ECOLOGICAL BASELINE ASSESSMENT

FOR

PROPOSED UPGRADE AND EXPANSION OF THE COASTAL ACCESS ROAD FROM L'AGULHAS TO SUIDERSTRAND

Prepared for:

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PROJECT DETAILS

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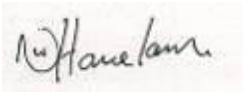
By Author	Director: Environmental Management; Principle Environmental Assessment Practitioner & Biodiversity Specialist	Nicolaas Hanekom		08 June 2018

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Executive Summary

The Cape Agulhas Municipality proposes to pave the current ±5km long and ±8m wide gravel coastal access road from L'Agulhas to Suiderstrand. The road width will be expanded by 2.5m (2.5m paved sidewalk on the coastal side) to a total width of 10.5m.

Along the 5km route there are three sections which fall within 100m from the high-water mark area for which environmental authorisation is required before the development can continue:

- Section 1: ±820m (±710m of this section has already been paved but is proposed to be expanded by 2.5m in width [paved sidewalk on coastal side]) Expected construction footprint = 4905m ²; final development footprint = 2945m² and total infill material = 1031m³
- Section 2: ±612m Expected construction footprint = 8874m ²; final development footprint = 6426m² and total infill material = 2249m³
- Section 3: ±400m Expected construction footprint = 5800m ²; final development footprint = 4200m² and total infill material = 1470m³

The total expected development within these three sections is ± 2ha (of which 1.6ha has already been completely cleared due to previous and existing road infrastructure).

The infill material to be used will be G4 gravel material obtained from the commercial borrow pit of Afrimat, Bredasdorp to be constructed by machines and paving material which will be 80mm thick interlocked concrete paving blocks for the road and 60mm thick concrete paving blocks for the sidewalk, which is placed by hand. The expected construction timeline for the completion of the proposed upgrades along the entire 5km route is ±18months.

Eco Impact has been appointed to conduct an ecological baseline assessment on the areas within 100m from the high water mark for which an Environmental Authorization is required to assess the ecological state of the proposed impacted area, identify potential constraints, assess the potential impact of the proposed activities on the ecological features of the site and surrounds and provide associated mitigation and management recommendations.

It was determined that the overall areas to be impacted upon have a low botanical sensitivity/conservation value. The proposed development areas along the road verges was disturbed and altered during the previous road and infrastructure development and the types of returning plant species (mostly pioneer) recorded on site is evidence of that.

According to the 2017 Western Cape Biodiversity Spatial Plan the road and its edges (proposed development area) outside the Agulhas National Park area is not mapped as a CBA or ESA. The 1st section closest to Agulhas falls within the Agulhas National Park and is mapped as a Protected Area. The area surrounding the proposed development area of section 2 and most of section 3 is mapped as Ecological Support Area (ESA 1), and a small surrounding area along section 3 as Terrestrial Critical Biodiversity Area (CBA 1). These areas were identified as such to protect coastal process. The paving and widening of the road will however not have a significant negative impact on these coastal processes as road paving and widening will occur mostly on already existing cleared gravel road area and only have a limited impact on surrounding indigenous vegetation areas, and even these areas are disturbed road verges with mainly returning pioneer species.

The National Vegetation Map of South Africa (2012) identifies the remnants of natural vegetation occurring within the area as Overberg Dune Strandveld (LT). The indigenous vegetation species populations recorded on site in the areas that will be impacted by the proposed development is mostly pioneer species not of conservation concern other than to stabilize the previously disturbed road edges. However, mitigation measures must be put in place to minimise the edge effects during construction and operation/maintenance to prevent wider areas of disturbance. Due to most of the proposed development areas already being cleared/developed upon for the current road infrastructure it is expected that a maximum of 0.4ha of indigenous vegetation will further be cleared for the proposed development within the relevant three sections.

No species of conservation concern were recorded nor are expected to occur on the impacted sites. This study also investigated any presence of any significant wetland/freshwater resources on or within close proximity to the development sites, however no such features were found during the survey.

It was concluded that, from an ecological impact point of view, the proposed development should not have an unacceptably significant negative impact on environmental features of the site and surrounds if specialist recommendations are taken into consideration and effectively implemented.

1. Background & Competency

This ecological baseline assessment is presented by Eco Impact Legal Consulting (Pty) Ltd ("Eco Impact").

Eco Impact has been appointed as the independent ecological impact assessment specialist for this project.

Eco Impact is independent and does not have any interest in the business nor receive any payment other than fair remuneration for services rendered as required in terms of the regulations.

Nicolaas Hanekom has 26 years' experience working as an ecologist for nature conservation organizations. He has extensive field experience and botanical knowledge, some knowledge of wetlands ecology, is knowledgeable of the region in which they are working and exercises sound and unbiased scientific and professional judgment. He is a qualified Environmental Assessment Practitioner and a registered Professional Natural Scientist (Ecologist) with the SACNASP who holds a M. Tech, Nature Conservation from the Cape Peninsula University of Technology. This master's thesis focussed on the impact of different land uses on the Phytodiversity ("Botany/ plants") of the West Coast Strandveld in and around Rocherpan Nature Reserve.

