In terms of vegetation integrity, the site was described as fragmented with severely disturbed natural drainage patterns. The vegetation on the site was severely degraded and transformed due to human disturbance, e.g. road building, original site clearance and installation of stormwater drainage systems, change of drainage patterns, illegal quarrying of sand, illegal dumping of waste, frequent fires at the wrong time etc. As a result, large areas were totally dominated by alien invader species such as Port Jackson (Acacia saligna) and Rooikrans (A. cyclops). The site is separated from the natural vegetation of the Melk Post and Witsand areas to the north and west by the Dassenberg road (R307).

The proposed transmission power line routes traverse an area that has been fairly extensively transformed by agriculture, originally by ploughing, and subsequently by heavy grazing and trampling by cattle, as well as too frequent fires. Alien invasive vegetation is therefore not surprisingly a prominent feature of the area. Some natural vegetation does however remain along the proposed power line alignment.

Soils are typically acid to neutral sands overlying shale – derived clays, and the latter are exposed in river valleys and along the railway cuttings.

Five potential faunal habitats are present within the study area, i.e.

» **Rocky habitat**, which supports many animals, including many invertebrates, amphibians, reptiles, birds and mammals. Rock habitat islets may therefore house unique forms and for this reason, this habitat has high conservation importance, especially along the western coastal lowlands.
» **Coastal fynbos/coastal sand**, a unique animal habitat that supports many endemic species, especially psammophylic or sand-loving species such as burrowing lizards, golden moles and mole rats.
» **Renosterveld**, found on the lowlands along the coast on shale and granite, from sea level to 400 m above. As a veld type, it is rich in a wide variety of species and dominated by renosterbos and the characteristic wealth of spring flowers. Although poor in fauna, a number of threatened species are associated with this habitat, e.g., several butterfly species, the Geometric Tortoise and the Cape Rain Frog.

» **Water bodies**, such as rivers, streams, pools, lagoons and estuaries and other wetland areas support a wide range of animal species, including many endemic species and/or species of conservation importance. The majority of frog species occurring in the greater study area are associated with water bodies. A wide range of bird species and several mammal species are also dependant on permanent or seasonal water bodies.
» **Mountain fynbos**, characterised by ericoids, restioids and proteoid shrubs like proteas and conebushes. Trees are scarce in this veld type. Several endemic bird species are associated with this habitat type.

The presence of any Red Data invertebrate taxa within the Atlantis study area is doubtful. Of the nine Red Data frog species occuring in the Western Cape, only the Cape Rain Frog (*Breviceps gibbosus* – listed as vulnerable), and the Cape caco (*Cacosternum capense* – listed as vulnerable) may occur within the study area.

Eighty-five reptile species occur in the greater study area, including 3 tortoise, one terrapin, 51 lizard and 30 snake species (Branch 1998). Of these, only 5 could occur within the study area, i.e. the Cape Sand Snake (*Psammophis l. leightoni* – listed as Lower Risk)[14], the Large-scaled Girdled Lizard (*Cordylus macropholis* – listed as Lower Risk)[15], the Silvery Dwarf Burrowing Skink (*Scelotes bipes* – listed as Data Deficient), Cuvier's Blind Legless Skink (*Typhlosaurus caecus* – listed as Data Deficient), and Austen's Thick-toed Gecko (*Pachydactylus austeni* - listed as Data Deficient).

Sixty-seven mammal species potentially occur in the greater study area, including seven insectivores, 11 bats, one primate, 3 hare/rabbit species, 23 rodents, 3 felids, 3 canids, 3 mustelids, 6 viverrids, the aardvark, the dassie, and 5 antelope species (Skinner & Smithers 1990). Of these, 8 are endemic to the greater study area. During previous investigations of the power station site (Bohlweki Environmental, 2005; 2007), there was no evidence of medium- to large-sized mammals, given the general nature of the area that is semi industrialised with an adjacent residential area. The presence of small mammals, in particular terrestrial rodents and subterranean rodents was considered more likely to occur in the proposed study area. Three Red Data species have the potential to occur in the study area as a result of the habitats present, i.e. the Forest Shrew (*Myosorex varius* – listed as Data Deficient), the Greater Musk Shrew (*Crocidura flavescens* – listed as Data Deficient), and the Cape Golden Mole (*Chrysochloris asiatica* – listed as Data Deficient).

[14] Presence unconfirmed but possible due to habitats present.

[15] Presence unconfirmed but possible due to habitats present.

The area supports 201 bird species, of which 15 species are Red-listed, 44 species are regional endemics or near-endemics, and three species are Red-listed endemics. Of the 5 avian microhabitats identified, natural (if generally degraded) Strandveld/Fynbos areas and wetlands support or partially support the bulk of the local avian diversity and most of the Red-listed and endemic species.

The Cape West Coast Biosphere Reserve is situated in the coastal zone north of Cape Town. Core areas consist of the West Coast National Park, and Dassen and Vondeling Islands. There is also a buffer zone and transition zones. The Atlantis study area is located within the transition zone of the Cape West Coast Biosphere Reserve[16] (refer to www.capebiosphere.co.za/CONSERVATION.55.0.html).

Other conservation areas in the region surrounding the power station site include the Koeberg Private Nature Reserve, the Blouberg Nature Reserve and the Blaauw Mountain Private Nature Reserve.

[16] Transition zones are areas of co-operation that contain a variety of land uses, including settlements, where the area's natural resources are sustainably developed for the benefit of those who live there.

ASSESSMENT OF ISSUES ASSOCIATED WITH THE PROPOSED POWER STATION CONVERSION CHAPTER 6

This section of the EIA Report serves to assess the identified potential environmental (socio-economic and biophysical) impacts associated with the proposed conversion of the OCGT units at the Ankerlig Power Station to CCGT units. Potential direct, indirect and cumulative impacts associated with the proposed conversion project are assessed, and recommendations are made regarding the management of the impacts for inclusion in the draft Environmental Management Plan (refer to Appendix P).

6.1. Assessment of Potential Impacts on Air Quality

The Ankerlig Power Station is situated on the western side of the Atlantis Industrial Zone. This area is located approximately 7 km inland from the Cape West Coast, approximately 40 km north of Cape Town. The existing Ankerlig Power Station is approximately 10 km northeast of Eskom's Koeberg Nuclear Power Station.

The existing air quality in the area is considered to be relatively good. There are several air pollution sources in the Atlantis Industrial area that could potentially have a negative impact on the ambient air quality. Apart from industrial activities in the area, other potential air pollution sources include vehicular traffic, domestic fires, ploughed fields and non-vegetated land.

Potentially sensitive receptors surrounding the power station site include (refer to Figure 6.1):

» The residential township of Atlantis
» The informal settlement of Witzand
» Open farmlands in the vicinity of the power station site

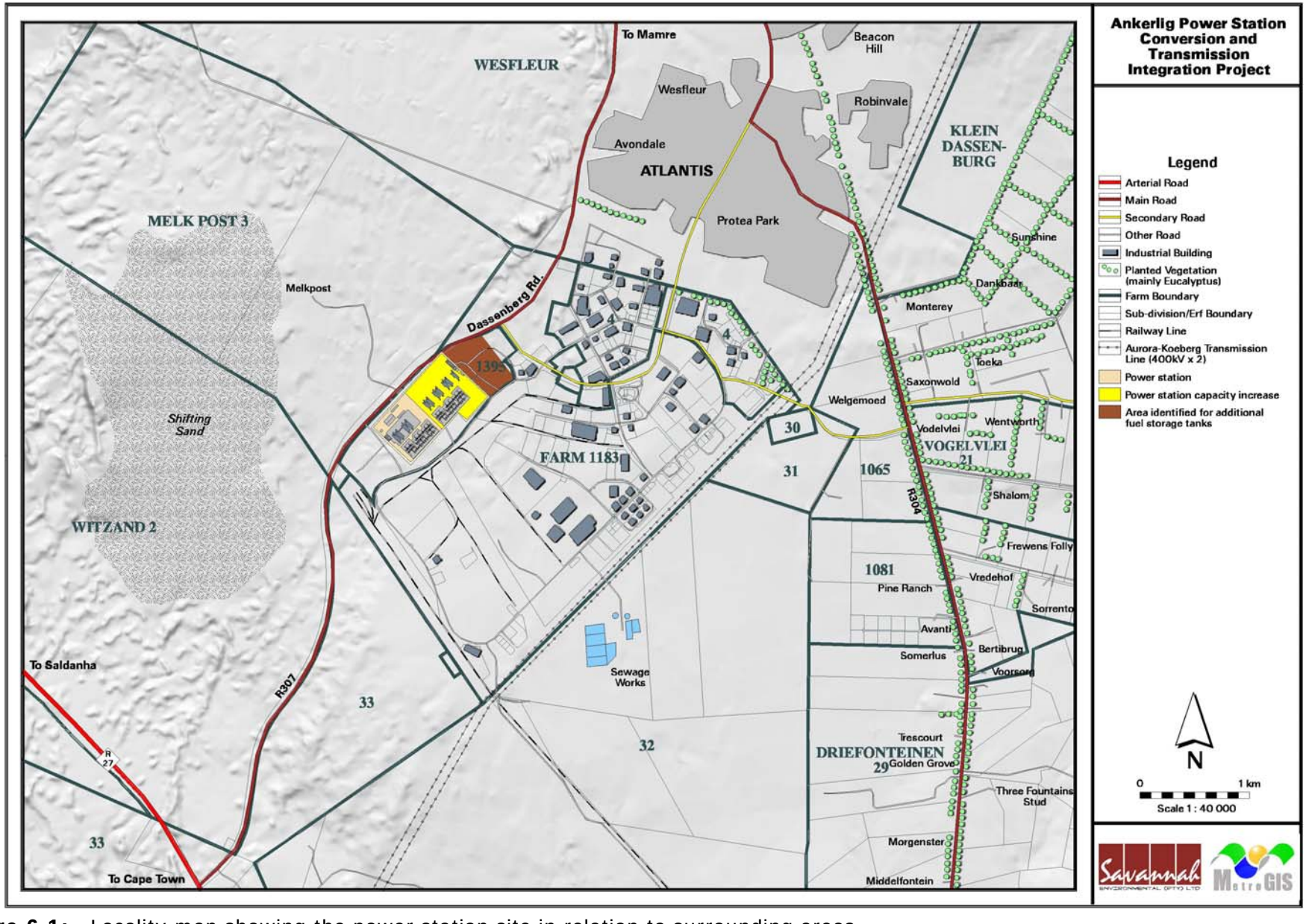

Figure 6.1: Locality map showing the power station site in relation to surrounding areas

Impacts associated with the proposed power station conversion are expected during both the construction and operational phases. The main air pollution sources identified to be associated with the proposed power station conversion include:

» The various construction activities during the construction phase.
» The turbine combustion emissions during the normal operation phase.
» The turbine combustion emissions during start-up and upset conditions.

It is important to note that the plant can use liquid fuel or natural gas as fuel. It is envisaged that the CCGT units would initially be diesel-fired, until such time that natural gas becomes available, if and when it becomes available.

Impact tables summarising the significance of air quality impacts associated with the power station conversion (with and without mitigation)

Nature: Increase of air pollution levels and dust deposition around the power station construction area Dust would be generated through the various construction activities of the proposed CCGT power station. The greatest impact of the dust would be limited to the immediate vicinity of the proposed site.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low-Moderate (5)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No loss	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: » Speed reduction to below 20 km/hr within and around the site. » Paving of internal roads as soon as possible. » Application of water suppression.		
Cumulative impacts: » Cumulative impacts due to the existing power station units, industrial sources in the adjacent Atlantis Industrial area and vehicular traffic in the area.		
Residual Impacts: » No residual impact after the activity ceases.		

Nature: Increase of air pollution levels around the power station site

The exhaust emissions during normal operation, start-up and upset conditions could have a negative impact on the air quality of residential townships in close proximity to the power station. The type of emissions are not expected to change from those currently generated by the 9 OCGT units, since instead of being released into the atmosphere after the turbines, as the gases from the OCGT plant will pass through a heat recovery system and then be released. The only variations to the OCGT emissions will be the different release heights of the new stacks and the temperature of the emitted gases.

	With Diesel Fuel	**With Gas Fuel**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	High impact (9)	Low to Moderate (5)
Probability	Highly probable (4)	Improbable (2)
Significance	**High (64)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	Yes

***Mitigation*:**

» Increase the stack height to at least 60m (as is proposed to be associated with the CCGT units).
» Investigate additional mitigation measures for the reduction of nitrogen dioxide emissions.

Cumulative impacts:

» Cumulative impacts due to existing industrial air pollution sources in the adjacent Atlantis Industrial area and vehicular traffic in the area.

Residual Impacts:

» No residual impact after the activity ceases.

6.1.2. Conclusions and Recommendations

Based on the air quality modelling results, the following can be concluded:

» During the construction of the proposed combined cycle units, the impact is considered to be Low.
» For the operational phase, the introduction of the combined cycle units will not change the emission quantities of the air pollutants. It will reduce, however, the temperature of the exit gases.
» During operation, the introduction of the combined cycle units will potentially increase the ground-level concentrations if the stack heights are not increased from the existing 30m. However, increasing the stack heights to 60m in height (as is proposed) will result in the ground level concentrations being at levels similar to those associated with the open cycle units.
» With the introduction of 60m high stacks, nitrogen dioxide was the only pollutant predicted to exceed its hourly guideline limit of 200 µg/m^3. The

number of incidents per year, however, was below 10. The annual guideline for this pollutant was not exceeded at any of the sensitive receptor locations.

» The other pollutants examined, i.e. sulphur dioxide, PM10 and VOCs, were well within their respective guidelines for all sensitive receptor locations.
» The utilisation of natural gas as fuel for the Ankerlig power Station units (should this become available) will significantly reduce the ground level concentrations of all pollutants, including nitrogen oxides to well below their respective guidelines.
» The overall impact significance for the combined cycle Ankerlig units was found to be of high significance. The introduction of natural gas (should this become available) will reduce this impact to Low.

6.2. Assessment of Potential Noise Impacts

The existing noise environment in the residential areas surrounding the Ankerlig Power Station is typical of a suburban residential area next to an industrial zone. The noise environment is affected by localised vehicular traffic from the R27 and R307, human activities and the existing industrial activities in the Atlantis Industrial area.

The acceptable daytime and night time rating levels in a residential district with little road traffic are, respectively, 50 dBA and 40 dBA. The current existing noise environment around the Ankerlig Power Station has noise levels of around 50 dBA, primarily due to the construction activities currently taking place, the existing industrial sources and the R307. The noise levels in the most southern part of the Atlantis residential area, i.e. Avondale and Protea Park, were around 48 dBA during day and night-time. The industrial activity from the Atlantis Industrial area, as well as construction activities were audible but not intrusive.

Noise impacts associated with the operation of the existing OCGT units at the Ankerlig Power Station on the Atlantis residential area and surrounding farm areas is considered to be limited, and would decrease with increased distance from the power station (DDA, 2007). It was concluded from preliminary ambient noise level measurements undertaken within the scoping study phase that the noise levels due to the operation of the four transformers at the Ankerlig Power Station during the daytime would be negligible for locations further than 1.5 km away from the power station (i.e. it would increase the existing noise levels below 1 dBA). For the night-time conditions, the noise contribution of the transformers would be negligible for locations further than 4.1 km away from the power station.

The conversion of the Ankerlig Power Station units from open cycle to combined cycle will introduce additional noise sources, including:

» The construction equipment and activities during the construction phase.
» The equipment during the operational phase such as:
  * the air filters
  * the gas compressor
  * the gas turbine
  * the generator
  * the electricity transformers
  * the fans associated with the stacks
  * the heat recovery equipment
  * the steam generator
  * the steam turbine
  * the air-cooled condenser system associated with the dry-cooling system

Impact tables summarising the significance of noise impacts associated with the power station conversion (with and without mitigation)

Nature of Impact: Increase of noise levels around the power station construction area during the construction period		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low-Moderate (5)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No loss	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: » Systematic maintenance of equipment and training of personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events.		
Cumulative impacts: » Cumulative impacts due to existing power station units, industrial noise sources in the adjacent Atlantis Industrial area and vehicular traffic in the area.		
Residual Impacts: » No residual impact after the activity ceases.		

Nature of Impact: Increase of noise levels around the power station site, in the adjacent rural areas and in Atlantis residential area during operation of the power station			
	Without mitigation	**Intermediate Mitigation**	**Substantial Mitigation**
Extent	Local (2)	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	High impact (8)	Moderate to high impact (7)	Minor (6)
Probability	Highly probable (4)	Probable (3)	Improbable (2)
Significance	**Moderate (56)**	**Moderate (39)**	**Low (24)**
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Reversible	Reversible	Reversible
Irreplaceable loss of resources?	No irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	Yes	Yes
Mitigation: » Intermediate: Increased boiler casing thickness, stack exit silencer, pump upgrades, steam turbine inside enclosure, low noise fans. » Substantial: Increased boiler casing thickness, stack exit silencer and transition barrier, place pumps inside enclosure, place steam turbine inside high STC enclosure, low noise fans with inlet and exit silencers and larger footprint.			
Cumulative impacts: » Cumulative impacts due to existing industrial noise sources in the adjacent Atlantis Industrial area and vehicular traffic in the area.			
Residual Impacts: » No residual impact after the activity ceases.			

6.2.2. Conclusions and Recommendations

In close proximity to the power station, i.e. within 300m from the site boundaries, the operation of the 9 open cycle units will result in an increase of the current (measured) noise levels of around 7 dBA and 10 dBA during daytime and night-time respectively. This increase is considered Moderate to High, and it will result in noise levels much greater that the SANS guidelines for rural areas of 45 dBA and 35 dBA during daytime and night-time respectively.

With the introduction of the closed cycle units without additional mitigation measures, the open cycle units' noise levels along the power station site's boundaries will increase between 4 dBA and 13 dBA from the current authorised situation (i.e. the operation of the 9 OCGT units). This increase is considered *Moderate*.

The incorporation of the Intermediate mitigation measures will restrict the above-mentioned increase between 3 dBA to 6 dBA. The incorporation of the substantial mitigation measures will eliminate the above-mentioned increase.

Based on the existing noise levels in the Avondale and Protea Park areas, the expected noise level increase due to the open cycle gas turbines was estimated to be around 1 dBA. The introduction of the combined cycle units will increase the current measured noise levels in the Avondale and Protea Park areas by 1 dBA during daytime, and by 1.2 dBA during night time respectively. In the Avondale and Protea Park areas, the difference between the noise levels resulting only from the open cycle units and the combined cycle (that includes the open cycle) was found to be 0.5 dBA, which is considered Negligible. The additional proposed mitigation measures will reduce this noise level increase even further.

The relocation of the Acacia electricity generation units (as assessed within a separate EIA Report, DEAT EIA Reference No 12/12/20/1155) will have only a local impact around the north-western boundary, increasing the noise levels by 3 dBA, when compared to the open cycle levels and mitigated combined cycle levels. The Acacia units will not have any significant cumulative effect on the noise-sensitive receptors of Atlantis, since the increase above the closed cycle noise levels in the Avondale and Protea Park areas will be below 0.3 dBA.