Nicolaas has been responsible for many Ecological Baseline Assessment (including botanical and freshwater assessments) since 2006.

2. Conditions Relating to this Report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. Eco Impact and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, as pertaining to this investigation.

This report may not be altered or added to without the prior written consent of the author. This restraint also refers to electronic copies of this report which are supplied as sub portion of other reports, including main reports. Similarly, any recommendations, statements, or conclusions drawn from or based on this report must specifically refer to this report. If such comments form part of a main report for this investigation, the base line report must be included in its entirety as an appendix or separate section to the main report.

3. Scope and Terms of Reference for the Study

Eco Impact Legal Consulting (Pty) Ltd was appointed to conduct an ecological baseline assessment to identify and assess potential impacts that proposed activities may have on any significant terrestrial or aquatic ecosystems of the applicable site and surrounds.

The basic terms of reference (TOR) for this study were the Cape Nature recommended TOR for biodiversity specialists, and are as follows:

- Produce a baseline analysis of the botanical attributes of the study area as a whole.

- This report should clearly indicate any constraints that would need to be taken into account in considering the development proposals further.

- The baseline report must include a map of the identified sensitive areas as well as indications of important constraints on the property. It must also:

- Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering viability etc.

- In terms of biodiversity pattern, identify or describe:

  Community and ecosystem level
  - The main vegetation type, its aerial extent and interaction with neighbouring types, soil or topography;
  - The types of plant communities that occur in the vicinity of the site
  - Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, etc.*)

  Species level

- Red Data Book species of conservation concern (RDBSCC) - (provide location)
- The viability of and estimated population size of the RDBSCC that are present (include degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High = 70-100% confident, Medium 40-70% confident, Low 0-40% confident)
- The likelihood of other RDBSCC species occurring within the vicinity (include degree of confidence)
- Other pattern issues
- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying
- The condition of the site in terms of current or previous land uses

- In terms of biodiversity process, identify or describe:
  - The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
  - Any mapped spatial component of an ecological process that may occur at the site or in the vicinity i.e. watercourses, biome boundaries, migration routes etc.
  - Any possible changes in key processes e.g. increase fire frequency or drainage/artificial recharge of aquatic systems.

- Describe what is the significance of the potential impact of the proposed project – with and without mitigation – on biodiversity pattern and process at the site, landscape, and regional scales.

- Recommend actions that should be taken to prevent or mitigate impacts. Indicated how these should be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.

- Indicate limitations and assumptions, particularly in relation to seasonality.

4. Limitations, Assumptions and Methodology

The site was surveyed during the afternoon of 30 April 2018.

The natural vegetation areas and any other prominent environmental features such as watercourses i.e. wetlands, drainage lines etc. if present were delineated and prominent indigenous and alien invasive species were recorded.

Characteristic plant species (if present on the proposed development site) were recorded during the survey as well as any rare, threatened or species of conservation concern or habitats. The GIS based South African National Biodiversity Institute (SANBI) vegetation map for South Africa (Mucina and Rutherford 2010) was consulted, along with the available regional conservation plans (CAPE), and the Western Cape Biodiversity Spatial Plan (2017), and a conclusion was drawn based on this documentation and professional experience in the area. SANBI – Red List of South African Plants website was also referred to if required.

One of the primary assumptions of this study is that sufficient botanical and ecosystem characteristics information could be gathered during the visit to make accurate conclusions regarding the conservation value of the area and potential impact of the development as proposed. Habitats (type, quality, rarity, characteristics) rather than species are used to inform mapping and decision making in this case. If sufficient botanical and/or ecosystem characteristics information could not be gathered during the initial site visit recommendations will be made to ensure adequate assessments are undertaken.

Due to the time of year, small area and current state of the site it is believed that sufficient ecosystem characteristics information could be gathered during the survey to conduct the assessment.

Relevant references are noted in the text, and conclusions were drawn based on this documentation and professional experience in the area. Areas were measured using Google Earth Pro.

It is assumed that the study area is an accurate representation of the proposed road expansion area as provided by the engineers. For purposes of this assessment the No Go alternative is assumed to be a continuation of the status quo, which in this case is existing gravel road. This study also investigated any presence of any significant wetland/freshwater resources on or within close proximity to the development sites, however no such features were found during the survey.

Conservation value and sensitivity of habitats are products of species diversity, plant community composition, rarity of habitat and vegetation type, degree and type of habitat degradation, rarity of species, ecological viability and connectivity, restorability, vulnerability to impacts, and reversibility of threats. Any areas with a good chance of supporting and maintaining viable populations of threatened or localised plant species are deemed to be of High sensitivity.

Medium sensitivity areas have been partly disturbed and typically support 10 - 30% of the original species diversity (prior to disturbance), may have limited numbers of a few plant Species of Conservation Concern, and have moderate rehabilitation potential.

Low sensitivity areas have been heavily disturbed, with changes to the soil structure and composition, and support less than 10% of the expected indigenous plant diversity, no plant Species of Conservation Concern, and rehabilitation potential is considered to be low, at least without substantial investments in time, materials and money.

Reference is made to the South African Vegetation Map (Mucina & Rutherford 2006 and 2012 updates), to the National Spatial Biodiversity Assessment (Rouget et al 2004), and to the National List of Threatened Ecosystems (DEA 2011). In addition, the City of Cape Town Biodiversity Network (2017) was also referenced as well.

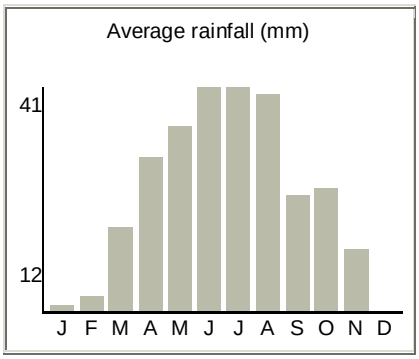
5. Broad Ecological Characteristics of the Site and Surrounds

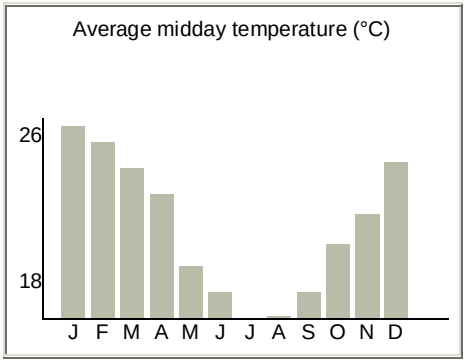
5.1 Topography

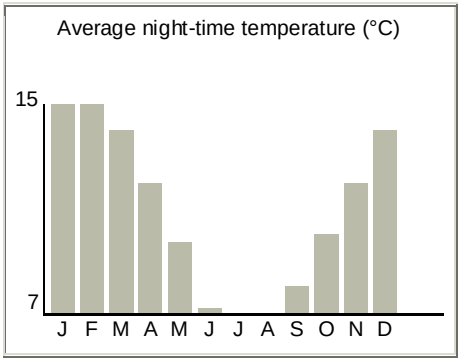
The proposed development area is relatively flat lying with coastal plain with an elevation of 5 – 11m above mean sea level.

5.2 Climate

The area normally receives about 303mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. The chart below (lower left) shows the average rainfall values for the area per month. It receives the lowest rainfall (11mm) in January and the highest (40mm) in July. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for the area range from 17.3°C in July to 25°C in January. The region is the coldest during June when the mercury drops to 7°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.







5.3 Geology

The soils on site have minimal development, are shallow, on hard or weathering rock. Lime generally present throughout the landscape.

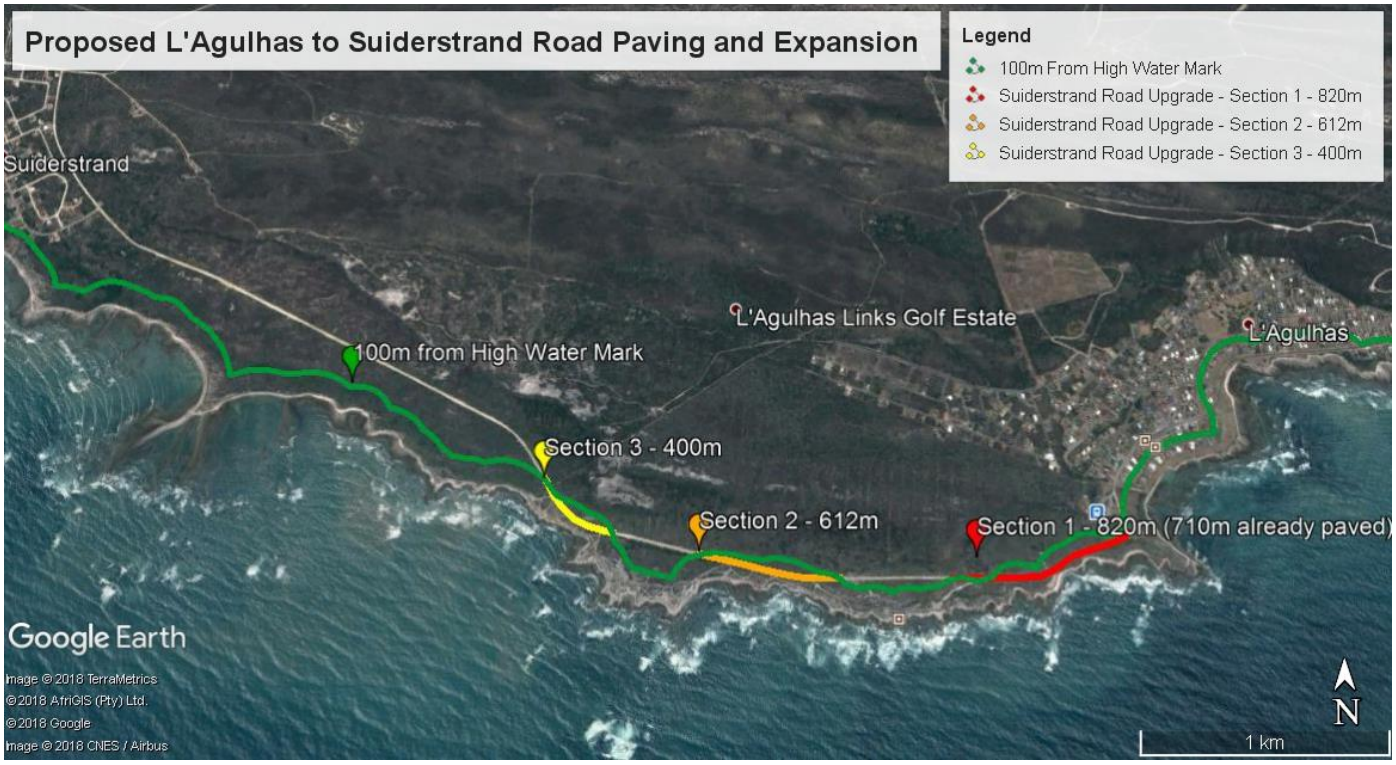
5.4 Vegetation at a Regional and National Context