The overall noise impact of the combined cycle units without mitigation, taking into consideration the resulting noise levels in the noise-sensitive area of Atlantis, was found to be Moderate. The introduction of the Substantial mitigation measures will reduce the impact rating to Low.

During construction the following is recommended:

» Diesel-powered and other equipment should be maintained regularly and have appropriate fitted silencers.
» Personnel should be specifically trained, in order to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events.
» Noisy operation such as piling, rock breaking, etc. should be restricted during daytime hours.
» Perimeter noise measurements should be performed biannually. The monitoring to include one or two points within the Atlantis community.

For the operational phase of the combined cycle units, the following is recommended:

» The substantial mitigation measures should be incorporated, in order to maintain the noise levels around the site similar to the ones expected to be

generated by the closed cycle units. These measures include but are not restricted to:

- Increased boiler casing thickness.
- Introduction of stack exit silencer and transition barrier.
- Placement of pumps inside enclosure.
- Placement of steam turbine inside high STC enclosure.
- Utilisation of low noise fans with inlet and exit silencers and larger footprint.

» Perimeter noise monitoring should be performed annually. For comparison purposes, the measurement points should include the measurement locations utilised in the noise impact assessment.

6.3. Assessment of Potential Visual Impacts

The Ankerlig Power Station site is removed from major centres, tourist attractions and major roads. It is located next to the R307 (Dassenberg Road) that functions as the primary access route to Atlantis and Mamre (north of Atlantis) from Cape Town. The closest major road is the R27 (about 5 km from the site). The R27 functions as the primary connector between Cape Town, Saldanha and the West Coast National Park. Significant landmarks in the wider area are the existing Ankerlig Power Station, Koeberg nuclear power station located some 9 km to the south-west, and the town of Mamre located some 3 km to the north.

The conversion of the power station from OCGT to CCGT technology, as a visual concern, primarily entails the increase of the dimensions of the gas turbine units. One OCGT unit measures 75m x 25m x 25m and the smoke stack is 30m above ground level. The conversion to CCGT technology will increase each turbine unit's smoke stack to approximately 60m above ground level. Additional infrastructure associated with the conversion project includes the construction of a small water reservoir (2 Ml), and eight fuel tanks (with a combined total capacity of approximately 43 million litres) to the east of the power station site. All additional infrastructure associated with the power station conversion will be located within the Ankerlig Power Station site.

The visual impact assessment is based on the visual exposure (visibility), the visual distance (proximity of the observer) and the viewer incidence (number of observers) of the proposed project infrastructure. It takes into account the size (width, height and length) of the structures associated with the power station conversion. The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed infrastructure are displayed on Figure 6.2.

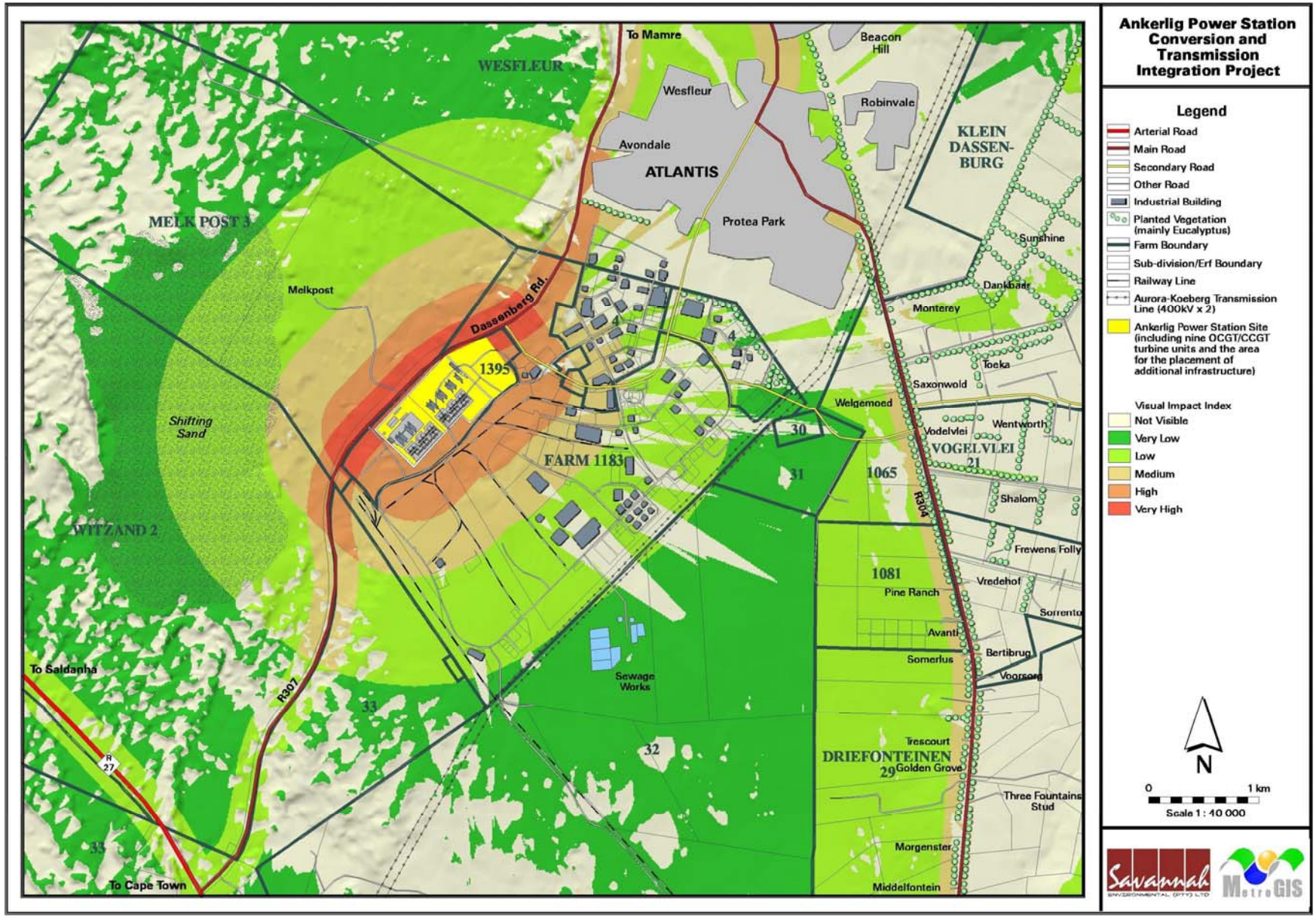

Figure 6.2: Visual impact index - Ankerlig power station conversion

Here the weighted impact and the likely areas of impact are indicated as a visual impact index. Values were assigned for each potential visual impact per data category (as mentioned above) and merged in order to calculate the visual impact index. An area with short distance visual exposure of the project infrastructure, a high viewer incidence and a predominantly negative perception of the structures would therefore have a higher value (greater impact) on the index.

The proposed power station conversion and additional infrastructure have the greatest potential to visually impact on road users travelling along the Dassenberg Road (R307). This is due to the observer's short distance (and high frequency) experience of the power station infrastructure. The facility is highly unlikely to be visible from the Atlantis residential area, but its residents travelling along the R307 would be able to view this infrastructure as they commute to and from Cape Town and other areas on a daily basis. Existing infrastructure, associated with the OCGT power station, is already visible from this road (mitigating the potential future visual impact to some degree) but is set back from the road at a distance of approximately 300m. The additional infrastructure will be placed adjacent to this road at distances closer than 150m from observers travelling along this road.

The other areas, further removed from the power station, that will experience a diminishing visual impact of the facility, are virtually all restricted to the industrial area itself or to predominantly vacant land north-west of the facility. Some of the smallholdings west of the R304 appear on the lower end of the index where these sightings will occur at an average distance of approximately 5 km.

Impact tables summarising the significance of visual impacts associated with the power station conversion (with and without mitigation)

Nature: Potential visual impact on users of Dassenberg road

The primary area of potential visual impact would occur along this section of road within a 200 m radius of the power station conversion and additionally constructed infrastructure. It must however be borne in mind that the visual impact associated with the power station conversion will be an additional impact and that the initial visual impact has already occurred during the construction of the original OCGT power plant and its associated infrastructure. This initial visual impact was further compounded by the capacity increase (i.e. the construction of additional OCGT units) as addressed by a previous visual impact assessment report (MetroGIS (Pty) Ltd, 2007).

The envisaged visual impact of the power station conversion and the construction of additional fuel storage tanks, as well as the proposed water reservoir are therefore not as significant as would be the case if this had been a "green fields" development site. The increase in power generating developments along the Dassenberg Road is however still expected to increase the cumulative visual impact on observers travelling past the facility, as more structures would be visible along a longer stretch of road due to the increased height of the structures (i.e. the 60 m high stacks associated with the CCGT units) and the

additional fuel tanks.		
	Without mitigation	**With mitigation**
Extent	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)
Magnitude	High (7)	High (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	**High (60)**	**Medium (56)**
Status (positive or negative)	Negative	Negative
Reversibility	None	None
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (partially)	NA
Mitigation: » Additional infrastructure (such as the water reservoir and fuel storage tanks) should be set back (further away) from the road as far as possible, or screened from the road through the use of vegetation. » The viability of the construction of a five to ten metre tall vegetated screening berm between the Dassenberg Road and the power station site (as proposed in the OCGT capacity increase VIA report) should be investigated.		
Cumulative impacts: Each new development, expansion or increase in dimensions of the power station infrastructure attributes to the accumulation of the visual impact of the facility along the Dassenberg Road.		
Residual impacts: None.		

Additional issues related to visual impact

» *Landscape character/land use character*
The proposed site for the power station conversion is located on the existing Ankerlig Power Station site within an established industrial area relatively far removed from residential developments or other conflicting land uses. The general land use is conducive to the conversion to, and operation of the CCGT plant and no significant impact on the general land use character of the greater area is envisaged.

» *Visually sensitive features (scenic features or attractions)*
The area in close proximity of the proposed power station conversion project does not contain any identified visually sensitive features or scenic attractions. Long distance views of Table Mountain may however be influenced by the project structures, depending on the location of the viewer in relation to the power station.

» *Potential impact of the project infrastructure on tourism and eco-tourism*
The specific area surrounding Atlantis and the proposed project infrastructure is not currently viewed as a major tourist destination. Tourism predominantly consists of visitors travelling to the West Coast National Park and Saldanha Bay along the R27. This road passes south-west of the Atlantis industrial area at a distance of about 4km (at the closest) from the power station. The conversion of the OCGT plant is not expected to significantly influence the tourism potential within the region.

» *Visual absorption capacity (VAC) of the natural vegetation*
The visual absorption capacity of the natural vegetation in this region is not considered as an element that could successfully negate or mitigate the visual impact of the proposed power station conversion due to the relatively low growth form and the highest point of the proposed conversion infrastructure (i.e. 60 m stacks).

» *Potential visual impact of lighting*
The effects of lighting are especially problematic in rural or sparsely populated areas where there is an absence of the lighting generally present in urban areas. The increase in the number of operational and security lighting fixtures, associated with the power station conversion project (and the aircraft warning lights required by the Civil Aviation Authority on the 60 m high smoke stacks) may potentially impact on adjacent landowners north of the Dassenberg Road (i.e. Melkpost). This area north of the power station site is however not densely populated, with the exception of Melkpost (which is situated almost 1.5 km from the site) and is not expected to experience significant lighting impacts.

Glare from floodlights has the potential to visually impact, or at the very least irritate, observers travelling along Dassenberg Road at night if not fitted properly. The impacts associated with light pollution can be lessened through the careful planning and sensitive placement of light fixtures and the fitment of covers and shields designed to contain, rather than spread the light. A qualified lighting engineer should be consulted during the design and construction phases of the power station technology conversion, to plan and fit any new lighting fixtures effectively from the outset. Any additional lighting which is required must be installed to meet Occupational Health and Safety Act requirements.

6.3.1. Conclusions and Recommendations

The visual impacts associated with the conversion of the power station will be additional to existing visual impacts. The operation of the Ankerlig OCGT power station and the number of transmission power lines already present within the

study area mitigates the visual impacts that would be associated with "green fields" projects. The establishment of the Atlantis industrial area in the mid-1970s and the presence of the Koeberg Nuclear Power Station to the west of the study area have set the trend for industrial style developments within the region. It is unlikely that this trend would be reversed in the foreseeable future and it is envisaged that the region will come under increasing development pressure, further impacting on the visual quality of the area.

» *Mitigation measures*

The above recommendation (regarding lighting) is an example of a potential mitigation measure that could diminish the visual impact of the proposed power station conversion.

Other potential mitigation measures for the proposed power station conversion project include the maintenance and general appearance of the facility. These measures focus on the fact that if/when the facility is seen by outsiders; the general impression should be favourable. Timely maintenance of the CCGT units, ancillary infrastructure and the general surrounds of the property (gardens, access roads, etc.) can prevent the visual impact of degradation and perceived poor management. The most notable aspect of maintenance on this type of structure is the painting of the CCGT units. In this regard and as a further mitigation to the visual impact, overtly contrasting and bright colours should be avoided. Natural hues that compliment the natural environment can soften the general appearance of the power plant. The colour schemes currently utilised for the OCGT units is deemed appropriate and should be continued for the CCGT units and associated infrastructure.

It was also previously noted that the ancillary project infrastructure (i.e. the water reservoir and fuel storage tanks) should be removed from the Dassenberg Road as far as possible, or a vegetated screen be erected. The technical feasibility of this suggestion should be investigated when the detailed site layout plans are compiled for the Ankerlig conversion project. This will assist in minimising the cumulative visual impact associated with the additional infrastructure proposed for the power station site.

Mention was also made of the vegetated screening berm that was proposed during the visual impact assessment for the Ankerlig capacity increase project. The effectiveness of this screening berm along the northern perimeter of the power station site was illustrated for the OCGT stacks at an offset of 30 m above ground level. The increase in the stack heights to 60 m above ground level will reduce the effectiveness of the berm to some extent in shielding observers travelling along Dassenberg Road from viewing them.

The proposed berm would however still be effective in hiding the ancillary infrastructure.

6.4. Assessment of Potential Impacts on Vegetation associated with the Additional Fuel Storage Area

The study area is part of the Cape Floristic Region, a renowned botanical hotspot with a very high percentage of endemic plant species (species restricted to that area) and threatened plant species. Almost 85% of the threatened plants found in South Africa are restricted to the Cape Floristic Region. Cape Flats Dune Strandveld is the main vegetation type within the area surrounding the power station site. This vegetation type is regarded as an Endangered vegetation type in terms of the NSBA (Rouget et al., 2004), and is restricted to the Atlantis area, the Cape Flats, and the south Peninsula.

The study area is located within a rapidly developing part of the south-western Cape, where much of the remaining natural vegetation is under intense development pressure. The ecology of the power station site has been largely transformed through the construction of the existing Ankerlig Power Station. Small portions of vegetation do, however, still exist in areas not directly impacted by construction, such as the area proposed for the establishment of additional fuel storage tanks. This area comprises approximately 17.5ha to the east of the existing power station.

Impact tables summarising the significance of ecological impacts associated with the additional fuel storage area associated with the power station conversion (with and without mitigation)

Nature: Permanent loss of vegetation in development footprint (17.5ha)

The primary direct impacts are loss of natural vegetation within the diesel fuel storage area. All hard infrastructure (fuel storage area) will result in the permanent loss of existing vegetation, and adjacent disturbance associated with this will be medium- to long-term in nature, but the vegetation should eventually recover. The development footprint will result in loss of at least 17.5ha of Cape Flats Dune Strandveld in the fuel storage area.

	Without mitigation	**With mitigation**
Extent	Local and regional (1)	Local and regional (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Medium (5)	Low (3)
Probability	Definite (5)	Probable (3)
Significance	**Medium (55)**	**Low (27)** – considered to be negligible
Status (positive or negative)	Negative	Neutral
Reversibility	No	No

Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Only through offset mitigation	
Mitigation: A significant biodiversity offset is the only appropriate mitigation; for this site at least 262ha of Cape Flats Dune Strandveld needs to be conserved in return for the loss of 17.5ha of this vegetation on this site (15: 1 ratio).		
Cumulative impacts: Yes; the previous developments by Eskom on the adjacent areas have not been effectively mitigated and impacts are ongoing		
Residual Impacts: Yes.		

Nature: Loss of ecological connectivity in area The proposed fuel storage area (approx. 17ha) impacts negatively on existing ecological connectivity across the western Atlantis area, even though the surrounding area is already partly developed. The development of this facility will have a relatively minor (Low) indirect negative ecological impact when compared to the main Ankerlig facility.		
	Without mitigation	**With mitigation**
Extent	Local & regional (1)	Local & regional (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Minor - low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Very Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	No	No
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Only through offset mitigation	
Mitigation: Biodiversity offset proposed for direct impact will help mitigate indirect impact as well		
Cumulative impacts: Yes; but relatively small		
Residual Impacts: Yes; small		

Cumulative impacts

To some extent a cumulative impact is a regional impact, rather than the local site scale impact, i.e. if something has a regional impact it also has a cumulative impact. The Atlantis to Cape Town region is a hotspot of threatened plant species

(pers. obs.), due to large scale habitat loss. Any development impacting on remaining natural vegetation in this area will thus have a cumulative negative impact. The larger the overall site impact, the larger the cumulative impact. The primary cumulative negative impact is therefore the loss of 17.5ha of Endangered Cape Flats Dune Strandveld for the fuel storage site, which is proposed to be situated adjacent to the Ankerlig Power Station.

Positive impacts

Substantial positive impacts could be realised if a biodiversity offset was part of this development. It is suggested that an appropriate offset would be to formally conserve an area of similar habitat and conservation value to that which is being lost. The main positive effect of an offset would be an increase in the conservation area of an Endangered vegetation type (Cape Flats Dune Strandveld, being the vegetation type which will be most impacted by this development). The positive effects of an offset could either be an increase in the conservation area of an Endangered vegetation type (Cape Flats Dune Strandveld, being the vegetation type which will be most impacted by this development), or otherwise improved ecological management (such as by funding alien clearing) of existing areas of conserved habitat of this type.

6.4.1. Conclusions and Recommendations

Overall the proposed diesel storage area is likely to have a Medium to High negative impact on the vegetation at a local scale, prior to mitigation. Regional impact would be **Medium negative**, prior to mitigation. The primary negative impact is a direct, permanent loss of natural vegetation (about 17.5ha). This impact cannot be avoided, and can only be mitigated by a biodiversity offset, which is regarded as essential. In the unlikely event of an adequate offset being put in place the overall impact could be reduced to Low positive. If this is not done botanical impacts here must be viewed as Medium negative.

» ***Recommended Site Specific Mitigation***

- Search and Rescue (S&R) of certain translocatable, selected succulents and bulbs occurring in the fuel storage area is recommended. However, it is difficult to know where to translocate these to, as no offset area has yet been decided on. Once an offset area has been decided and confirmed then the rescued material can be translocated to the offset area.
- The need for on-site offsets should be discussed with the authorities, should this be deemed necessary.