The study area is part of the fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics).

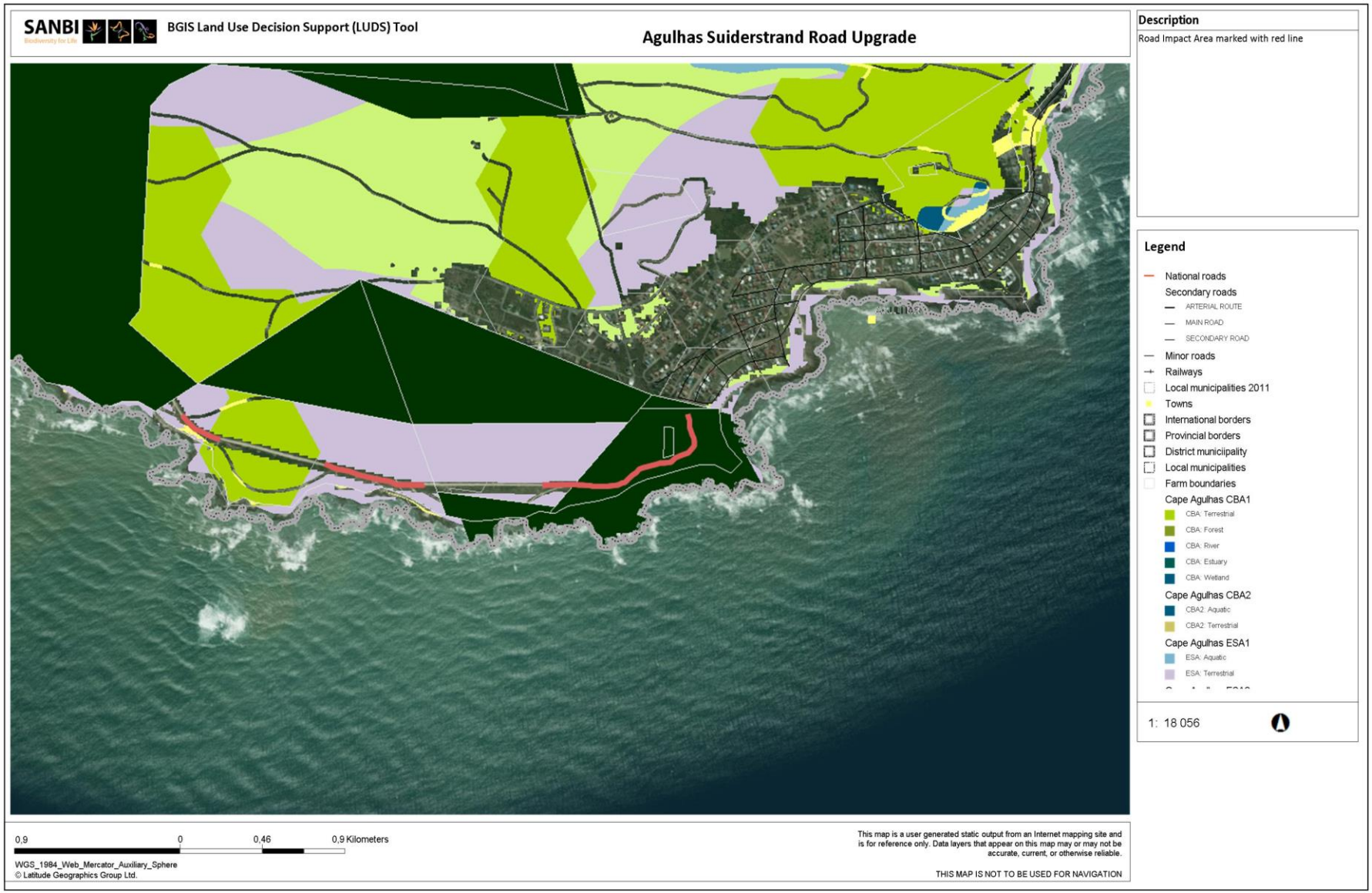
Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only

in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009). It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The Western Cape Biodiversity Spatial Plan (2017) indicates identified Critical Biodiversity Areas (CBAs) which aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. It serves as the common reference for all multi-sectoral planning procedures, advising which areas can be lost to development, and which areas of critical biodiversity value and their support zones should be protected against any impacts.



Map 1: Study Area. Road paving and widening proposed within 100m from high water mark of the sea marked in red.



Map 2: Critical Biodiversity Areas, Ecological Support Areas and NFEPA Wetlands according to the WCBSP (2017) mapping.

6. Observations and Findings Relative to the Terms of Reference

6.1 In terms of biodiversity pattern, identify or describe, at a community and ecosystem level-

6.1.1 The main vegetation type and plant communities that occur on, and in the vicinity of the site:

The National Vegetation Map of South Africa (2012) identifies the remnants of natural vegetation occurring within the area as Overberg Dune Strandveld (LT).

Vegetation Type : Overberg Dune Strandveld
Ecosystem threat status: Least Threatened
Listed under criterion: Biome: Fynbos
Province: Western Cape

Distribution Western Cape Province: Scattered patches from Rooiels (Cape Hangklip area) as far east as Cape Infanta at the mouth of the Breede River, with the largest one surrounding the Agulhas Peninsula—as a rule bordering on coastal limestone formations. Altitude 0–100 m, but reaching 160 m in places.

Vegetation & Landscape Features Flat or slightly undulating dune fields of Die Plaat near Stanford and those of De Hoop, supporting up to 4 m tall, closed, evergreen, hard-leaved shrublands in moist dune slacks and wind-protected valleys and up to 1 m tall, coastal thicket in many places wind-shorn along exposed littoral situations.

Geology & Soils Deep, Recent marine-derived calcareous sands forming dunes that line the coast (Quaternary Strandveld Formation of the Bredasdorp Group), to shelly, shallow-marine sandstones and limestones of the Bredasdorp Group deposited on underlying Table Mountain Group sandstone. The most important land types include Hb (37%), Ha (31%) and Fc (18%).

Climate Mainly cyclonic rainfall varying from approximately 400 mm in the east to 600 mm in the west, mainly in winter, but still with considerable summer rainfall in the eastern regions of the unit. The winter rains are accompanied by strong northwesterly winds and cooler temperatures. The winds tend to be strong southwesterly (trade winds with average velocity of 35 km per hour) in summer. Mean daily maximum and minimum temperatures 25.1°C and 7.0°C for January and July, respectively. Mean monthly maximum and minimum temperatures for Cape Agulhas 27.1°C and 7.3°C for January and June, respectively. No incidences of snowfalls have been recorded; frost is infrequent and hail occurs occasionally. Dense mist banks regularly occur through the Overberg region in autumn and winter.

Conservation About 95% of the original total extent of **Overberg Dune Strandveld** still remains (an unusually high figure for a lowland vegetation type in the region), of which about 36% is formally conserved (much of it in the Agulhas National Park), and it has a conservation target of 36% of its total original extent, which has thus been achieved (Rouget et al 2004).

Some of the indigenous plant species recorded previously in this vegetation type in the bigger area include *Morella cordifolia* (wasbessie), *M. quercifolia, Otholobium bracteolatum* (skaapbostee), *Ficinia lateralis, Indigofera brachystachya, Searsia laevigata* (dune taaibos), *Searsia glauca* (blue kunibush), *Euclea racemosa* (sea guarrie), *Pterocelastrus tricuspidatus* (kershout), *Robsonodendron maritimum, Metalasia muricata* (blombos), *Osteospermum moniliferum* (bietou), *Restio eleocharis, Phylica ericoides, Ficinia ramosissima, Carpobrotus acinaciformis* (suurvy), *Senecio arniciflorus, Muraltia* sp., *Agathosma collina, Passerina paleacea* (duingonna), *Helichrysum patulum* (kooigoed), *H. dasyanthum, H. niveum, Colpoon compressum* (pruimbas), *Chaenostoma revoluta, Ehrharta villosa* (pypgras), *Cassytha ciliolata* (dodder), *Thesidium fragile, Eriocephalus racemosus* (kapokbos), *Anthospermum spathulatum* and *Solanum guineense*.

Observations and Findings within the Study Site:

The vegetation on the site and surrounds is typical Dune Strandveld, and due to the deep, well drained nature of the sands does not include any wetlands. No bedrock is evident on site. The surrounding site is dominated by some extensive, stable dunes, up to 15m higher than the coastal flats. These dunes also have many archaeological deposits of importance, in the form of shell middens.