6.5. Assessment of Potential Traffic Impacts

The existing road network is well established in the local area consisting of Provincial Roads (Proclaimed Truck, Main, Divisional and minor roads – in terms of the Roads Ordinance) and many of which that now fall within the "Inner Municipal Area" of the City of Cape Town. The Provincial Government is the controlling authority for the N7 and the R27 while all other roads in the vicinity fall under the City of Cape Town. In the immediate vicinity of the Atlantis Industrial area, it is understood that there are no future road alignments that are going to affect the site in future or have any implications for traffic patterns in the area.

The traffic and transportation impact on the surrounding road network will have a number of related issues and impacts, i.e.:

» Construction transport related to the transport of very large Power Station components such as 250 ton turbines, which need to be transported from a harbour that can accommodate bulk carriers. As such, components could be landed at either Cape Town or Saldanha Bay Harbours and will be transported to site from there.
» Construction traffic (employees and heavy construction vehicles) related to the construction phase of the project.
» Traffic Impact of permanent employees upon commissioning.
» Road based transport of fuel to supply the power station on a daily/weekly basis from the Caltex Refinery on Plattekloof Road, Milnerton.

Impacts associated with abnormal loads and construction employees are not considered significant for the proposed project.

Impact tables summarising the significance of traffic impacts associated with the power station conversion (with and without mitigation)

Nature: Pavement Loading Impact during Construction (Construction Traffic)

The cumulative damaging effect of all individual axle loads is expressed as the number of equivalent 80kN single-axle loads (E80s). This is the number of 80kN single-axle loads that would cause the same damage to the pavement as the actual spectrum of axle loads.

With the proposed conversion of the Ankerlig Power Station, the extended construction activity would place additional loading on the road pavements and would shorten the time to the next routine maintenance / rehabilitation intervention. It was assumed by SSI that 15 truckloads per day, which are fully loaded inbound (3.5 E80s per truck) and empty outbound (1.8 E80s per truck), would result in additional 80 E80s per day along Neil Hare Road. It was observed that currently 550 E80s drive along Neil Hare per day and the accumulative pavement loading for construction vehicles adds up to 186 E80s per day. This indicates that 34% of the E80 traffic loading during construction can be attributed to

the construction work at the Power Station. A worst-case scenario with all heavy vehicle trips along the same route were taken into account for the above described assumptions.

	Without mitigation	**With mitigation**
Extent	Local & regional (2)	N/A
Duration	Short-term (36 months) (2)	N/A
Magnitude	Low (3)	N/A
Probability	Definite (5)	N/A
Significance	**Low to Moderate (35)**	N/A
Status (positive or negative)	Negative	N/A
Reversibility	No. The impact of the loading cannot be reversed and the impact will contribute to the deterioration in riding quality.	
Irreplaceable loss of resources?	No. The road pavement material could be re-cycled / re-used	
Can impacts be mitigated?	No. The onset of degradation / deterioration of the riding quality of the road pavements could be mitigated by a routine maintenance surface treatment (if appropriate). Over the life span of the road pavement, the construction impact will however be minimal.	

Mitigation:
None

Cumulative impacts:
The axle loading on the road pavement is accumulative and contributes to the deterioration of the road over its life span.

Residual Impacts:
No since the road can be repaired in future.

Nature: Pavement Loading Impact during Operation - Future Fuel Tanker Demand and Transport Route Impact

It is necessary to evaluate the impact fuel tankers have on the pavement loading conditions. It was assumed by SSI that the number of E80s per loaded fuel tanker results in 3.5 E80s per truck and 1.8 E80s per empty tankers on their return trip. Therefore, a total of (36 x 3.5) 126 E80's will have an impact on the pavement structure of the northbound lane per day and a total of (36 x 1.8) 65 E80s on the pavement structure of the southbound lane per day. This adds up to approximately 45 865 E80s

(126 trucks*7 weekdays*52 weeks) per year. For a design life span of 25 years for the power station, the total number of fuel tankers having an impact on the pavement loading will be around 1 146 600 E80s.

According to GOBA, the highest impact regarding pavement loading occurs on Neil Hare Road with 6.4 million E80s in a 25-year term. The total fuel tanker contribution to the pavement loading is then 17.9%.

It must be noted that the major routes such as the R27 and N7 have been designed to accommodate high numbers of E80s

	Without mitigation	**With mitigation**
Extent	Local & regional (2)[24]	Local (1)
Duration	Long-term (>15 years) (4)[25]	Long-term (>15 years) (4)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Probable (3)[26]
Significance	**Moderate (45)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	No. The impact of the loading cannot be reversed and the impact will contribute to the deterioration in riding quality.	
Irreplaceable loss of resources?	No. The road pavement material could be re-cycled / re-used	
Can impacts be mitigated?	Yes	

Mitigation:

» The onset of degradation / deterioration of the riding quality of the road pavements could be mitigated by a routine maintenance surface treatment (if appropriate). Over the life span of the road pavement, the operational impact will contribute to the deterioration of the road pavements which is mitigated by planned routine maintenance undertaken by the responsible road authority.

» The implementation of the fuel pipeline or rail transport options will possibly eliminate the impact. However the road based transport option is still available as a back up to the pipeline or rail option.

Cumulative impacts:

The axle loading on the road pavement is accumulative and contributes to the deterioration of the road over its life span.

Residual Impacts:

No since the road can be repaired in future.

[24] Plattekloof Road, Koeberg Road, Blaauwberg RoadWest Coast Road (R27), Dassenberg Road (R307), Niel Hare, John Dreyer, Charl Uys, Mamre Road (R304), Philadelphia Road and the N7.

[25] The impact will be intermittent and variable during the operational life and cease upon decommissioning of the facility

[26] Road based transport would always be an alternative option should there be problems with the rail or pipeline option

6.5.1. Conclusions and Recommendations

» *Construction Phase Impact*
- Construction Plant and Delivery of Materials: No significant impact on intersections and traffic operations.
- Pavement Loading Impact during Construction: The axle loading on the existing road pavements can be described as negative but there would have been a similar construction traffic impact for the development of any of the industrial sites in the Atlantis area. The damaging effect of construction vehicle loading is mitigated by the on-going routine maintenance by the responsible Road Authority and covered by the licensing and fuel levies paid by the transport operator for his fleet of vehicles.
- Transporting Abnormal Loads: A number of Power Station components need to be transported to the site from the local harbours. There are recognised abnormal haul routes along the R27 and permits (with conditions) will need to be obtained prior to transporting. There will be no significant impact on the existing road pavement and the duration of the impact is per trip.
- Construction Employees: Using both public and private transport, the impact is not significant.
- Power lines: Depending on the route selected, there may be the need to negotiate access to the proposed power line servitudes across private property. Construction vehicles will need to access each tower for the erection phase and during cable installation, thereafter there will be no further affect apart from routine maintenance about twice a year.

» *Operational* Phase Impact (Development Traffic)
- Employee Traffic Impact: It is understood that the maximum number of staff employed after the proposed extension and conversion will most likely not exceed 18 persons at any one time, including operators, maintainers and key personnel due to the automated operational nature of the facility. As such the trip generation is negligible.
- Fuel Supply Traffic Impact: It is understood that the deliveries for fuel are able to occur at any time of the day or night (i.e. on a 24-hour basis). Fuel tankers take the route from Caltex Refinery via Plattekloof Road, Koeberg Road, Blaauwberg Road, R27 and then via the R307 to Atlantis Industrial. The operation of the Ankerlig Power Station will demand extra fuel in addition to the fuel tanker demand for the existing power station.
- Pavement Loading Impact: The number of E80 axle loads imposed by the transportation of fuel from the Caltex Refinery to the Power Station Site is very significant and will significantly shorten the life span of the road pavement structure along the transportation route. GOBA estimated in

their report that the highest impact regarding pavement loading occurs on Neil Hare Road with 6.4 million E80's in a 25-year term. The increased fuel demand increases Eskom's contribution to 1.15 million E80s (or approximately 17.9%). A more detailed study / assessment is currently underway and discussions with the City of Cape Town have commenced to investigate ways of monitoring Eskom's contribution to the axle loading on the road network and to quantify Eskom's contribution to the Road Authorities maintenance programmes.

» *Intersection Capacity Analysis*
The traffic counts used by SSI in their 2007 study were taken into account and updated to 2008 traffic volumes. The following intersections were re-analysed:
* R27 West Coast Road / R307 Dassenberg Road
* R307 Dassenberg Road / Neil Hare Road
* R307 Dassenberg Road / Charel Uys Drive
* Charel Uys Drive / Neil Hare Road

All analysed intersection as listed in Chapter 5 operate at a good level of service with relatively low average delays in the present 2008 and expected 2018 scenarios.

» *Site Accesses*
There are currently two accesses from Neil Hare Road in operation – one operational and fuel supply access and one access for construction vehicles. Both accesses are security controlled via booms and security guards.

6.6. Assessment of Potential Impacts on the Social Environment

The Ankerlig Power Station site is located within the Koeberg and Blaauwberg sub-councils of the City of Cape Town Metropolitan Municipality in the Western Cape Province. The Ankerlig Power Station site is situated in the Atlantis Industrial area, and is currently occupied by the OCGT power station which is proposed to be converted into a CCGT power station. The existing power station consists of 9 OCGT units (i.e. four existing OCGT units, plus an additional five OCGT units, currently under construction).

The population potentially affected by the development include residents of Atlantis, particularly the suburbs of Avondale, Wesfleur, Protea Park, Beacon Hill and Robinvale, and the nearby informal settlement of Witsand, situated in close proximity to the Industrial area.

Social impacts associated with the power station conversion are expected to occur during both the construction and operational phases. Impacts are expected to be

similar to those that were identified for the initial OCGT development, which was assessed in 2005 (environmental authorisation received December 2005), as well as the expansion of the OCGT plant, which was assessed at the beginning of 2007 (environmental authorisation received July 2007).

6.6.1. Potential Social Impacts Associated with the Construction Phase

Potential impacts associated with the construction phase include:

» Creation of temporary employment opportunities;
» Business opportunities
» Skills development
» Social investment;
» Influx of job seekers and temporary workers;
» Increase in traffic;
» Intrusive impacts associated with visual and noise impacts.

Impact tables summarising the significance of social impacts associated with the construction phase of the power station conversion (with and without mitigation)

Nature: Temporary local employment opportunities

Construction activities will create a number of temporary employment opportunities, resulting in a positive economic impact at a local level. In addition to creating job opportunities for construction workers, the project may also offer other sources of temporary employment. These include possible indirect employment creation in the informal sector, for instance catering for construction workers.

Although the impact on employment will be temporary, due to high levels of poverty and unemployment in the area, any impact on job creation in the area will have some positive impact and thus will be of positive significance. This impact can be optimised by focusing on local employment creation where possible, and addressing current community concerns (as detailed in the Social Impact Assessment included within Appendix H).

	Without Mitigation	**With Mitigation**
Extent	Local (2)[27]	Local (2)
Duration	Very short (1)	Short-term (2)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Highly probable (4)
Significance	**Low (27)**	**Moderate (48)**
Status	Positive	Positive
Reversibility	Positive impact lasts only as long as employment.	Positive impact can be augmented through skills development and on-the-job training.

[27] The impact measured emphasises creation of local labour

Can impacts be mitigated?	Yes - effective mitigation can maximise this potential positive impact.

Mitigation:

» Make use of local labour where possible. Means to achieve this are suggested below:
» Identify types and levels of employment that the development could offer.
» Appoint a local labour broker, to be identified in consultation with local community stakeholders.
» Refer contractors to jobseeker's databases kept by local community structures (e.g. local council, Red Door, Residents' Association) when sourcing local labour.
» Identify targets for BEE & local employment. Criteria for 'local' to be agreed in consultation with local community stakeholders.
» Reserve agreed percentage of higher level positions for local employment.
» Skills training to be undertaken where viable to facilitate employment.
» Location of appropriate transport providers who would be available to assist contractors in transporting workers from these sites.
» Younger people tend to have higher levels of education and may stand in line for higher levels of employment. Opportunities for the employment of younger people should be maximised.
» Investigate opportunities to maximise employment of women.
» Mitigation measures should be supplemented by lessons learnt from the construction of the first OCGT units and the expansion. These should preferably be workshopped. These workshops should be attended, either together or in different workshops, by Red Door, the LED Forum, Eskom, Contractors, and any other relevant representatives. Aspects to be addressed should, amongst others, include the procurement process, procurement criteria, salaries, transparency, and community expectations.

Cumulative Impacts:

The impact of ongoing employment through ongoing construction activities at the Ankerlig Power Station site can be considered cumulative to previous construction processes and other project components, as well as other developments in the area, with Atlantis currently being targeted for increased industrial developments. The longer duration of impacts present ongoing economic opportunities for the local Atlantis community.

Residual Impacts"

» The families of those who secure work will benefit and this will impact on their health and well-being for the duration of employment.
» Local businesses benefit indirectly as a result of increased local spending by those who are employed. This also impacts on the health and well-being of their families.

Nature: Business opportunities

In addition to (mostly unskilled) employment created during construction, the Atlantis community has also benefited from business opportunities for local contractors and service providers. It has been reported that Atlantis received an economic boost during the first phases of the power station construction as a result of the creation of direct and indirect business opportunities (i.e. for contractors to the site and for the provision of catering and security services, as well as the provision of accommodation facilities).

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Very short (1)	Medium-term (3)
Magnitude	Low (4)	Moderate (6)
Probability	Improbable (2)	Highly probable (4)
Significance	**Low (18)**	**Moderate (48)**
Status	Positive	Positive
Reversibility	Positive impact for limited contracts.	Positive impact can be augmented through skills development leading to future opportunities.
Can impacts be mitigated?	Yes - effective mitigation can maximise this potential positive impact.	

Mitigation:

» Make use of local suppliers of goods and services where possible. Means to achieve this are suggested below:
» Open tender processes – improved communication of tender opportunities through advertising in local community media, including Radio Atlantis.
» Expedite process of registering local service providers on Eskom's procurement database.
» Provide information regarding the types of business opportunities and economic spin-offs that may arise from the proposed development.
» Identify targets for BEE & local procurement. Criteria for 'local' to be agreed in consultation with local community stakeholders.
» Include basic business and entrepreneurial skills as part of a skills development component of the development.
» Participatory workshops in which interested members of local communities can be guided with regards to types of business opportunities that could arise.
» Investigate ways of enabling potential subcontractors from low-income areas to tender.
» Set up linkages for small business loans, as well as small business skills training. In this regard, the role that partnership with other role-players who could assist in these matters should be considered.
» Closer interaction with institutions that could assist with provision of support to small businesses, including the possible identification of agencies that could assist with the provision of seed finance and entrepreneurial counselling (Red Door, LED Forum, Local Council).
» Mitigation measures should be supplemented by lessons learnt from the construction of the first OCGT units and the expansion. These should preferably be workshopped. These workshops should be attended, either together or in different workshops, by Red Door, the LED Forum, Eskom, Contractors, and any other relevant representatives. Aspects to be addressed should, amongst others, include the procurement process, procurement criteria, salaries, transparency, and community expectations.

Cumulative Impacts:

» The impact of ongoing business opportunities through ongoing construction activities at the Ankerlig Power Station site can be considered cumulative to previous construction processes and other project components, as well as other developments in the area. The longer duration of impacts present ongoing economic opportunities for the local Atlantis community.

» Learning from the past presents the opportunity for more effective local procurement, and for more businesses to potentially benefit for a longer period.

Residual Impacts:

» The families of those who secure work will benefit and this will impact on their health and well-being.

» Local businesses benefit, and this also impacts on the health and well-being of their families.

Nature: Skills Development

Lack of suitable skills was highlighted by McCarthy (2006) as a key constraint to recruiting local labour, as well as procuring contracts and services from local companies in Atlantis. The ongoing nature of developments at Ankerlig (starting with OCGT 1, followed by the expansion project, and now potentially extending to the conversion) provides ongoing opportunities for development of local skills in construction. Skills development has been occurring throughout the development process to date.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Very short (1)	Medium-term (3)
Magnitude	Low (4)	Moderate (6)
Probability	Improbable (2)	Highly probable (4)
Significance	Low (18)	Moderate (48)
Status	Positive	Positive
Reversibility	Positive impact for limited contracts.	Skills can be used beyond the project to improve future employability
Can impacts be mitigated?	Yes - effective mitigation can maximise this potential positive impact.	

Mitigation:

» Provide an indication of skills requirements for the Proposed Development. To include Construction as well as long-term Operational phase employment and skills requirements.

» Identify specific focus areas for targeted intervention based on identification of skills requirements and existing skills within local communities.

» Appoint appropriate service provides to design skills development programmes and conduct necessary training.

» Recognition for Prior Learning (RPL) – assess existing skills and provide training as appropriate.

» Liaise closely with community and business representatives with regards to targeting of employment and skills development initiatives.

» Consider involvement of suitable candidates in project management activities in a process of skills transfer and mentorship.

» Implement a supplier development programme as is currently under consideration at Gourikwa Power Station in Mossel Bay to assist local businesses with registration on Eskom's database, to include assistance in meeting compliance standards and understanding tender requirements.

Cumulative Impacts:

Ongoing developments at the Ankerlig Power Station site, provide further opportunities for

skills development of locals, which can contribute to improved employability in other developments happening in the area.

Residual Impacts:

Improved skills will assist in increasing the future employability of local labourers.

Local businesses can benefit from skills development opportunities provided to prepare them for possible future developments in and around the Atlantis and surrounding areas.

Nature: Housing of temporary workers

If construction workers are not sourced locally, but are housed close to the site, this may lead to conflict with locals (Afrosearch 2005). Conversely the presence of temporary workers could provide a small stimulus to the local economy if accommodation for such workers could be procured locally.

The presence of outside labourers in the local community can create numerous social problems, including

Added emphasis on jobs locals could do that are given to outsiders, thus resulting in increased resentment of the project by the local community.

Potential conflict between outside workers and the local community, enhanced by a feeling of competition for scarce resources, notably much needed employment opportunities.

Social integrity: The presence of construction workers from elsewhere could aggravate existing social problems, particularly alcohol and drug abuse.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long (4)	Short (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	Moderate (36)	Low (12)
Status	Negative	Positive/ Negative
Reversibility	Housing only required for duration of contracts. Social problems created may endure.	Positive impacts (e.g. business opportunities for B&Bs) only for duration of construction work. Social problems created may endure.
Can impacts be mitigated?	Yes	

Mitigation:

» Maximise local employment to minimise the need for housing of temporary workers which could lead to social problems of integration with the local community.
» Ensure that no temporary workers' quarters are allowed for the development.
» Meetings should be arranged with residents' associations of neighbouring residential areas, as well as with the local Community Policing Forum to discuss the contractor's plans, procedures, schedules and possible difficulties and safety and security concerns.
» Workshops with relevant parties (Red Door, Contractors, sub contractors, Eskom, municipality) should be held to discuss and implement relevant lessons learnt from the first OCGT. Other mitigation suggested in the MasterQ assessment for the OCGT expansion included the following:

» All construction activities should be restricted to working areas.
» Construction workers should wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce. This should be applicable to all construction workers, including those who are locally recruited.
» What workers bring on site should be monitored. The provision of catering on-site will reduce the chances that substances such as alcohol are brought on-site or used during working hours, reducing the likelihood of alcohol-related conflict and disturbances.
» Note that these measures can only be enforced on the construction site, and would have little impact on workers' interactions with the local community outside working hours.