The following indigenous vegetation species were recorded along the road verges (areas to be impacted upon) during the survey –
Metalasia muricata (blombos), *Osteospermum moniliferum* (bietou), *Phylica ericoides, Helichrysum patulum* (kooigoed), *Colpoon compressum* (pruimbas), and *Solanum guineense*.

No plant Species of Conservation Concern (SCC) were recorded within the proposed development areas and none are expected to occur within these areas/road verges.

Alien Trees, Weeds and Grasses-

- *Acacia cyclops*

From a botanical point of view development of the study site should therefore not have any significant detrimental impact on sensitive botanical habitats or on any plant species of conservation concern.

6.1.2 Threatened or vulnerable ecosystems:

The CBAs as mapped for the relevant area are shown on Map 2. According to the 2017 Western Cape Biodiversity Spatial Plan the road and its edges (impact zone) outside the Agulhas National Park area is not mapped as CBAs. The section 1 closest to Agulhas falls within the Agulhas National Park and is mapped as protected area. A small area surrounding the road expansion area is mapped as a Terrestrial Critical Biodiversity Area (CBA 1) area and the rest as an Ecological Support Area (ESA 1).

The indigenous vegetation species populations recorded on site in the areas that will be impacted by the road surface is mostly pioneer species of low conservation value other than to stabilize the area as a result of the disturbances that occurred to this vegetation and habitat during the roads original construction. However, control must be put in place to minimise the edge effects during construction to prevent wider areas of disturbance.

Due to most of the proposed development areas already being cleared/developed upon for the current road infrastructure it is expected that a maximum of 0.4ha of indigenous vegetation will further be cleared for the proposed development within the relevant three sections.

Photo 1: First section close to Agulhas in the National Park.

Photo 2: First section close to Agulhas in the National Park already paved.

Photo 3: First section close to Agulhas in the National Park already paved.

Photo 4: Second section outside the Agulhas National Park.

Photo 5: Last/3rd section outside the Agulhas National Park.

Photo 6: Last/3rd section outside the Agulhas National Park.

It was concluded that the overall areas to be impacted upon has a low botanical conservation value. The proposed development areas along the road verges was disturbed and altered during the previous road and infrastructure development and the types of returning plant species (mostly pioneer) recorded on site is evidence of that.

No species of conservation concern were recorded nor are expected to occur on the site.

6.1.3 The types of animal communities (fish, invertebrates, avifauna, mammals, reptiles):

Fish

No fish species are present on the site or within close proximity to the site. No freshwater ecosystems occur on or within close proximity to the proposed development sites either.

Invertebrates

Observations and Findings:

It is expected that the area has a rich and diverse invertebrate life especially within the surrounding area. The proposed development, if restricted to recommended development area, will however not have a significant detrimental impact on the invertebrate species within the area.

Birds (Avifauna)

Approximately 235 species are known to occur in the bigger area (Hockey et al 2006).

Observations and Findings:
No bird of conservation concern were recorded along the road verges at the time of the survey, however the coastal habitat is an important area for coastal bird breeding habitat.

If recommendations as provided in this report are adhered to it is not expected that the proposed development will have a significant detrimental impact on any bird species of conservation concern or their habitat due to extensive undeveloped areas that will remain adjacent to proposed development areas and construction areas being limited to a small an area as possible.

Mammals

As reported in Smithers (1983) small buck e.g. common duiker, steenbok and grysbok, rodents such as mole rats, field mice and hares, as well as carnivores such as genets, mongoose and caracal are likely to inhabit the area.

Some 69 mammal species are known to occur in the bigger area (Smithers 1983).

Observations and Findings:
No mammal of conservation concern or their associated habitat were observed on site at the time of the survey.

If recommendations as provided in this report are adhered to it is not expected that the proposed development will have a significant detrimental impact on any mammal species of conservation concern or their habitat due to extensive undeveloped areas that will remain adjacent to proposed development areas.

Amphibians and Reptiles (Herpetofauna)

With respect to amphibians, Minter et al (2004) state that “habitat loss or modification as a result of agriculture and other forms of human activity remains the most important single threat to the survival of amphibian populations. The scale of these changes and their relative permanence are the major cause. At greatest risk are species that have limited distributions.”

As reported in Alexander et al (2007) 37 reptile species are likely to inhabit the area.

Observations and Findings:

No reptile or amphibian SCC or their associated habitat were observed on site at the time of the survey.

Before and during clearing activities on site search and rescue of tortoises must be conducted. All tortoises collected must be released on the adjacent natural areas not to be developed upon.

If recommendations as provided in this report are adhered to it is not expected that the proposed development will have a significant detrimental impact on any reptile or

amphibian species of conservation concern or their habitat due to extensive undeveloped areas that will remain adjacent to proposed development areas.