Cumulative Impacts:

Additional impacts of outside workers in local communities, whether positive or negative, can be considered cumulative to those experienced from Eskom's previous and other involvement in the area, as well as other developments taking place in and around Atlantis.

Residual Impacts:

Conflict could lead to social mobilisation.
Limited economic benefits to the community if handled appropriately.

Nature: Influx of job seekers

As news regarding the proposed project spreads, expectations regarding possible employment opportunities may take root. Consequently, the area surrounding the site could experience an influx of job seekers. This can result in an increase in informal settlement, which could lead to social problems such as alcohol abuse, and prostitution (Afrosearch 2005).

If the area experiences an influx of job seekers, competition over scarce employment opportunities may give rise to conflict between local residents and newcomers. An influx of newcomers might also be accompanied by an increase in crime. Even if particular instances of crime are not as a result of the newcomers, they may still be attributed to them by local communities (Afrosearch 2005).

Consultation with local councillors in Atlantis as part of this assessment, particularly Councillor Yiba who is responsible for Ward 32, including the Atlantis Industrial area and surrounding neighbourhoods, as well as the Witsand settlement, indicated that, although immigration to the area in search of work is on the increase, squatting is not considered a serious problem at the moment as measures are in place to deal with this issue. Eskom's project furthermore should be seen in the broader development context for Atlantis, where the local Council recently released a number of properties for development particularly to draw investors in a drive to create employment in the area. The majority of those coming to the area in search for work come through family connections, who assist them with housing.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short (2)	Very short (1)
Magnitude	Moderate (6)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	Low (20)	Low (10)
Status	Negative	Negative
Reversibility	Once construction and employment cease this would no longer be seen as an attraction for further job-seekers, but	

	those who have come in search of jobs remain in the area.
Can impacts be mitigated?	Yes

Mitigation:

» Maximise local employment according to strategies outlined previously, ensuring appropriate criteria to determine 'local' (see mitigation for employment creation and influx of labourers above).
» Access to the building site should be controlled.
» Meetings with the local municipality should be held to discuss the management of informal settlement as a result of the project.

Cumulative Impacts:

Possible population influx that may be caused by additional developments at and around the power station site can be considered a cumulative impact related to general development in the area. The extent to which Eskom's operations will specifically add to this impact cannot easily be quantified, but measures can be put in place to minimise possible social disruption caused by such influx.

Residual Impacts:

Conflict could lead to social mobilisation.

Nature: Social Conflicts/disputes

Local community representatives have raised numerous issues and concerns during this assessment about the use of labour brokers by Eskom's main contractors during the construction of the initial OCGT project, and again during current construction of the additional units. Concerns have also been raised over treatment of workers on-site by labour brokers as well as contractors.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long (4)	Short-term (2)
Magnitude	High (8)	Low (4)
Probability	Highly probably (4)	Improbable (2)
Significance	Moderate (56)	Low (16)
Status	Negative	Negative/ positive
Reversibility	Unlikely	Possible
Can impacts be mitigated?	Yes	

Mitigation:

» Maintain the community stakeholders' forum which has been established, where labour-related issues can be addressed in consultation with local community representatives on a regular basis throughout ongoing construction phases.
» Emphasis on strategies to make use of local labour where possible.
» Specific emphasis should be placed on the use of local labour brokers. The local ward councils, Residents Associations, and Red Door all have databases of job-seekers that can be used for this purpose. Local communities as well as workers at the Ankerlig site have expressed serious concerns with current labour brokers appointed by contractors on-site. These issues are likely to escalate if not addressed appropriately.
» Ensure utmost sensitivity in the treatment of workers on-site, particularly regarding potential racial issues that may be implicated. This particularly applies to the manner in which labour disputes, when they occur, are handled by contractors and, when

necessary, Eskom Project Managers. The social environment around Atlantis should be considered as extremely sensitive and needs to be treated accordingly.

Cumulative Impacts:

The longer construction activities continue while labour related issues remain unresolved, the greater the cumulative impact of potential conflict builds, and the greater the likelihood for increased tension and resentment between Eskom, contractors, labour brokers, workers, and the Atlantis community.

Residual Impacts:

Appropriate mitigation could improve Eskom's standing within the local community, and Eskom and contractors' relationships with workers.

Failure of mitigation could lead to social mobilisation.

Nature: Increase in traffic - disruption of daily movement patterns and safety concerns

Increase in traffic can result in the disruption of daily movement patterns. Depending on access routes that are used, construction vehicles could impact on safety and daily movement patterns of residents in surrounding communities. The magnitude of this impact will depend on current traffic volumes, traffic volumes that will be associated with construction activities, as well as construction schedules (Afrosearch 2005), but is expected to be similar to that experienced during the construction phases associated with the OCGT power station (initial 4 units) and the current expansion activities (additional 5 units). (Refer also to the Traffic Impact Assessment contained within Appendix L).

	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Regional (3)
Duration	Short (2)	Short (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	Low (27)	Low (18)
Status	Negative	Negative
Reversibility	Impacts on road conditions would last until beyond construction.	Impacts on roads minimised; traffic impacts only related to construction.
Can impacts be mitigated?	Yes - see traffic assessment.	

Mitigation:

» Construction activities should be planned to minimise added disruption of traffic, especially during peak hours.

» Workshops with relevant parties (Red Door, Contractors, sub contractors, Eskom, Municipality, Community Liaison Forum) should be held to discuss and implement relevant lessons learnt from the initial construction phases of the power station.

» Mitigation measures listed in the traffic impact assessment should be implemented and monitored by the Environmental Control Officer.

» The initial traffic study (GMKS, 2005) recommended that impacts on pavement loading should be mitigated after completion of construction by possible contribution to the roads rehabilitation programme by Eskom.

Cumulative Impacts:

Accidents could result in injury and death, which will affect families and friends.

Residual Impacts:
None

Nature: Intrusive impacts		
Potential intrusive impacts relate to impacts such as visual and noise impacts, as well as increase in dust, that may be experienced during construction. These impacts are assessed in separate specialist studies (refer to Sections 6.1, 6.2 and 6.3 and Appendices E and G), and are assessed here from a social perspective in terms of the potential for intrusion.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short (2)	Short (2)
Magnitude	Low (4)	Small (0)
Probability	Probable (3)	Very improbable (1)
Significance	**Low (24)**	**Low (4)**
Status	Negative	Negative
Reversibility	Yes – once construction is complete the impact will be removed	
Can impacts be mitigated?	Yes	
Mitigation:		
» Refer to noise, visual, air quality and traffic assessments for specific mitigation measures. » Mitigation and compensation for directly affected parties to be negotiated with affected landowners and residents. » Mitigation for impacts in broader region to consider recommendations made in visual and air quality specialist studies.		
Cumulative Impacts:		
» Impacts can be considered cumulative to existing power station		
Residual Impacts:		
» Extent of impact could require affected residents to relocate, resulting in inconvenience and possible material loss. This is discussed with regard to the operational phase impacts.		

6.6.2. Potential Social Impacts Associated with the Operation Phase

Potential impacts associated with the operation phase include:

» Ongoing employment opportunities for locals;
» Social investment;
» Increase in traffic;
» Impacts on health and safety;
» Impact on Sense of Place

Impact tables summarising the significance of social impacts associated with the operation phase of the power station conversion (with and without mitigation)

Nature: Ongoing Employment, business opportunities and skills development for locals

It was noted in the MasterQ assessment that for the operational staff component of less than 30, Eskom recruited people from the local community to be trained during the construction of the first OCGT. Some local people have also been trained as operators and maintainers, which also indicates areas of potential benefit. The 2008 Red Door Report (McCarthy, 2008) noted 4 local people to have been permanently employed by Roschcon.

Consultation with the Operations Manager at Ankerlig as part of this assessment indicated that 7 local people are currently employed, five as utility men, one as learner operator and one in admin. The plant is currently recruiting operators. Three local candidates have been identified, and it is hoped to recruit another five locally. It is estimated that an additional 10 local employment opportunities would be created as part of the conversion process.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Very short (1)	Medium (3)
Magnitude	Small (0)	Minor (2)
Probability	Improbable (2)	Probable (3)
Significance	**Low (6)**	**Low (21)**
Status	Positive	Positive
Reversibility	Positive impact for duration of employment.	Ongoing positive impact.
Can impacts be mitigated?	Yes - can be optimised.	

Mitigation:

» Local labour and suppliers should be used as far as possible for maintenance, service provision and any additional opportunities arising during the operational phase.

Cumulative Impacts:

» Any additional permanent opportunities created would be a positive cumulative impact to existing developments. Longer involvement in the area provides additional opportunity to identify and train local people for possible employment, as well as maintenance and provision of general services required.

Residual Impacts:

» The families of those who secure work will benefit and this will impact on their health and well-being. Impacts on these households will be significant as these are permanent job opportunities created.

» Local businesses benefit, and this also impacts on the health and well-being of their families.

Nature: Social Investment

As the number of employment opportunities that will be created during the operational phase of the project will be limited, it will be necessary to augment the benefits for surrounding communities by implementing appropriate social investment activities. Social development

initiatives implemented by Eskom and the contractors involved during construction of the initial OCGT units in addition to those of ESDEF are discussed in the MasterQ assessment (2007). These included Upgrading of the Multi-Purpose Community Centre (MPCC); extra curricular classes for sixteen (16) Grade 11 students of four (4) high schools; and building of a children's ward at the Wesfleur hospital. Local labour was used for control, labour, maintenance and service delivery as part of these projects.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (3)
Duration	Short (2)	Medium (3)
Magnitude	Minor (2)	High (8)
Probability	Probable (3)	Highly probable (4)
Significance	Low (18)	Moderate (56)
Status	Positive	Positive
Reversibility	Sustainability of social development initiatives will depend on the manner in which these are identified and implemented.	
Can impacts be mitigated?	Yes - this impact can be optimised.	

Mitigation:

» Main contractors should continue to support Social development initiatives.
» Ensure appropriate communication channels to disseminate information about the types of assistance available through ESDEF in the community, through initiatives such as Red Door, the LED forum, and Local Council.
» Eskom to take a more pro-active stance in assisting community members to take advantage of its assistance through effective consultation with stakeholders on opportunities for assistance and how to access it.

Cumulative Impacts:

Any increased emphasis on social investment due to ongoing developments in the area would have a positive impact on surrounding communities benefiting.

Residual Impacts:

Improved relationship between Eskom and local communities.

Nature: Increase in traffic

The CCGT units proposed would utilise the same amount of liquid fuel (i.e. diesel) as is currently the case for the OCGT units (i.e. approximately 40 tons of diesel/unit/hour) for the same operating regime. However, in order to meet the electricity supply demand in the medium-term, the plant will have to operate for more hours per day than was anticipated for the OCGT plant (i.e. higher than anticipated load factors). This higher load factor would require higher fuel consumption. Therefore, Eskom are proposing the storage of additional fuel on the site to the west of the existing Ankerlig Power Station. The installation of a liquid fuel pipeline to the Ankerlig Power Station, as well as transport of fuel by rail is currently being investigated as part of a separate EIA application.

Fuel for the existing OCGT plant is currently obtained from the Caltex refinery in Milnerton. The Transport Studies that were undertaken for the first OCGT project (GMKS, 2005) estimated fuel transport to require a maximum of 50 fuel tankers per week, or 10 per weekday. A subsequent study undertaken for the capacity expansion project (SSI, 2007) showed that additional fuel requirements for the additional five units would translate to a

maximum of 80 tankers per week, or 14 per weekday. Impacts associated with this additional load included impacts on intersections and pavement loading impacts. The initial (GMKS) study found fuel supply impacts on traffic to be 'moderate'. Impacts on intersections were considered "acceptable" and no intersection upgrading was recommended, while pavement loading impact was thought to be covered by fleet licensing fees paid by transport operators (SSI, 2007). A similar conclusion was reached through the Traffic impact Assessment undertaken for the proposed conversion project (refer to Appendix L).

	Without Mitigation	**With Mitigation**
Extent	Widespread (3)	Local (2)
Duration	Long (4)	Medium (3)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Probable (3)
Significance	Moderate (52)	Low (21)
Status	Negative	Negative
Reversibility	Impacts on road conditions and safety would extend and worsen	Impacts on roads and traffic minimised
Can impacts be mitigated?	Yes - also see Traffic Impact Study	

Mitigation:

» Alternate fuel transportation - notably rail or fuel pipeline- should be considered.
» long-term impact could be mitigated by using alternative means of transporting the fuel
» transporting the fuel via rail or pipeline between the Caltex Refinery and the Power Station, and this road based option could be used for emergencies only.
» permit issuing authority to impose conditions that will need to be met during the transportation of the components
» Upgrading and widening of R27 to accommodate additional traffic (assist to motivate Provincial Government to make this a priority).

Cumulative Impacts:

Impacts on road conditions and road safety can already be felt by residents of Melkbosstrand and surrounding areas as these areas experience increasing population growth, without concurrent development of public infrastructure (notably the R27). The impact of additional fuel trucks may be regarded as the potential "straw to break the camel's back" (Raymond Williamson, MRA) adding to already heightened levels of tension and insecurity.

Residual Impacts:

Worsening road conditions, economic impacts of future upgrading.
Road accidents, heightened death toll and injuries, pressure on local healthcare facilities, economic impacts.

Nature: Impacts on Health and Safety

Potential health and safety implications may result from:

» Transportation of fuel
» Storage of fuel
» Impacts on air quality during operation
» Potential impacts on water availability and quality of water
» (Refer to Traffic Impact Assessment (Appendix L), Air quality impact assessment (Appendix E) and Risk Assessment (Appendix M).

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long (4)	Long (4)
Magnitude	Moderate (6)	Small (0)
Probability	Probable (3)	Improbable (2)
Significance	Moderate (36)	Low (12)
Status	Negative	Negative
Reversibility	See relevant specialist studies	
Can impacts be mitigated?	Yes – Refer to air quality, risk, groundwater, traffic assessments.	

Mitigation:

» Implement mitigation proposed in the Risk, Air Quality and Traffic Assessments
» Results of the Risk, Air Quality, and Traffic assessments should be disseminated to assuage unsubstantiated public fears.
» The contingency safety plan outlined in the EMP to be adhered to.

Cumulative Impacts:

Potential cumulative impacts of additional fuel storage and emission above what was anticipated as assessed in specialist studies.

Residual Impacts:

If mitigation measures and safety plans are not successfully implemented, Eskom will be seen as a "bad neighbour", and negative attitude towards future projects could jeopardise these.

Nature: Impacts on Sense of Place

As the proposed Ankerlig Power Station Conversion would take place in the Atlantis Industrial Area, on a site currently occupied by the Ankerlig Power Station, impact on sense-of place can be expected to be limited. It is however worth noting that the tallest of the new components (i.e. the smokestacks) will be 60 m tall whereas the existing tallest structures (exhaust stacks) are 30 m tall. Eskom are also planning additional fuel storage on the site. This may have an impact as a result of cumulative visual impacts (assessed as part of a separate specialist study). It is also important to note that the Atlantis community already perceives itself as vulnerable to a variety of developments which many feel are being 'dumped' on them. The impact on sense of place can thus be regarded as a cumulative psychological impact, whereby Atlantis residents increasingly feel victim to broader developments in which they have no say or control potentially impacting on them.

To the extent that such impacts may occur, their significance would relate partly to other impacts, notably visual and noise impacts, as well as impacts on air quality and traffic volumes, which need to be taken into consideration in assessing this impact. Potential visual and noise impacts that may be associated with the operational phase of the Conversion Project have been addressed in separate specialist assessments.

Also contributing to this impact will be the degree to which the local Atlantis community feels recognised as a host community that should benefit from the development as much as possible. Increasing perceptions of being a 'dumping ground', particularly for Eskom's energy generation projects would contribute to the impact more power developments have on people's 'sense of place'.

Conversely, if Eskom's presence can be seen to have visible benefits to local communities in terms of job creation, business opportunities, skills development and social investment, perceptions of the area as an 'energy hub' for South Africa may acquire a positive connotation which could change the status of this impact.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Medium (3)	Short (1)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Very improbable (2)
Significance	**Moderate (33)**	**Low (10)**
Status	Negative	Negative/ Positive
Reversibility	"Sense of place" essentially alters over time. Ankerlig is situated in an industrial area in a region increasingly characterised by industrial and power developments (Atlantis Industria, Gas turbines and areas located near the site like Koeberg, Nuclear, PBMR etc.). This eventually becomes part of the area's 'sense of place'	
Can impacts be mitigated?	Yes	

Mitigation:

» Minimise noise, visual, air quality, traffic impacts through appropriate mitigation.
» Maintain good relationships with local communities through regular, inclusive stakeholder engagement and consultation processes.
» Maximise local benefit through specific focus on employment, business opportunities, skills development and social investment.

Cumulative Impacts:

» Impacts related to the Ankerlig site can be considered cumulative to numerous other industrial and other developments in the area such as the proposed municipal landfill site, all combining to create a sense of becoming a 'dumping ground' for such developments.

Residual Impacts:

» Perceiving one's home to be a 'dumping ground' for developments can have detrimental psychological impacts on the local population, particularly if they do not feel appropriately known in these developments through effective public engagement processes.

6.6.2. Conclusions and Recommendations

The positive impact of electricity provision associated with the proposed power station conversion outweighs potential negative impacts that may be associated with the development. Such negative impacts can be mitigated, while potential positive impacts such as social investment and employment creation during construction can be optimised through appropriate management measures.

6.7. Risk Assessment

The CCGT conversion project involves the inclusion of 8 x 5400 m^3 diesel storage tanks. Therefore a fuel oil risk assessment study was undertaken to determine the extent of impacts from accidental fires and explosions.

6.7.1. Hazard Identification

The first step in any risk assessment is to identify all hazards. The merits of including the hazard for further investigation are subsequently determined by its significance, normally using a cut-off or threshold quantity.

Once a hazard has been identified, it is necessary to evaluate it in terms of the risk it presents to the employees and the neighbouring community. In principle, both probability and consequence should be considered, but there are occasions where if either the probability or the consequence can be shown to be sufficiently low or sufficiently high, decisions can be made on just one factor.

During the hazard identification component, the following considerations are taken into account:

» Chemical identities;
» Location of facilities that use, produce, process, transport or store hazardous materials;
» The type and design of containers, vessels or pipelines;
» The quantity of material that could be involved in an airborne release; and,
» The nature of the hazard (e.g. airborne toxic vapours or mists, fire, explosion, large quantities stored or processed handling conditions) most likely to accompany hazardous materials spills or releases.

Diesel was found to be a combustible liquid while propane was found to be a flammable gas at room temperature. The main hazard of the facility would be thermal radiation from large pool fires and explosions from the fuels and flammable gases stored on site.

6.7.2. Conclusions

Risk calculations are not precise. The accuracy of the predictions is determined by the quality of base data and expert judgements. The risk assessment was done on the assumption that the site will be maintained to an acceptable level and that all-statutory regulations will be applied. It was also assumed that the detailed engineering designs will be performed by competent people and that the plant requirements will be correctly specified for the intended duty.