6.2 In terms of biodiversity pattern, identify or describe, at species level- (Show the degree of confidence in predictions based on the availability of information and specialist knowledge, i.e. High 70 -100% confident, Medium 40 - 70% confident, Low 0 - 40% confident. Assess the likelihood of other RDB species, or species of conservation concern, occurring in the vicinity. Reflect this in degree of confidence indicator).

6.2.1 The viability of, and estimated population size of the TOPS and RDB species of conservation concern that are present.

Red Data Listed or species listed under TOPS regulation (Vegetation)
No indigenous vegetation species of conservation concern remain on the proposed development site.

Red Data Listed or species listed under TOPS regulation (Reptiles and Amphibians)

No amphibian or reptile SCC is known to occur on the proposed development area and no rare or localized species were recorded at the time of the survey.

Red Data Listed or species listed under TOPS regulation (Mammals)

No mammal SCC is known to occur on the proposed development area and no rare or localized species were recorded at the time of the survey.

Red Data Listed or species listed under TOPS regulation (Avifauna)
No bird SCC is known to occur on the proposed development area and no rare or localized species were recorded at the time of the survey.

6.3 Other pattern issues-

Any significant landscape features or rare or important vegetation/faunal associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity:

As previously mentioned CBA1, ESA1 and Protected Areas have been mapped within and adjacent to the development areas. These areas were identified to protect coastal process. The paving and widening of the road will however not have a significant negative impact on these coastal processes as road paving and widening will occur mostly on already existing cleared gravel road area and only have a limited impact on surrounding indigenous vegetation areas, and even these areas are disturbed road verges with mainly returning pioneer species.

6.4 The extent of alien plant cover on the site:

Low density of *Acacia cyclops* was recorded on some of the proposed impacted areas.

6.5 The condition of the site/s in terms of current or previous land uses:

The whole proposed impacted area has a low botanical conservation value. The surrounding habitat was disturbed and altered during the previous road construction and the types of pioneer plant species recorded on site is evidence of that.

No species of conservation concern were recorded nor are expected to occur on the site.

6.6 In terms of biodiversity process, identify or describe:

6.6.1. The key ecological "drivers" and/or environmental gradients of ecosystems on the site and in the vicinity.

Key ecological drivers identified on the site and surrounds are the coastal processes that will not be significantly impacted upon if recommendations as provided in this report are adhered to during construction and maintenance activities.

6.6.2 Any possible changes in key processes e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.

No.

6.6.3 The condition and functioning of rivers and wetlands (if present) in terms of possible changes to the channel, flow regime and naturally-occurring riparian vegetation.

Not applicable

6.6.4 Would the conservation of the site lead to greater viability of the adjacent ecosystem by securing any of the functional factors listed?

No, not the impacted road verge areas.

6.6.5 Does the site or neighbouring properties potentially contribute to meeting regional conservation targets for both biodiversity pattern and ecological processes?

Yes. Some of the area already protected area.

6.6.6 Is this a potential candidate site for conservation stewardship?

No, not the impacted road verge areas.

7. Ecological Impact Assessment with Associated Mitigation and Rehabilitation Measures to be implemented

(See Appendix B attached for Impact Assessment Methodology used)

<u>Construction and Operational/Maintenance Phases:</u>

Nature of potential impact:
Impact of proposed activities on indigenous vegetation and associated fauna and avifauna habitat

as part of mapped protected areas, CBAs and ESA's

Discussion:
On the proposed development area the indigenous vegetation is of low conservation value with no plant species of conservation concern, and the site is not expected to be an important breeding site or habitat for any fauna or avifauna species of conservation concern.

Cumulative impacts:
Loss of indigenous vegetation and associated fauna and avifauna habitat.

Mitigation:

- Clearly demarcate the proposed development footprint area before any construction commences and undertake construction (including construction camp and associated stockpiling) only in demarcated development footprint area to minimise edge effects. Demarcation method to be approved by an Environmental Control Officer (ECO).
- No construction related disturbance should be allowed outside the demarcated areas.
- Implement site specific erosion and storm water runoff management measures to prevent (or if prevention is not possible limit) any erosion from occurring on the development footprint area and surrounds.
- The landowner/s must adhere to his/her legal obligations to actively eradicate and manage alien vegetation infestations present on the applicable and surrounding properties.
- Conduct tortoise search and rescue operations daily while site clearance is underway (before clearance commences on a day to day basis) and move all tortoises to surrounding impacted areas.
- Rehabilitate all areas that were disturbed outside of the proposed development areas immediately and implement mitigation measures to prevent associated impacts from re-occurring.
- During operation/maintenance no areas outside of the proposed development footprint areas may be disturbed and only existing access routes etc. may be used.

Criteria	**Without Mitigation**	**With Mitigation**
Extent	2	1
Duration	5	5
Magnitude	10	2
Probability	5	2
Significance	85 - High	16 - Low
Status	High Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	2 – Partial loss of resources
Degree to which impact can be mitigated	2 – Partly, some loss of indigenous vegetation will occur	

Nature of potential impact:
Impact of proposed development activities on surface- and groundwater resources

Discussion:
Construction activities can impact negatively upon the surface and groundwater resources on and adjacent to the site.