A number of incident scenarios were considered and the following conclusions were reached.

» *Pool Fires*
Large bund fires and pool fires from spillages from road and rail offloading operations were calculated for the Ankerlig Power Station and the proposed CCGT conversion. The study concluded that Ankerlig Power station and the CCGT conversion could have impacts a short distance beyond the site boundary.

The risks from pool and bund fires of $1x10^{-6}$ fatalities per person, which is generally considered as tolerable, extended beyond the site's boundary and in some instances were excessive.

As the $1x10^{-4}$ fatalities per person per year lies a short distance over the boundary there is possibility to reduce risks to acceptable levels with engineering and administrative controls.

» *Jet fires*
Jet fires from a release of pressurised propane would form a maximum flame length of 20.4 m. This flame would not extend beyond the site's boundary but could injure people and damage equipment within the flame.

» *Explosions*
As a result of additional structures for the CCGT conversion, a large release of propane could result in a partial confined explosion that could extend beyond the site's boundary. However the risks for offsite fatalities are considered acceptable.

» *Major Hazardous Installation*
This investigation concluded that the CCGT conversion would have risk excessive of $1x10^{-6}$ fatalities per person per year at the site boundary and would classify the facility as a Major Hazardous Installation. While there is potential to reduce the impacts and risks, a quantitative risk assessment would be required in terms of the Major Hazardous Installation (MHI) Regulations (July 2001) prior to project construction. The risk assessment must be done with final designs and layouts. Exemption from completing a MHI risk assessment can not be done at this stage as designs are preliminary and subject to change.

6.7.3 Recommendations

As a result of the risk assessment study conducted for the fuel storage facility for the proposed OCGT conversion, the following are recommendations:

» *Major Hazardous Installation Risk Assessment*

As off-site consequences are possible, a quantitative risk assessment would be required in terms of the Major Hazardous Installation (MHI) Regulations (July 2001) prior to project construction. The risk assessment must be done by an Approved Inspection Authority, as recognised by the Department of Labour, with final designs and layouts.

» *Project Approval*

Large petrochemical storage facilities have been installed around the world having acceptable risks. While consequences of the fuel storage facility may extend beyond the sites' boundaries, the risk can be engineered to within acceptable risks.

As a result of the risk assessment study conducted for the proposed CCGT conversion project, no fatal flaws were apparent that could prevent the project proceeding. It is thus recommended that the project proceed into the detailed phase of the design with the following provisions:

i. Compliance to all statutory requirements e.g. Vessel Under Pressure Regulations etc.;
ii. Compliance with applicable SANS codes SANS 10087-3, SANS 10108. etc.;
iii. A recognised process hazard analysis (HAZOP, FMEA, etc) should be completed for the proposed plant prior to construction. This is to ensure design and operational hazards have been identified adequate mitigation put in place. It would be preferable if study could be facilitated by an independent party that can not benefit financially from offering services, equipment or instrumentation for the project;
iv. A safety document detailing safety and design features reducing the impacts from fires, explosions and flammable atmospheres must be prepared and issued to the MHI assessment body at the time of the MHI assessment. The built facility can be audited against the safety document to ensure compliance with the EIA Terms of Reference. Codes such as IEC 61511 can be used to achieve these requirements. Eskom and their contractors must demonstrate that sufficient mitigation has been included in the designs to ensure the safety of the surrounding neighbours and the public.
v. Emergency response documentation must be done with input from local authorities; and;
vi. A risk assessment in accordance to the prescribed Major Hazard Installation (MHI) Regulations must be conducted after completion of the final designs and layout, but prior to construction.

ASSESSMENT OF ISSUES ASSOCIATED WITH THE PROPOSED TRANSMISSION POWER LINE CHAPTER 7

Three technically feasible alternative transmission power line alignment corridors (each approximately 500 m in width) were initially identified for the proposed 400kV transmission power line between the Ankerlig Power Station and the already authorised Omega Substation (to be located on the Farm Groot Oliphantskop 81) (refer to Figure 3.2). Through the Scoping Study, it was concluded that the adoption of Option A would potentially have the lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, Option A was nominated as a preferred alternative for further investigation in the EIA phase. Options B and C have therefore not been considered further within the EIA process.

During the public review period of the draft Scoping Report, a power line sub-alternative in the vicinity of the Koeberg Nuclear Power Station was recommended by the stakeholders. This sub-alternative is proposed to follow the alignment of the existing power lines for the section of the route past Koeberg (refer to Figure 7.1). This sub-alternative is considered to be a technically feasible alternative and has been investigated within the EIA phase.

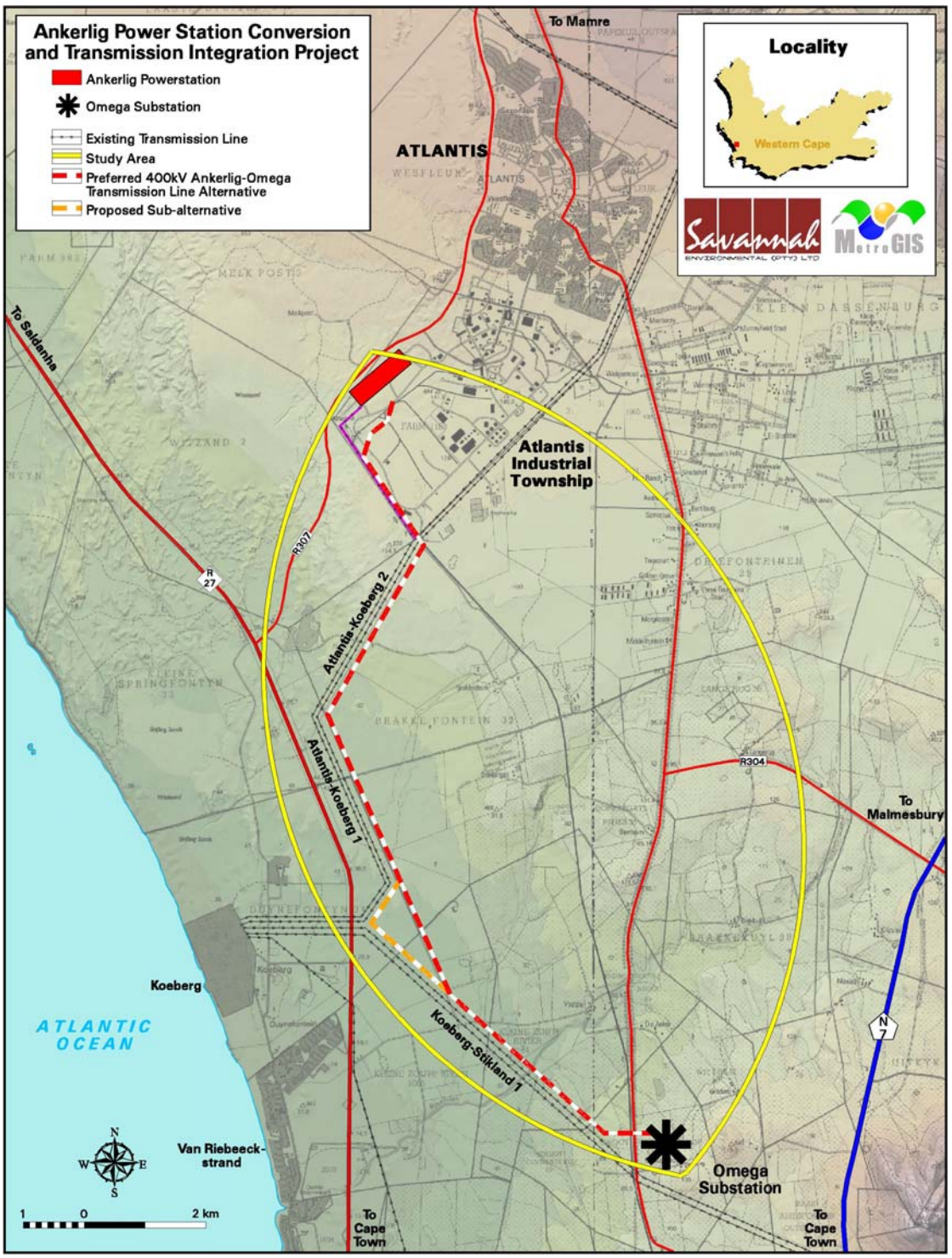

Figure 7.1: Transmission power line alternatives identified for detailed investigation within the EIA phase of the EIA process

This chapter serves to comparatively assess the identified potential direct, indirect and cumulative environmental (socio-economic and biophysical) impacts associated with the proposed power line alternatives in order to nominate one preferred alternative power line corridor for consideration by DEAT. Recommendations are made regarding the management of the impacts for inclusion in the draft Environmental Management Plan (refer to Appendix P).

7.1. Assessment of Potential Impacts on Vegetation

The study area is part of the Cape Floristic Region, a renowned botanical hotspot with a very high percentage of endemic plant species (species restricted to that area) and threatened plant species. Almost 85% of the threatened plants found in South Africa are restricted to the Cape Floristic Region. The vegetation of the area is Cape Flats Dune Strandveld in the north-western section, Atlantis Sand Fynbos on the sandy sections and Swartland Shale Renosterveld on the clayey sections (Mucina & Rutherford 2006). Alien plant infestation in the area is considerable and large sections have been transformed.

The first 1 km of the transmission power line route traverses Cape Flats Dune Strandveld. This vegetation type is restricted to the area from Atlantis south to the Cape Flats and the Cape Peninsula, and is regarded as an Endangered vegetation type on a national basis (Rouget et al 2004). Most of the High sensitivity vegetation associated with the proposed transmission power line is located in this section of the proposed route (refer to Figure 7.2).

The majority of the proposed route passes through what is mapped as Atlantis Sand Fynbos (Mucina & Rutherford 2006). This vegetation type is restricted to acid sands in the Atlantis area, and has been severely impacted by agriculture, urbanisation and alien invasive plants, so that only 60% remains, with 2% conserved, and a national conservation target of 30%. The vegetation type is thus regarded as Endangered on a national basis (Rouget et al 2004). Within the study area much of this habitat is severely invaded by alien *Acacia saligna* (Port Jackson) and *Acacia cyclops* (rooikrans), and was recently burnt, making it impossible to assess the vegetation accurately. Large parts of this section of the route are rated as being of Medium or High sensitivity (refer to Figure 7.2), as this section of the route supports Endangered and largely undisturbed, natural vegetation with potentially viable populations of rare species.

The southern third of the route passes through an area that is a mosaic of habitats, and which can be classified as a broad transitional area (ecotone) between two main vegetation types – i.e. Swartland Shale Renosterveld and Cape Flats Sand Fynbos. There is very little natural vegetation remaining in this section of the route, except along the drainage lines. Consequently much of the route in this area is considered to be of Low sensitivity, although there are localised areas of Medium and High sensitivity. Both these vegetation types are regarded as Critically Endangered, and are amongst the most threatened in the Cape region (Rouget et al 2004).

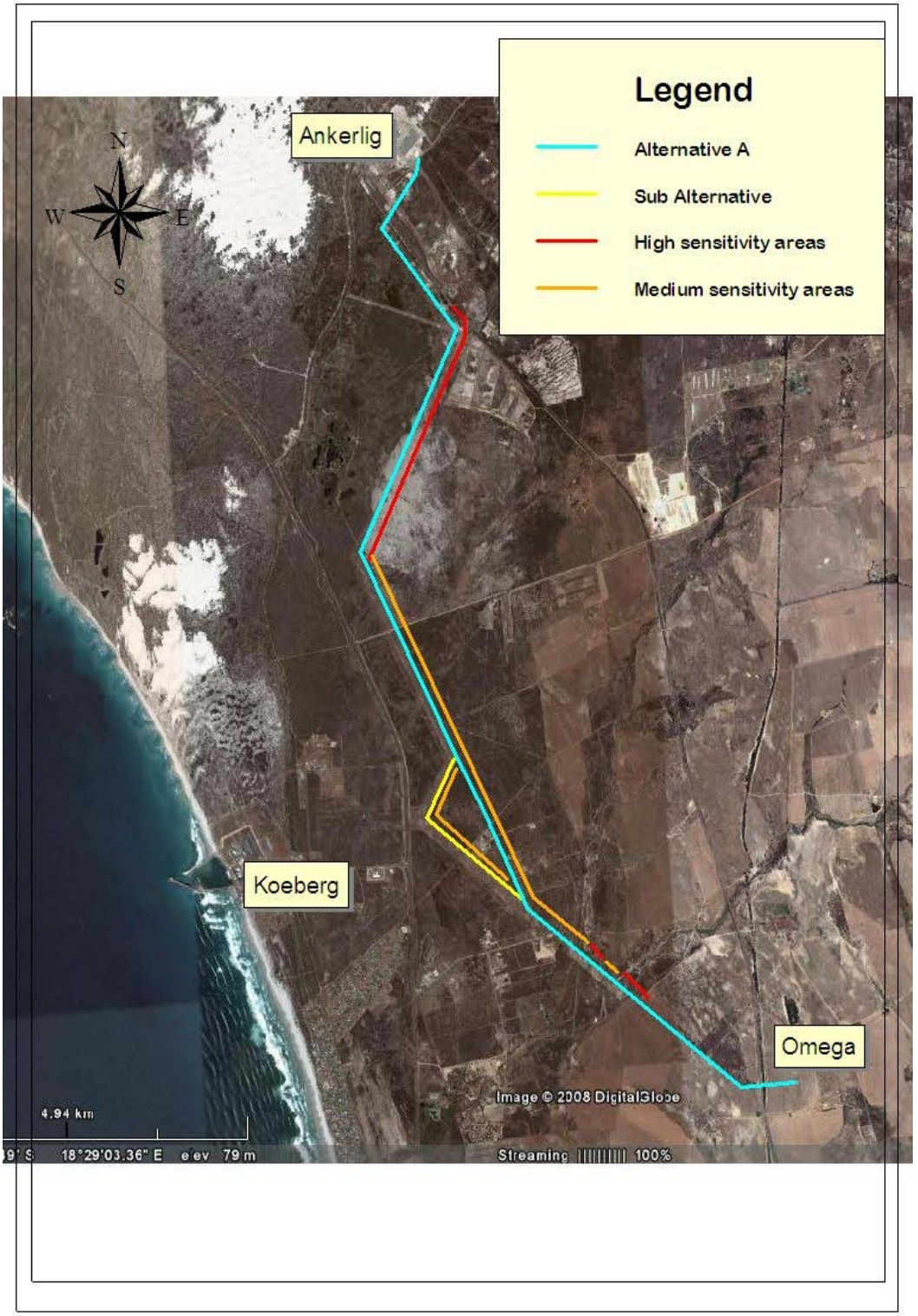

Figure 7.2: Satellite image of the proposed power line route, showing areas of botanical sensitivity along route. Unmarked areas are of low sensitivity.

The proposed sub-alternative follows the existing Koeberg power line and would presumably run on the east side of the existing line, so as not to cross the existing lines. The vegetation in this area is Atlantis Sand Fynbos, but it is fairly heavily degraded, and may have been previously ploughed in places, and is consequently heavily invaded by alien *Acacia saligna*. Overall conservation value of this section of vegetation is considered to be Low to Medium, as it could probably be rehabilitated, and is likely to support a few rare species, in limited numbers (e.g. *Lampranthus* spp.). However, these rare species are likely to be very scattered, and the area is currently not being adequately managed from an ecological perspective.

The botanical impacts of establishing the power line along the proposed sub-alternative are likely to be very similar to those associated with the nearby section of Alternative A, as discussed below.

Impact tables summarising the significance of impacts on vegetation associated with the transmission power line (with and without mitigation)

Nature: Permanent loss of vegetation in tower footprints (1ha) and bushcut servitude (66ha)

The primary direct impacts are loss of natural vegetation at tower footprints, as well as potential impacts associated with the management of the servitudes, such as bushcuttting. Some temporary (long-term) loss of vegetation will also occur in the tracks required to service the power lines, even if they use existing tracks, as the track is not always in the area needed. All hard infrastructure (power line footings) will result in the permanent loss of existing vegetation, and adjacent disturbance associated with this will be medium- to long-term in nature, although the vegetation should eventually recover.

The development footprint will result in loss of at least 1ha of mixed vegetation in an estimated 72 tower footprints (15km of line, with average spans of 250m, estimated footprint of 10m by 10m). If typical Eskom bushcutting is undertaken during operation and maintenance within the full servitude width and length, then this will be a direct negative impact on up to 66ha (55m wide by about 12 000m of Medium or High sensitivity vegetation). Regular (annual, or even up to once every four years) bushcutting eliminates numerous species and totally alters the vegetation structure, effectively turning it into a species-poor and fire-prone grassland. Bushcutting should however not be necessary as this vegetation does not grow much taller than 1.2m, and the fire risk is no more than in the grassy vegetation that comes to dominate in bushcut areas.

Impacts are therefore associated with direct impacts associated with development footprints (1ha of tower footprints) and direct impacts associated with the too frequent bushcutting of the 66ha power line servitude.

	Without mitigation	**With mitigation**
Extent	Local and regional (1)	Local and regional (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (3)

Probability	Definite (5)	Probable (3)
Significance	**High (70)**	**27 (Low)** – considered to be negligible
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» Modification of normal Eskom buschclearing methodology is required in Medium and High sensitivity areas – these areas must not be bushcut more than once every ten years.

» Additional standard mitigation required includes ongoing, annual alien clearing in entire servitude.

» A significant biodiversity offset is the only appropriate mitigation for total loss of vegetation in tower footprints - probably totalling only 1ha, thus need to conserve minimum of 15ha (15: 1 ratio).

Cumulative impacts:

Yes; but very small if adequately mitigated

Residual Impacts:

Yes; therefore the need for biodiversity offsets - which are the only way to deal effectively with residual impacts (notably ongoing loss of Endangered and Critically Endangered vegetation types)

Nature: Long term but temporary loss of vegetation in servitude tracks

The existing natural vegetation will be disturbed in various areas, mostly as a result of heavy machinery and heavy vehicles required to erect the power line and towers. These areas should eventually recover to a significant degree (if natural vegetation is retained in the adjacent areas), but certain species may not return for many years, due to changes in soil structure (such as compaction). The impacts in this case thus rate as being long-term. A very rough estimate is that along 15km of new power line about 7ha of currently mostly natural (some alien invaded or partly disturbed) vegetation may suffer long-term but temporary disturbance (excluding bushcutting, which is addressed above), mostly in the tweespoor track areas.

	Without mitigation	**With mitigation**
Extent	Local and regional (1)	Local and regional (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low – Medium (5)	Low - Medium (5)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (40)**	**Medium (40)**
Status (positive or negative)	Negative	Negative
Reversibility	No	No
Irreplaceable loss of	No	No

resources?		
Can impacts be mitigated?	Not really	
Mitigation: Mitigation cannot really reduce the magnitude of this specific impact, but annual alien clearing in the servitude can help to alleviate the primary environmental problem in the area.		
Cumulative impacts: Yes; but very small		
Residual Impacts: Very small		

Nature: Alien invasion associated with disturbance along power line

Indirect ecological impacts are often difficult to identify, and even more difficult to quantify. There are few indirect impacts of the power line, as it does not disrupt ecological connectivity or ecological processes, at least from a botanical point of view. As soil disturbance encourages alien plant invasion a possible indirect impact would be increased invasion of disturbed areas by alien plants (notably Acacia), and a possible positive impact (after mitigation) in the form of removal of invasive alien vegetation in the 55m wide servitude, and thus totalling some 66ha (this would be regarded as essential mitigation). Overall indirect impacts of the power line after mitigation could thus be Low positive.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**
Status (positive or negative)	Negative	Positive
Reversibility	No	No
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Mitigation should centre on ongoing annual alien clearing within servitude, along with a policy of no bushcutting in servitude, or bushcutting at most once every 10 years.		
Cumulative impacts: Yes; but small		
Residual Impacts: No		

Cumulative impacts

To some extent a cumulative impact is a regional impact, rather than the local site scale impact, i.e. if something has a regional impact it also has a cumulative impact. The Atlantis to Cape Town region is a hotspot of threatened plant species (pers. obs.), due to large scale habitat loss, and any development impacting on remaining natural vegetation in this area will thus have a cumulative negative impact. The larger the overall site impact, the larger the cumulative impact.

Positive impacts

The potential positive impacts will only come about if recommendations noted under Mitigation (Section 7.1.1 below) are implemented and enforced. If mitigation is not effectively carried out there will be no positive impacts. Alien clearing within the 55 m wide servitude would be a Low positive impact, as alien invasive vegetation is currently a major problem in much of the study area. It would be most important and valuable to clear aliens with the High and Medium sensitivity areas (estimated at up to 12km of servitude).

Substantial positive impacts could be realised if a biodiversity offset was part of this development. It is suggested that an appropriate offset would be to formally conserve an area of similar habitat and conservation value to that which is being lost. The main positive effect of an offset would be an increase in the conservation area of an Endangered vegetation type (Cape Flats Dune Strandveld, being the vegetation type which will be most impacted by this development). The positive effects of an offset could either be an increase in the conservation area of an Endangered vegetation type (Cape Flats Dune Strandveld, being the vegetation type which will be most impacted by this development), or otherwise improved ecological management (such as by funding alien clearing) of existing areas of conserved habitat of this type.

7.1.1. Conclusions and Recommendations

Overall the proposed new power line is likely to have a **Medium to High negative impact** on the vegetation at a regional scale, prior to mitigation, primarily due to the high chance of typical Eskom bushcutting practices in the High and Medium sensitivity areas. The primary negative impact is the highly significant impact that would result from the usual Eskom bushcutting in High and Medium sensitivity areas (up to 66ha of servitude), as this would cause total community change and species loss. Additional direct, permanent loss of natural vegetation would occur in pylon footprints (about 1ha), and a long-term but temporary impact in the track areas (up to 7ha). The bushcutting impact can only be mitigated by careful and ongoing removal of all invasive alien vegetation in the 55m wide servitude, and by not engaging in bushcutting in the High and

Medium sensitivity areas. Bushcutting should really not be necessary as this vegetation does not grow much taller than 1.2 m, and the fire risk is no more than in bushcut, grassy vegetation. Impacts could be reduced to Negligible after mitigation.

The power line footprint itself will have only a Low negative impact on the vegetation, and there is no significant difference between the Sub-Alternative and Alternative A in terms of botanical impacts. Therefore, there is **no preference** from a botanical perspective.

Recommended Site Specific Mitigation

» Creation of new tracks must be minimised within the servitudes.
» No bushcutting may occur within the High and Medium sensitivity sections of the servitudes (refer to Figure 7.2). If it is proven essential, the maximum frequency permitted should be once every ten years.
» Ongoing, annual alien plant management must be undertaken in the High and Medium sensitivity sections of the servitudes. Methodology used must comply with DWAF methodology for control of *Acacia saligna* and *Acacia cyclops*. Key elements include: alien clearing must be undertaken by well trained teams using the right equipment; all stems must be cut by hand (not heavy machinery); all cut stumps must immediately (within 5 minutes) be painted with a suitable herbicide that contains a visible dye (in order to prevent resprouting, and to ensure that all stems are painted); no spraying of herbicide; cut stems must be neatly stacked at the outside edges of the servitudes, or preferably removed from the servitudes to an approved organic waste dump site.
» Additional botanical inputs at the walk-down stage would add relatively little value, and are not consequently recommended.
» No towers or tracks should be placed in the wetland areas indicated in both the scoping study and this report (High sensitivity patches in southern half of Figure 7.2).
» Annual monitoring should be undertaken by an independent consultant to ensure that alien vegetation is being cleared appropriately (see bullet 5) from the High and Medium sensitivity areas, and to ensure that these areas are not being bushcut more than once every ten years.

7.2. Assessment of Potential Impacts on Terrestrial Fauna

Five potential faunal habitats are present within the study area, i.e. Rocky habitat, coastal fynbos/coastal sand, Renosterveld, water bodies, such as rivers, streams, pools, lagoons and estuaries and other wetland areas, and Mountain fynbos. From a faunal perspective, the Cape Flats Dune Strandveld is probably the most sensitive habitat in the Atlantis study area.

Although unconfirmed[28], animal species of conservation importance may be present in the study area. Those species that can not effectively vacate affected areas during the construction phase of the proposed transmission line, e.g., burrowing lizards and burrowing mammals, may suffer direct mortality during construction. Although the natural habitat has been highly degraded in the study area, the construction of a new transmission line may also result in the loss of habitat of faunal significance.

Impact tables summarising the significance of impacts on terrestrial fauna associated with the transmission power line (with and without mitigation)

Nature: Direct mortality

Several faunal species of conservation importance may be directly impacted on through mortality of individuals during construction of the proposed transmission line.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (0)
Probability	Improbable (2)	Improbable (2)
Significance	Low (8)	Low (4)
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources	Yes	
Can impacts be mitigated	Yes	

Mitigation:

» Animals found on construction site and that cannot flee by themselves, should be relocated to adjacent areas.

» Except for dense colonies of the Cape Gerbil Tatera afra, animal numbers in the Acacia infested habitat will be low and no formal searches will be required before construction starts, as these will be highly ineffective.

Cumulative impacts:

None

Residual impacts:

None

Nature: Loss of faunal habitats

Construction of a transmission line from Ankerlig to Omega may result in the loss of faunal habitats.

The habitat is of extremely poor quality along the entire route for the proposed power line, including the sub-alternative route. Large sections have been completely transformed, while the remainder is heavily infested with Acacia. It is therefore

[28] Presence unconfirmed but possible due to habitats present.

concluded that the construction of a power line along the proposed routes will not add significantly to the already poor quality of the habitat. There do not appear to be any sensitive faunal habitats along the route.		
	Without mitigation	**With mitigation**
Extent	Local (1)	N/A
Duration	Medium-term (3)	N/A
Magnitude	Minor (2)	N/A
Probability	Probable (3)	N/A
Significance	Low (21)	N/A
Status	Negative	N/A
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Not required	
Mitigation: Not required		
Cumulative impacts: None		
Residual impacts: None		

7.2.1. Conclusions and Recommendations

As a result of the uncertainty as to how far the ranges of potentially sensitive coastal species extend inland into the Atlantis Sand Fynbos habitat, the power line sub-alternative in the vicinity of Koeberg would have the highest potential to impact on animal species of conservation concern. Although Alternative A may result in greater habitat destruction than when following the existing line with its already cleared corridor, the extremely poor quality of the habitat will negate this impact. In summary, as far as terrestrial fauna is concerned, **Alternative A** in the vicinity of Koeberg would be the preferred one, although the case for this conclusion is not very strong.

» From a terrestrial fauna perspective, there do not appear to be any obvious risks associated with the construction of a power line between the Ankerlig Power Station and the already authorised Omega Substation.
» The habitat in the study area is highly degraded and the erection of a power line will not significantly add to the environmental stress already being experienced by terrestrial fauna in the affected areas.
» Although a number of Red Data reptile and frog species may potentially occur in the affected areas, their presence remains unconfirmed.
» The inland route in the vicinity of Koeberg (Alternative A), would, from a terrestrial fauna perspective, be the preferred route, although the case for this decision is not very strong.
» From a humanitarian point of view, animals encountered during site clearing and tower construction should be relocated to adjacent unaffected areas.

Because of the highly transformed nature of the habitat and expected low presence of fauna, no formal search and relocation strategy is required. It should be standard practice during all site clearing and construction activities to assist stranded animals to escape.

As a result of the highly transformed nature of the habitat and the expected absence of Red Data species in the affected areas, no measures for inclusion in the management plan are required as far as terrestrial fauna are concerned.

7.3. Assessment of Potential Impacts on Heritage Sites

Numerous fossil and archaeological sites have been recorded in the broader study area. No specific heritage surveys have been carried out for this project at this stage, as sufficient information was obtainable from existing information.

Three archaeological sites were found on or close to Alternative A (refer to Figure 7.3). These were all on ploughed agricultural land towards the south of the study area. No material was recorded on the sandy stretches of the servitude between Vaatjie and Atlantis. The area between Ankerlig and the entrance to the shooting range, where the lines turn south-west towards Koeberg is already heavily affected by construction of the railway line and station, the shooting range road and development of the industrial area.

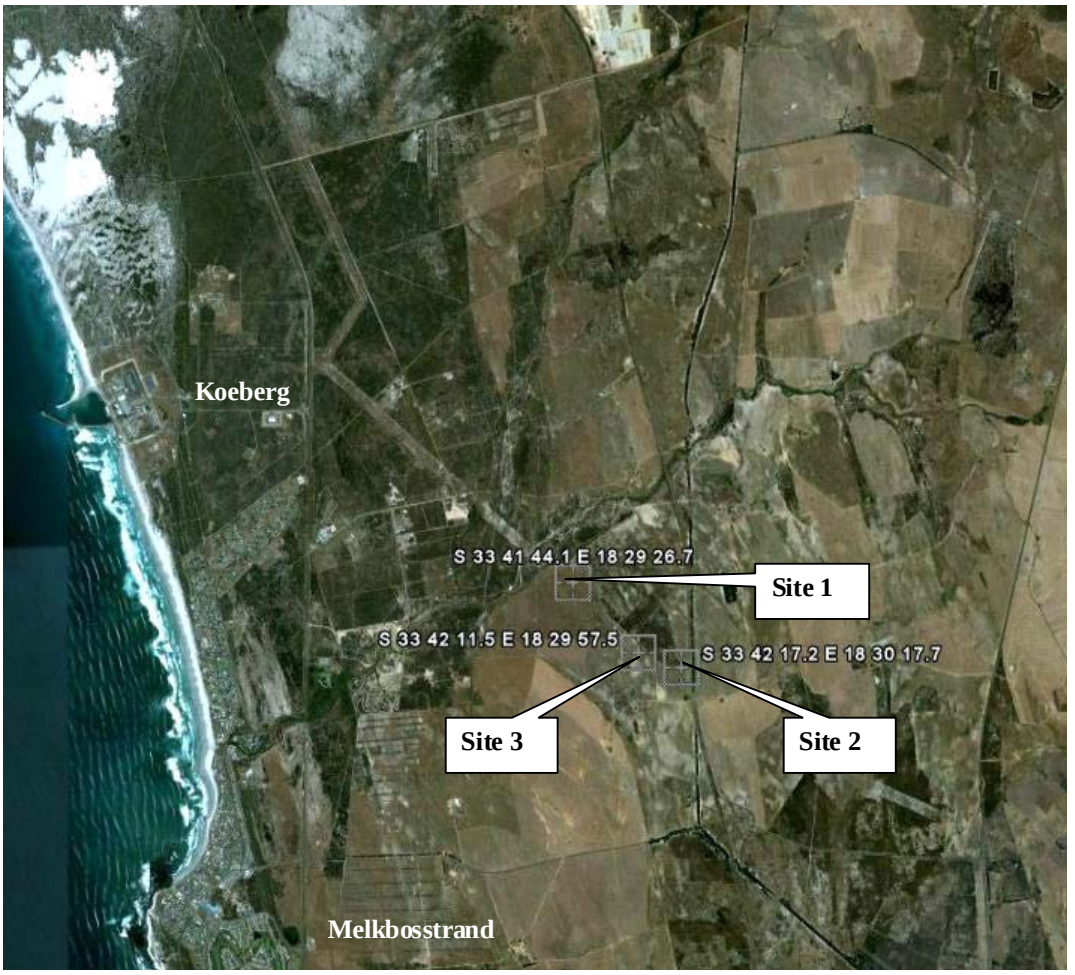

Figure 7.3: Location of archaeological sites found on or close to Alternative A

Heritage sites can be negatively affected by disturbance of the land surface, destruction of significant structures and places as well as any action that will alter the feel and appearance of an historic place or building. Therefore, the construction of the transmission line could result in moderate impacts to the land surface during the construction phase but permanent changes in terms of visual impacts and changes to the feel of a landscape.

Impact tables summarising the significance of impacts on heritage sites associated with the transmission power line (with and without mitigation)

Nature Of Impact: Impacts to cultural landscape (historical pattern of settlement)
The possible impact would be visible physical disruption of the historical pattern of land-use.
Since the Eskom servitude is already established and now a recognised element of the landscape, the addition of a further transmission line is not expected to constitute a

significant impact. Re-use of the existing alignment and consolidation of the electrical infrastructure is far more preferable than creating a completely new route which will subject the area to a new visual intrusion.		
	Without mitigation	**With mitigation**
Extent	Local (1)	N/a
Duration	Long-term (4)	N/a
Magnitude	Small (1)	N/a
Probability	Unlikely (2)	N/a
Significance	**Low (12)**	N/a
Status	Neutral – negative	N/a
Reversibility	Yes	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	Mitigation not required	
Mitigation: No mitigation required		
Cumulative Impacts: N/a		
Residual Impacts: N/a		

Nature Of Impact: Impacts to pre-colonial archaeology caused by destruction and displacement of archaeological material but excavation of bases for towers The 3 archaeological sites identified are already highly disturbed. In the unlikely event that any of the tower footings rest on any of these sites, the impact that will take place will be the moderate lateral displacement of already disturbed stone artefacts. This is an impact of very low significance. Since the material will continue to lie on the landscape, effectively protected by the presence of the servitude it is concluded that the proposed activity does not constitute an impact requiring any mitigation action.		
	Without mitigation	**With mitigation**
Extent	Local (1)	N/a
Duration	Permanent (5)	N/a
Magnitude	Small (1)	N/a
Probability	Unlikely (2)	N/a
Significance	**Low (12)**	N/a
Status	Neutral – negative	N/a
Reversibility	irreversible	N/a
Irreplaceable loss of resources?	No	N/a
Can impacts be mitigated?	Mitigation not required	
Mitigation: » No mitigation required. » Site environmental officer must report any unexpected finds of archaeological material, fossil bone or human remains to relevant authority.		

Cumulative Impacts:
N/a
Residual Impacts:
N/a

7.3.1. Conclusions and Recommendations

No significant impacts on heritage sites are expected occur as a result of the construction of the proposed power line. Both Alternative A and the sub-alternative are considered to be equally suitable for the proposed activity in heritage terms. Therefore, there is **no preference** from a heritage perspective.

The fact that the 3 archaeological sites identified in the servitude are already highly impacted and dispersed warrants no further action on the side of the proponent. It is not necessary to shift tower bases as further disturbance to small portions of these sites will not alter their character, spatial patterning or scientific potential.

» *Action required during the proposed activity*
Should any finds be unearthed during construction activity, an archaeologist and Heritage Western Cape should be informed immediately. The relevant contact person at Heritage Western Cape is Ms Celeste Booth (021 4839685). The person responsible for reporting any finds that evoke concern should be a senior person on site, or an environmental control officer who is on site during construction.

» *Human remains*
Human remains can occur anywhere on the landscape. Most archaeologists retrieve several skeletons a year from various development projects around the province, so finds of this nature are not necessarily rare. Human remains are protected by several sets of legislation which means that certain protocols must be followed in the event of a find.

1) leave the remains in place, nothing should be moved
2) Cordon off the area
3) Call Ms Mary Leslie at SAHRA (021 4624509)
4) Contact an archaeologist
5) Once an archaeologist has examined the find, the archaeologist/SAHRA should contact SA Police services and the state pathologist to report human remains
6) If the human remains are found to be a legitimate burial or a pre-colonial burial, an emergency exhumation permit will be issued by SAHRA or HWC
7) If a crime is suspected, a police docket will need to be opened.

7.4. Assessment of Potential Visual Impacts

The Ankerlig Power Station site is relatively remote and far removed from major centres, tourist attractions and major roads. Significant landmarks in the wider area are the existing Ankerlig Power Station, Koeberg Nuclear Power Station located some 9 km to the south-west, and the town of Mamre located some 3 km to the north.

The area between the Ankerlig Power Station and the Omega Substation is largely rural in nature (smallholdings and agricultural lands), with some limited industrial and infrastructural developments (such as the Wesfleur wastewater treatment works located to the south of the Atlantis industrial area, and the Apollo Brick Works located to the east of the railway line). Existing transmission power lines are also present within the study area.

The visual impact assessment is based on the visual exposure (visibility), the visual distance (proximity of the observer) and the viewer incidence (number of observers) of the proposed project infrastructure. It takes into account the size (width, height and length) of the structures associated with the transmission power line. The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed infrastructure are displayed on Figure 7.3. Here the weighted impact and the likely areas of impact are indicated as a visual impact index. Values were assigned for each potential visual impact per data category (as mentioned above) and merged in order to calculate the visual impact index. An area with short distance visual exposure of the project infrastructure, a high viewer incidence and a predominantly negative perception of the structures would therefore have a higher value (greater impact) on the index.

The area of potentially high visual impact is indicated within a 500m buffer zone from the transmission power line. This area (predominantly vacant farmland) is however greatly devoid of random observers upon whom the transmission power line could have a visual impact.

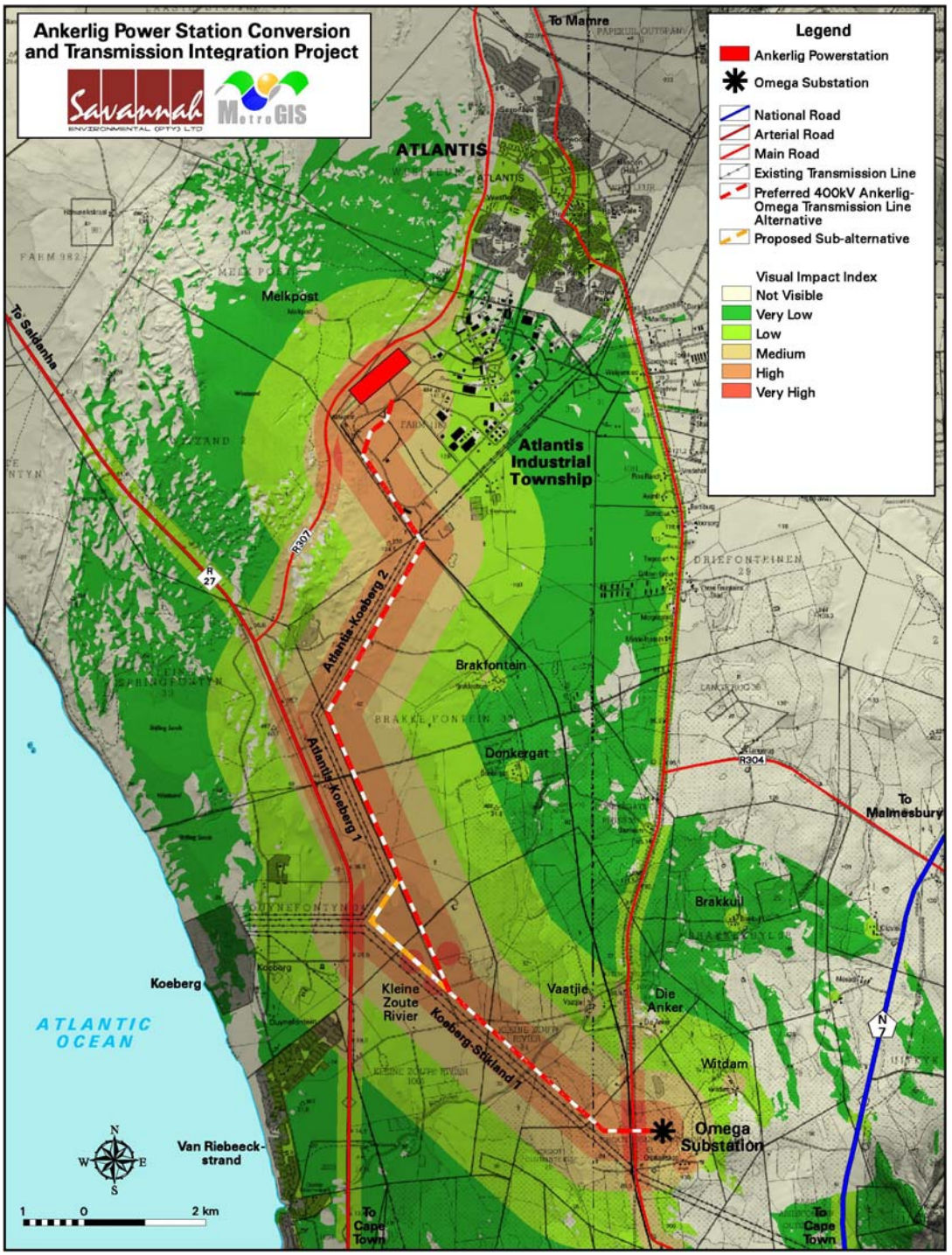

Figure 7.3: Visual impact index - transmission power line

Other areas with a potentially very high visual impact value occur along the R27, near Koeberg, and the R303 near the Omega substation. The sightings of the proposed Ankerlig - Omega transmission power line along the R27 will be influenced/obstructed by the existing transmission power line infrastructure (Atlantis-Koeberg 1 and 2, and Koeberg-Stikland 1), virtually negating the potential visual impact. This is also true for the proposed sub-alternative section near Koeberg where a great number of existing power lines exit the power station and cross over the R27. The section where the proposed transmission power line

crosses the R303, approximately 500m from where the Koeberg-Stikland 1 lines cross the road, will experience the highest visual impact. The visual impact will be compounded by the additional line crossing over the road.

Most of the farm settlements (as identified from the 1:50 000 topo-cadastral maps) are not expected to experience high visual impacts. The sensitive visual receptor indicated as Vaatjie on the map, may experience a medium visual impact (from approximately 1.5km from the alignment) while most of the other identified farmsteads (Witdam, Die Anker, Donkergat and Brakfontein) are located beyond two kilometres from the proposed power line.

The Kleine Zoute Rivier settlement area is expected to experience the highest potential visual impact as the proposed transmission power line alternatives effectively traverse these properties. This is especially true for the proposed sub-alternative that will span across a number of residences and slightly less so for Alternative A that will cross between the residential dwellings. Alternative A is therefore preferred to the proposed sub-alternative due to this potential critical flaw.

The potential visual impact of the proposed Ankerlig-Omega 400kV transmission power line is generally envisaged to be relatively low. This is due to the transmission alignment adjacent to the existing power lines within the study area. The already visible power lines (existing vertical disturbance) are expected to absorb the visual exposure of an additional power line to a large degree. To this end the proposed sub-alternative, near the Koeberg Power Station would have been preferred in order to confine the exposure of the transmission power line within an already disturbed development corridor. Alternative A would spread the visual exposure and would effectively sterilise (encapsulate) this triangular section created between the power lines from a visual point of view. The location of the Kleine Zoute Rivier settlement immediately in the path of this alignment however renders this sub-alternative not preferred from a visual perspective.

Impact tables summarising the significance of visual impacts associated with the transmission power line (with and without mitigation)

Nature: Potential visual impact on users of the R303

The areas with the highest envisaged visual impact along the transmission line alignment are expected to occur near the Omega substation, where the power line would cross the R303, and at the Kleine Zoute Rivier settlement. Observers travelling north along the R303 will pass underneath existing transmission power lines (Koeberg-Stikland 1) and after approximately 500m will encounter the Ankerlig -Omega power line. The repetitive observation of power lines along this section of road is therefore spread out over a longer distance thereby increasing the visual impact.

	Without mitigation	**With mitigation**
Extent	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (5)	Moderate (5)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (52)**	**Medium (39)**
Status (positive or negative)	Negative	Negative
Reversibility	None	None
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (partially)	NA
Mitigation: » The realignment of the preferred alignment to facilitate the crossing of the R303 adjacent to (in closer proximity to) the existing power lines, should this be technically feasible.		
Cumulative impacts: The construction of each new power line across this road contributes to the potential cumulative visual impact experienced by road users. Setting the new power lines further apart spreads the visual impact over a larger distance.		
Residual impacts: None		

Nature: Potential visual impact on residents of the Kleine Zoute Rivier settlement associated with Alternative A		
	Without mitigation	**With mitigation**
Extent	Local (4)	NA
Duration	Long term (4)	NA
Magnitude	Very high (8)	NA
Probability	Highly probable (4)	NA
Significance	**High (64)**	NA
Status (positive or negative)	Negative	NA
Reversibility	None	NA
Irreplaceable loss of resources?	No	NA
Can impacts be mitigated?	No	NA
Mitigation: None possible.		
Cumulative impacts: The construction of each new power line in close proximity of this settlement contributes to the potential cumulative visual impact experienced by its residents.		

Residual impacts: None

Nature: Potential visual impact on residents of the Kleine Zoute Rivier settlement associated with the Sub-alternative		
	Without mitigation	**With mitigation**
Extent	Local (4)	NA
Duration	Long term (4)	NA
Magnitude	Very high (10)	NA
Probability	Definite (5)	NA
Significance	**Very High (90)**	NA
Status (positive or negative)	Negative	NA
Reversibility	None	NA
Irreplaceable loss of resources?	No	NA
Can impacts be mitigated?	No	NA
Mitigation: None possible.		
Cumulative impacts: The construction of each new power line in close proximity of this settlement contributes to the potential cumulative visual impact experienced by its residents.		
Residual impacts: None		

Additional issues related to the visual impact

» *Landscape character/land use character*
The construction of the Ankerlig - Omega transmission power line adjacent to existing power lines (i.e. an existing vertically disturbed landscape) is not in conflict with the landscape character.

» *Visually sensitive features (scenic features or attractions)*
The area in close proximity of the transmission power line does not contain any identified visually sensitive features or scenic attractions.

» *Potential impact of the project infrastructure on tourism and eco-tourism*
The specific area surrounding Atlantis and the proposed project infrastructure is not currently viewed as a major tourist destination. Tourism predominantly consists of visitors travelling to the West Coast National Park and Saldanha Bay along the R27. This road passes south-west of the Atlantis industrial area at a distance of about 4km (at the closest) from the power station. The

construction of the proposed transmission line is not expected to significantly influence the tourism potential within the region.

» *Visual absorption capacity (VAC) of the natural vegetation*
The visual absorption capacity of the natural vegetation in this region is not considered as an element that could successfully negate or mitigate the visual impact of the proposed power line due to the relatively low growth form and the height of the proposed infrastructure (i.e. ~35m stacks).

7.4.1. Conclusions and Recommendations

From the above assessment, it can be concluded that Alternative A would have a lower visual impact on the surrounding environment. Therefore, **Alternative A** is nominated as the preferred alternative from the visual perspective.

The visual impact associated with the construction of the Ankerlig-Omega transmission power line will be additional to existing visual impacts associated with the existing power lines in the study area. The operation of the Ankerlig OCGT power station and the number of transmission power lines already present within the study area mitigates the visual impacts that would be associated with "green fields" projects.

» *Potential mitigation measures*
Mitigation measures for the proposed Ankerlig - Omega power line include avoiding the unnecessary removal of vegetation for the transmission power line servitude and limiting access to the servitude (during both construction and operational phases) along existing access roads.

7.5. Assessment of Potential Impacts on the Social Environment

The study area is located within the Koeberg and Blaauwberg sub-councils of the City of Cape Town Metropolitan Municipality in the Western Cape Province. The population potentially affected by the development include:

» Residents of Atlantis, particularly the suburbs of Avondale, Wesfleur, Protea Park, Beacon Hill and Robinvale, and the nearby informal settlement of Witzand, situated in close proximity to the Industrial area.
» Residents of Atlantis non-urban[29]
» Residents of Melkbosstrand, Duynefontein and Van Riebeeckstrand
» Users of land which could be affected by the proposed power line, including:

[29] Comprised of the rural area surrounding Atlantis to the north, south, east and west stretching South to include the Klein Zoute Rivier and Morning Star Agricultural Holdings, as well as the regions indicated as 'Malmesbury non-urban' and 'Koeberg' on the City of Cape Town Census suburb map (refer to Appendix L).

- Brakkefontein Clay Products Pty Ltd/Apollo Bricks (current works and proposed expansion)
- Users of the Delta 200 Airstrip (used as a drop zone by the sky divers club)
- Users of the Corobrick Four Wheel Drive Challenge site
- Residents of Klein Zoute River Agricultural Holdings
- Landowners of farms situated in the Malmesbury non-urban area immediately south of Atlantis Industrial Area.

Impacts on the social environment as a result of the proposed transmission power line will be associated with both the construction and operational phases.

7.5.1. Potential Impacts Associated with the Construction Phase

Issues relevant for the construction phase include:

» Creation of temporary employment opportunities;
» Influx of job seekers and temporary workers;
» Increase in traffic;
» Impact on current land-uses;
» Impact on sense of place.

Impact tables summarising the significance of social impacts associated with the construction phase of the Ankerlig-Omega power line (with and without mitigation)

Nature: Temporary local employment opportunities, business opportunities and skills development (Alternative A and Sub-alternative)

Construction of the transmission power line will create a number of temporary employment opportunities in construction. Sourcing of construction workers from the local labour pool is likely to be limited to unskilled and semi-skilled workers due to the highly technical nature of the work to be undertaken. This could have some economic benefits for surrounding communities, although only of a temporary nature (Afrosearch 2005).

In addition to creating job opportunities for construction workers, the project may also offer indirect employment creation for entrepreneurs in the informal sector, for instance food stalls for the convenience of construction workers (Afrosearch 2005).

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Very short (1)	Short-term (2)
Magnitude	Low (4)	High (8)
Probability	Probable (3)	Highly probable (4)
Significance	Low (21)	Moderate (48)
Status	Positive	Positive

Reversibility	Positive impact lasts only as long as employment.	Positive impact can be augmented through skills development and on-the-job training.
Can impacts be mitigated?	Yes - effective mitigation can maximise this potential positive impact.	

Mitigation:

» Make use of local labour where possible. Means to achieve this are suggested below:
» Identify types and levels of employment that the development could offer.
» Appoint a local labour broker, to be identified in consultation with local community stakeholders.
» Refer contractors to jobseeker's databases kept by local community structures (e.g. local council, Red Door, Residents' Association) when sourcing local labour.
» Identify targets for BEE & local employment. Criteria for 'local' to be agreed in consultation with local community stakeholders.
» Reserve agreed percentage of higher level positions for local employment.
» Skills training to be undertaken where viable to facilitate employment.
» Location of appropriate transport providers who would be available to assist contractors in transporting workers from these sites.
» Younger people tend to have higher levels of education and may stand in line for higher levels of employment. Opportunities for the employment of younger people should be maximised.
» Investigate opportunities to maximise employment of women.
» Mitigation measures should be supplemented by lessons learnt from the construction of the first OCGT units and the expansion. These should preferably be workshopped. These workshops should be attended, either together or in different workshops, by Red Door, the LED Forum, Eskom, Contractors, and any other relevant representatives. Aspects to be addressed should, amongst others, include the procurement process, procurement criteria, salaries, transparency, and community expectations.

Cumulative Impacts:

The impact of ongoing employment through ongoing construction activities at the Ankerlig Power Station site can be considered cumulative to previous construction processes and other project components, as well as other developments in the area, with Atlantis currently being targeted for increased industrial developments. The longer duration of impacts present ongoing economic opportunities for the local Atlantis community.

Residual Impacts:

The families of those who secure work will benefit and this will impact on their health and well-being for the duration of employment.

Local businesses benefit indirectly as a result of increased local spending by those who are employed. This also impacts on the health and well-being of their families.

Nature: Housing of temporary workers (Alternative A and Sub-alternative)

If construction workers are not sourced locally, but are housed close to the site, this may lead to conflict with locals (Afrosearch 2005). Conversely the presence of temporary workers could provide a small stimulus to the local economy if accommodation for such workers could

be procured locally.

The presence of outside labourers in the local community can create numerous social problems, including

Added emphasis on jobs locals could do that are given to outsiders, thus resulting in increased resentment of the project by the local community.

Potential conflict between outside workers and the local community, enhanced by a feeling of competition for scarce resources, notably much needed employment opportunities.

Social integrity: The presence of construction workers from elsewhere could aggravate existing social problems, particularly alcohol and drug abuse.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long (4)	Short (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	Moderate (36)	Low (12)
Status	Negative	Positive/ Negative
Reversibility	Housing only required for duration of contracts. Social problems created may endure.	Positive impacts (e.g. business opportunities for B&Bs) only for duration of construction work. Social problems created may endure.
Can impacts be mitigated?	Yes	

Mitigation:

» Maximise local employment to minimise the need for housing of temporary workers which could lead to social problems of integration with the local community.
» Ensure that no temporary workers' quarters are allowed for the development.
» Meetings should be arranged with residents' associations of neighbouring residential areas, as well as with the local Community Policing Forum to discuss the contractor's plans, procedures, schedules and possible difficulties and safety and security concerns.
» Workshops with relevant parties (Red Door, Contractors, sub contractors, Eskom, municipality) should be held to discuss and implement relevant lessons learnt from the first OCGT. Other mitigation suggested in the MasterQ assessment for the OCGT expansion included the following:
» All construction activities should be restricted to working areas.
» Construction workers should wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce. This should be applicable to all construction workers, including those who are locally recruited.
» What workers bring on site should be monitored. The provision of catering on-site will reduce the chances that substances such as alcohol are brought on-site or used during working hours, reducing the likelihood of alcohol-related conflict and disturbances.
» Note that these measures can only be enforced on the construction site, and would have little impact on workers' interactions with the local community outside working hours.

Cumulative Impacts:

Additional impacts of outside workers in local communities, whether positive or negative, can be considered cumulative to those experienced from Eskom's previous and other involvement

in the area, as well as other developments taking place in and around Atlantis.

Residual Impacts:

Conflict could lead to social mobilisation.

Limited economic benefits to the community if handled appropriately.

Nature: Influx of job seekers (Alternative A and Sub-alternative)

As news regarding the proposed project spreads, expectations regarding possible employment opportunities may take root. Consequently, the area surrounding the site could experience an influx of job seekers. This can result in an increase in informal settlement, which could lead to social problems such as alcohol abuse, and prostitution (Afrosearch 2005).

If the area experiences an influx of job seekers, competition over scarce employment opportunities may give rise to conflict between local residents and newcomers. An influx of newcomers might also be accompanied by an increase in crime. Even if particular instances of crime are not as a result of the newcomers, they may still be attributed to them by local communities (Afrosearch 2005).

Consultation with local councillors in Atlantis as part of this assessment, particularly Councillor Yiba who is responsible for Ward 32, including the Atlantis Industrial area and surrounding neighbourhoods, as well as the Witsand settlement, indicated that, although immigration to the area in search of work is on the increase, squatting is not considered a serious problem at the moment as measures are in place to deal with this issue. Eskom's project furthermore should be seen in the broader development context for Atlantis, where the local Council recently released a number of properties for development particularly to draw investors in a drive to create employment in the area. The majority of those coming to the area in search for work come through family connections, who assist them with housing.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short (2)	Very short (1)
Magnitude	Moderate (6)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	Low (20)	Low (10)
Status	Negative	Negative
Reversibility	Once construction and employment cease this would no longer be seen as an attraction for further job-seekers, but those who have come in search of jobs remain in the area.	
Can impacts be mitigated?	Yes	

Mitigation:

» Maximise local employment according to strategies outlined previously, ensuring appropriate criteria to determine 'local' (see mitigation for employment creation and influx of labourers above).
» Access to the building site should be controlled.
» Meetings with the local municipality should be held to discuss the management of informal settlement as a result of the project.

Cumulative Impacts:

Possible population influx that may be caused by additional developments at and around the

power station site can be considered a cumulative impact related to general development in the area. The extent to which Eskom's operations will specifically add to this impact cannot easily be quantified, but measures can be put in place to minimise possible social disruption caused by such influx.

Residual Impacts:
Conflict could lead to social mobilisation.

Nature: Impact on current and planned land-users

Existing land users that may be impacted by construction (and subsequent operation of) the proposed transmission power line includes residential, commercial and industrial land (refer to Table 7 of the Social Impact Assessment contained in Appendix H).

Surrounding residents noted severe concerns at the construction of a potential transmission line in close proximity to their homes. Alternative A would impact severely on the Bantjes, Gerber, De Nekker, Viljoen, Schutte, and Theron households, some (if not all) of whom would need to be relocated due to the proximity of the servitude to their houses. The sub-alternative would impact severely on the Gerber household, who would need to be relocated as an additional servitude for another transmission line to the east of current lines running across the property would pass across their house.

Alternative A		
	Without Mitigation	**With Mitigation**
Extent	Site-only (1)	Site-only (1)
Duration	Short (2)	Short (2)
Magnitude	High (8)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (55)**	**Low//Moderate (30)**
Status	Negative	Negative
Reversibility	Rehabilitation of construction areas would be required as part of EMP.	
Can impacts be mitigated?	Yes	

Mitigation:
» Mitigation and compensation to be negotiated with neighbouring landowners and residents.

Alternative A Sub-alternative		
	Without Mitigation	**With Mitigation**
Extent	Site-only (1)	Site-only (1)
Duration	Short (2)	Short (2)
Magnitude	High (8)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (55)**	**Low (25)**
Status	Negative	Negative
Reversibility	Rehabilitation of construction areas would be required as part of EMP.	
Can impacts be mitigated?	Yes	

Mitigation:
» Mitigation and compensation to be negotiated with neighbouring land owners and

residents.

Cumulative Impacts:

» Impacts can be considered cumulative to existing transmission lines

Residual Impacts:

» As mitigation may require relocation of neighbouring residents, real impacts can be considered long-term although this section refers only to the construction phase. Impacts associated with the proposed transmission line are discussed in more detail below with respect to the operational phase.

Nature: Intrusive impacts

Visual impacts and impacts on air quality related to an increase of dust during construction are assessed in separate specialist studies. Construction noise impacts associated with the transmission line are expected to be of low significance and of short duration and thus will not be assessed in detail. Impacts will be particularly severe for residents immediately adjacent to the proposed alignment. These include Klein Zoute Rive residents (Alternative A & sub-alternative).

Alternative A		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short (2)	Very short (1)
Magnitude	High (8)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Moderate (36)**	**Low (14)**
Status	Negative	Negative
Reversibility	Rehabilitation of construction areas would be required as part of EMP.	
Can impacts be mitigated?	Yes	

Alternative A Sub alternative		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short (2)	Very short (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Low / Moderate (30)**	**Low (14)**
Status	Negative	Negative
Reversibility	Rehabilitation of construction areas would be required as part of EMP.	
Can impacts be mitigated?	Yes	

Mitigation:

» Mitigation and compensation for directly affected parties to be negotiated with affected landowners and residents.

» Mitigation for impacts in broader region to consider recommendations made in visual and air quality specialist studies.

Cumulative Impacts:

» Impacts can be considered cumulative to existing transmission lines

Residual Impacts:

» Extent of impact could require affected residents to relocate, resulting in inconvenience and possible material loss.

7.5.2. Potential Impacts Associated with the Operation Phase

Issues relevant for the operation phase include:

» Impacts on current land uses
» Impacts on health and safety
» Impacts on sense-of-place

Impact tables summarising the significance of social impacts associated with the operation phase of the Ankerlig-Omega power line (with and without mitigation)

Nature: Impact on current land-users and neighbouring residents

Impacts on current land users will include:
» permanent loss of land to the servitude;
» loss of income from land (notably existing and planned sand mining operations);
» decrease in property value; (Wimpie Henning, Eskom's Transmission Negotiator, confirmed that property value in the project area can be expected to decrease significantly as a result of additional transmission lines.)
» impacts on health and safety of neighbouring residents (see 4.5.2 below); and
» impacts on sense of place (see 4.5.3 below), which are primarily related to visual and noise impacts in an area selected by residents for its peace and solitude and quiet rural character.

The severity of impacts on affected residents could require purchasing of entire properties if households can no longer reside in such close proximity to the lines. This would need to be negotiated between affected landowners and Eskom.

Alternative A		
	Without Mitigation	**With Mitigation**
Extent	Site-only (1)	Site-only (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (10)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (80)**	**Moderate (45)**
Status	Negative	Negative
Alternative A sub-alternative		
	Without Mitigation	**With Mitigation**
Extent	Site-only (1)	Site-only (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Probable (3)

Significance	**Moderate / High (60)**	**Moderate (45)**
Status	Negative	Negative
Reversibility	Yes – landowners can still use the land for certain activities such as crop planting, but they cannot erect any permanent structures or use centre pivot irrigation systems. Landowners have noted potential impacts on livestock that do not graze under power lines. Although not directly verifiable, this perception should be taken into account as it affects landowners' perception of the development	
Irreplaceable loss of resources	Yes - Land under lines cannot be used for future development.	Yes - Land under lines cannot be used for future development.
Can impacts be mitigated?	Yes - to be negotiated with affected landowners.	
Mitigation: » Purchase land of landowners affected by alignment selected. » Mitigation and compensation to be negotiated with landowners » Detailed planning of alignment should consider current landowners and land uses.		
Cumulative Impacts: » Impacts will be cumulative to those with existing transmission lines on their properties.		
Residual Impacts: » Material loss if compensation for land acquired by Eskom does not compensate for investments in property. » Permanent loss of land to servitude. » Decrease in property value (Confirmed by Eskom Transmission Negotiator) » Impacts on health » Impact on sense of place, resulting from visual impacts and noise from the corona associated with power line operation. » Potential relocation of current households if entire property is to be purchased by Eskom. » Loss of income from sand mining operations.		

Nature: Impact on Health and Safety The impact relates to potential risks associated with living in close proximity to a transmission line as a result of EMFs.		
Alternative A		
	Without Mitigation	**With Mitigation**
Extent	Site only (1)	Site only (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Small (0)
Probability	Highly probable (4)	Improbable (2)
Significance	(2+5+8)4 = 60 = Medium/High	(2+5+0)2 = 14 = Low
Status	Negative	Negative

Reversibility	Irreversible	Irreversible
Can impacts be mitigated?	Ensure minimal exposure	
Alternative A sub-alternative		
	Without Mitigation	**With Mitigation**
Extent	Site only (1)	Site only (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Small (0)
Probability	Highly probable (4)	Improbable (2)
Significance	(2+5+6)4 = 52 = Medium	(2+5+0)2 = 14 = Low
Status	Negative	Negative
Reversibility	Irreversible	Irreversible
Can impacts be mitigated?	Ensure minimal exposure	
Mitigation » Select the alternative which would have the lowest impact on residents. » Buy out directly affected landowners to ensure minimal exposure.		
Cumulative Impacts: » Potential cumulative impacts due to presence of existing transmission lines on affected properties		
Residual Impacts: » Perception of risk. While power line servitude and design may be technically considered as sufficient mitigation to limit health impacts that are only deemed to affect the area situated directly under the power line, people's perceptions of the health risks of exposure to EMFs are firmly entrenched. Surrounding residents will thus continue to perceive this as a significant potential social impact, despite studies by Eskom indicating the actual impact to be limited.		

Nature: Impact on sense of place The proposed transmission power line across rural countryside may be expected to have an impact on the currently semi-rural character of the area (described by residents consulted in this process as a place they came "to get away of the city"), thus affect surrounding residents' 'sense of place'. A number of residents potentially affected by the proposed and sub alternatives consulted indicated that they (and their neighbours) chose to live "in the bush" to get away from people and noise, expressing great alarm at the prospect of their chosen isolation being disturbed by the presence of a transmission line right on their doorstep.		
Alternative A		
	Without Mitigation	**With Mitigation**
Extent	Site-only (1)	Site-only (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (10)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (80)**	**Low (24)**
Status	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of	Irreplaceable loss of peace and tranquillity which	

resources	motivated current landowners to move to this area.	
Can impacts be mitigated?	Not if affected landowners remain resident on properties.	
Alternative A sub-alternative		
	Without Mitigation	**With Mitigation**
Extent	Site-only (1)	Site-only (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	**Moderate/High (60)**	**Low (20)**
Status	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources	Irreplaceable loss of peace and tranquillity which motivated current landowners to move to this area.	
Can impacts be mitigated?	Not if affected landowners remain resident on properties.	
Mitigation: » Land along selected alignment would need to be purchased by Eskom at market related rates, as residents consider impacts on neighbouring residents unacceptable. » Recommendations made by visual assessments should be taken into consideration to mitigate impacts on the rural character of the region, particularly noting its location within the Cape West Coast Biosphere Reserve, which is a potential tourist destination.		
Cumulative Impacts: » The impact of additional power lines through the Cape West Coast Biosphere Reserve can be considered cumulative, particularly to neighbouring residents		
Residual Impacts: » Visual and noise impacts » Loss of land to servitude » Potential relocation of current households if land is to be bought by Eskom.		

7.5.3. Conclusions and Recommendations

Alternative A sub-alternative which directly follows existing transmission lines is considered the preferred alternative from a social perspective, as it would impact mainly on those landowners who already have servitudes for the existing transmission lines registered on their properties. The proposed sub-alternative alignment to the east of the existing alignments will impact on the Gerber's house on Portion 20 KZR AH as well as on sand mining operations of Mphoweni Sands on the land of Suzie Langer, and a proposed sand mining development on the land of Joseph Jenkinson (Portion 18 KZR AH). Acquisition of the Gerbers' property (portion 20 KZR AH) may be required as additional land lost to servitude will impact severely on this household as well as impacting on health and safety and viability of the Gerbers' current residence, and also further deteriorate the value of their property. This alternative would also impact on land of Joseph

Jenkinson, Clive Spolander and Suzie Lander, who would have to be compensated accordingly.

Alternative A follows the existing transmission lines from Ankerlig to Koeberg, but continues in a straight line where the existing lines turn to the Koeberg Power Station, and meeting up again with lines from Koeberg to the Omega substation at a point situated in the Klein Zoute Rivier Agricultural Holdings. Although the distance covered by the new servitude required for the portion where the line continues straight instead of turning off to Koeberg is short, it would have significant impacts on the Gerber, Van Wyk, De Nekker, Schutte, Viljoen, and Theron households. This alternative could require acquisition of all the properties of affected households as land lost to the servitude, health and safety impacts associated with close proximity of lines, as well as impacts to 'sense of place', related to noise and visual impacts on these households would be considered unacceptable. This alternative would also impact on land of Joseph Jenkinson, Clive Spolander and Suzie Lander, who would have to be compensated accordingly

7.6. Nomination of Preferred Transmission Power Line Alternative

From the specialist studies undertaken, various conclusions have been drawn regarding the preferred alternative for establishment of the power line.

» There is **no preference** between the power line alternatives from a vegetation and heritage perspective.
» From a terrestrial fauna perspective, **Alternative A** is slightly preferred.
» From a visual perspective, **Alternative A** is preferred.
» From a social perspective (considering, inter alia, number of properties affected), the **Sub-alternative** is preferred.

Visual impacts and social impacts are considered to be of equal importance in determining a preferred alternative. Social impacts can be mitigated through acquisition of all the properties of affected households, whereas it would not be possible to mitigate the visual impacts associated with the transmission power line. Therefore, **Alternative A** is nominated as the preferred alternative from an environmental perspective.

This conclusion is supported from a technical perspective, as this would allow for future power lines exiting the Koeberg Nuclear Power Station site.

CONCLUSIONS AND RECOMMENDATIONS CHAPTER 8

Eskom Holdings Limited (Eskom) is investigating the conversion of the nine Open Cycle Gas Turbine (OCGT) units at the existing Ankerlig Power Station (located in Atlantis Industria) plant to a Combined Cycle Gas Turbine (CCGT). This would increase the generating capacity of this existing power station by a maximum capacity of 720 MW. The proposed conversion would involve the addition of Heat Recovery Steam Generators (HRSG) to generate steam, and steam turbines and generators to the existing gas turbine plant (essentially adding a steam cycle to the existing gas cycle), and would be established on the same site as the existing Ankerlig Power Station.

Eskom is also proposing the construction of a 400kV transmission power line between the Ankerlig Power Station and the already authorised Omega Substation (to be located on the Farm Groot Oliphantskop 81) to integrate the additional power generated at Ankerlig Power Station into the national electricity grid.

The environmental impact assessment (EIA) for the proposed project has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

The EIA Phase aimed to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the proposed alternatives put forward as part of the project.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed project.
» Comparatively assess identified alternatives put forward as part of the project.
» Nominate a preferred power line alternative corridor for consideration by the decision-making authorities (i.e. DEAT and DEA&DP).
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The conclusions and recommendations of this EIA are the result of the assessment of identified impacts by specialists, and the parallel process of public

participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

8.1. Evaluation of the Proposed Project

The preceding chapters of this report together with the specialist studies contained within Appendices E - M provide a detailed assessment of the environmental impacts on the social and biophysical environment as a result of the proposed project. This chapter concludes the EIA process by providing a summary of the conclusions of the assessment of the proposed Ankerlig Power Station Conversion and Transmission Integration Project. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental consultants during the course of the EIA and presents an informed opinion of the environmental impacts associated with the proposed project.

8.1.1. Conclusions and Recommendations drawn from the Assessment of the Proposed Conversion of the Ankerlig Power Station

All components of the proposed power station conversion project will be on the site of the existing Ankerlig Power Station, and will not require any additional land take outside of the existing power station boundaries. Potential impacts associated with the proposed power station conversion project are expected to occur during both the construction and operational phases. In general, impacts are expected to be similar to those associated with the initial phases of the power station project (i.e. the initial 4 OCGT units currently in operation, and the additional 5 OCGT units currently under construction). New impact sources associated with the power station conversion project would include:

» **Air quality impacts** associated with the construction phase (dust) and the operational phase (emissions from the power station). Impacts on air quality associated with the construction phase are expected to be restricted to the power station site and of low significance. For the operational phase, the introduction of the combined cycle units will not change the emission quantities of the air pollutants. However, the temperature of the exit gases will be reduced with the introduction of the CCGT units. During operation, the introduction of the combined cycle units will potentially increase the ground-level concentrations if the stack heights are not increased from the existing 30m. However, increasing the stack heights to 60m in height (as is proposed) will result in the ground level concentrations being at levels similar to those associated with the open cycle units. With the introduction of 60m high stacks, nitrogen dioxide was the only pollutant predicted to exceed its hourly guideline limit of 200 $\mu g/m^3$. The number of incidents per year, however, was below 10. The annual guideline for this pollutant was not

exceeded at any of the sensitive receptor locations. The other pollutants examined, i.e. sulphur dioxide, PM10 and VOCs, were well within their respective guidelines for all sensitive receptor locations. The utilisation of natural gas as fuel for the Ankerlig power Station units (should this become available) will significantly reduce the ground level concentrations of all pollutants, including nitrogen oxides to well below their respective guidelines. The overall impact significance for the combined cycle Ankerlig units was found to be High. The introduction of natural gas (should this become available) will reduce this impact to Low.

» **Noise impacts** associated with the existing OCGT units as well as the additional CCGT components to be added onto the existing power station (i.e. air filters, the gas compressor, the gas turbine, the generator, the electricity transformers, the fans associated with the stacks, the heat recovery equipment, the steam generator, the steam turbine and the air-cooled condenser system associated with the dry-cooling system). Noise impacts on sensitive receptors in the residential areas surrounding the Atlantis Industria area as a result of the proposed Ankerlig Power Station conversion project is expected to be **negligible**. The additional proposed mitigation measures will reduce this noise level increase even further.

» **Visual impacts** as a result of the additional infrastructure associated with the conversion project to be added onto the existing power station (i.e. the heat recovery steam generator (HRSG), the 60 m high stacks, the 25 m - 30 m high air-cooled condensers, the additional fuel storage tanks and the water reservoir). The visual impacts associated with the conversion of the power station will be additional to existing visual impacts and are expected to be of **high** significance without mitigation. The operation of the Ankerlig OCGT power station and the number of transmission power lines already present within the study area mitigates the visual impacts that would be associated with "green fields" projects. Mitigation measures are required to be considered during the detailed design phase in order to minimise visual impacts associated with the proposed project.

» **Impacts on the biodiversity** as a result of the proposed additional fuel storage area. The ecology of the power station site has been largely transformed through the construction of the existing Ankerlig Power Station. Small portions of vegetation do, however, still exist in areas not directly impacted by construction, such as the area proposed for the establishment of additional fuel storage tanks. This area comprises approximately 17.5ha to the east of the existing power station. The primary negative impact is a direct, permanent loss of natural vegetation. This impact cannot be avoided, and can only be mitigated by a biodiversity offset, which is regarded as

essential. Potential impacts are expected to be of **moderate to low** significance without mitigation.

» **Traffic and transportation impacts associated with the transportation of additional fuel to the power station site** as a result of the construction and operation of the power station (due to the need to operate the power station at a higher load factor (i.e. for longer hours) than is currently the case). Impacts are expected to be of **moderate to low** significance without mitigation. This is largely due to the fact that the major roads within the study area are designed to accommodate a certain number of heavy loads within their design life, thereby minimising the potential impacts associated with the proposed project.

» **Impacts on the social environment** expected during both the construction and operation phases of the proposed project. The positive impact of electricity provision associated with the proposed power station conversion outweighs potential negative impacts that may be associated with the development. Such negative impacts can be mitigated, while potential positive impacts such as social investment and employment creation during construction can be optimised through appropriate management measures.

8.1.2. Conclusions and Recommendations drawn from the Assessment of the Ankerlig-Omega Transmission Power Line

Potential impacts associated with the proposed transmission power line are expected to occur during the construction and operational phases, and have been identified through this scoping process include:

» **Impacts on flora and fauna** as a result of the disturbance of habitats within the power line servitude and at tower footprints.
» **Impacts on avifauna** as a result of collisions with the earthwire, electrocution and disturbance of habitats within the power line servitude.
» **Impacts on heritage sites** as a result of disturbance or destruction during the construction phase, as well as due to visual impacts on heritage sites.
» **Visual impacts** on the surrounding area.
» **Impacts on the social environment** as a result of the creation of employment opportunities, influx of workers to the area, impacts on land use, and impacts on sense of place.

In general, the nature and extent of impacts identified is dependent on the alignment which is selected. From the specialist studies undertaken, various conclusions have been drawn regarding the preferred alternative for establishment of the power line.

» There is **no preference** between the power line alternatives from a vegetation and heritage perspective.
» From a terrestrial fauna perspective, **Alternative A** is slightly preferred.
» From a visual perspective, **Alternative A** is preferred.
» From a social perspective (considering, inter alia, number of properties affected), the **Sub-alternative** is preferred.

Visual impacts and social impacts are considered to be of equal importance in determining a preferred alternative. Social impacts can be mitigated through acquisition of all the properties of affected households, whereas it would not be possible to mitigate the visual impacts associated with the transmission power line. Therefore, **Alternative A** is nominated as the preferred alternative from an environmental perspective.

This conclusion is supported from a technical perspective, as this would allow for future power lines exiting the Koeberg Nuclear Power Station site.

8.2. Overall Conclusion (Impact Statement)

The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that:

» There are no environmental fatal flaws that should prevent the proposed project from proceeding on the identified site.
» From the assessment of the alternative power line alternatives, **Alternative A** is considered to be the alternative which would result in the lower impact on the environment as potential impacts associated with this alternative can be mitigated to some extent. This conclusion is supported from a technical perspective, as this would allow for future power lines exiting the Koeberg Nuclear Power Station site.
» The significance levels of the majority of identified negative impacts can be minimised by implementing the recommended mitigation measures.

8.3. Overall Recommendation

Based on the nature and extent of the proposed project, the local level of disturbance predicted, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the application for the proposed Ankerlig Power Station Conversion and Transmission Integration Project be authorised by DEAT.

The following conditions of this recommendation must be included within the authorisation issued:

- All mitigation measures detailed within this report and the specialist reports contained within Appendices E to M must be implemented.
- The draft Environmental Management Plan (EMP) as contained within Appendix P of this report should form part of the contract with the Contractors appointed to undertake the decommissioning, relocation and re-commissioning activities associated with the project, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMP for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
- Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site, disturbance to heritage sites, disturbance of protected vegetation, and disturbance to any riparian vegetation or wetlands.
- During construction, unnecessary disturbance to habitats should be strictly controlled and the footprint of the impact should be kept to a minimum.
- The process of communication and consultation with the community representatives must be maintained after the closure of this EIA process, and, in particular, during the construction phase associated with the proposed project.

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