Possible chemicals found on site during construction as well as any hydrocarbon spillages will negatively affect the soil and surface or ground water interacting with it. Should the spills not be cleaned up and surface water infiltrate the ground, pollutants may even affect the groundwater

resource.

Cumulative impacts:
Loss of fresh water habitat and pollution of surface water resources.

Mitigation:

- All construction activities and personnel on site to stay within demarcated construction areas.
- Proper waste bins to be provided to construction staff and all waste to be regularly removed to municipal landfill site.
- If any fuel or hazardous materials is spilled on site it must be treated as according to EMP hazardous spill management requirements.
- The cement mixing area must be within the demarcated area and no seepage of site into the surrounding vegetation may occur.

Criteria	**Without Mitigation**	**With Mitigation**
Extent	2	1
Duration	5	1
Magnitude	10	2
Probability	5	2
Significance	85 - High	8 - Low
Status	High Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100%	100%
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1- Completely	

Nature of potential impact:
Potential erosion of the site and surrounds

Discussion:
Vegetation clearance and hardening of surfaces could lead to an increase in storm water runoff and eventually lead to soil erosion which can occur due to wind (wind erosion cause dust pollution); and due to overland storm water flow should heavy rains fall.

Cumulative impacts:
Exposing soil may lead to erosion of site and surrounds if not mitigated.

Mitigation:

- Construction and operational phase storm water management measures must be implemented to prevent any erosion or significant increase in storm water runoff from occurring.
- Should any signs of erosion or artificial recharge be observed the municipality must implement rectification and preventions measures immediately and consult with the appointed ECO before implementing these measures.

Criteria	**Without Mitigation**	**With Mitigation**
Extent	3	1
Duration	5	1
Magnitude	6	2
Probability	4	2
Significance	56 - Medium	8 - Low
Status	Medium Negative Significance without Mitigation	Low Negative Significance with Mitigation

Reversibility	100%	100%
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

Decommissioning/Rehabilitation Phase:

Nature of potential impact: Potential erosion of the site and surrounds during rehabilitation phase
Discussion: Rehabilitation (i.e. demolishing developed structures) could lead to soil erosion which can occur due to wind (wind erosion cause dust pollution); and due to overland storm water flow should heavy rains fall.
Cumulative impacts: Exposing soil may lead to erosion of site and surrounds if not mitigated.
Mitigation: • Decommissioned areas must be rehabilitated and planted with indigenous vegetation immediately after built structures have been removed. • Engineered contour structures reinstated and maintained. • Monitor rehabilitation of area on a 6 monthly basis until effective/successful rehabilitation has been obtained. • If erosion is detected implement erosion rectification and preventions measures as guided by an ECO

Criteria	**Without Mitigation**	**With Mitigation**
Extent	3	1
Duration	5	1
Magnitude	6	2
Probability	4	2
Significance	56 - Medium	8 - Low
Status	Medium Negative	Low Negative (Acceptable)
Reversibility	100%	100%
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

8. Concluding Remarks and Summary of Impact Mitigation and Rehabilitation Measures Proposed before, during and after the Proposed Activities

It was determined that the overall areas to be impacted upon have a low botanical sensitivity/conservation value. The proposed development areas along the road verges was disturbed and altered during the previous road and infrastructure development and the types of returning plant species (mostly pioneer) recorded on site is evidence of that.

According to the 2017 Western Cape Biodiversity Spatial Plan the road and its edges (proposed development area) outside the Agulhas National Park area is not mapped as a CBA or ESA. The 1st section closest to Agulhas falls within the Agulhas National Park and is mapped as a Protected Area. The area surrounding the proposed development area of section 2 and most of section 3 is mapped as Ecological Support Area (ESA 1), and a small surrounding area along section 3 as Terrestrial Critical Biodiversity Area (CBA 1). These areas were identified as such to protect coastal process. The paving and widening of the road will however not have a significant negative impact on these coastal processes as road paving and widening will occur mostly on already existing cleared gravel road area and only have a limited impact on surrounding indigenous vegetation areas, and even these areas are disturbed road verges with mainly returning pioneer species.

The National Vegetation Map of South Africa (2012) identifies the remnants of natural vegetation occurring within the area as Overberg Dune Strandveld (LT). The indigenous vegetation species populations recorded on site in the areas that will be impacted by the proposed development is mostly pioneer species not of conservation concern other than to stabilize the previously disturbed road edges. However, mitigation measures must be put in place to minimise the edge effects during construction and operation/maintenance to prevent wider areas of disturbance. Due to most of the proposed development areas already being cleared/developed upon for the current road infrastructure it is expected that a maximum of 0.4ha of indigenous vegetation will further be cleared for the proposed development within the relevant three sections.

No species of conservation concern were recorded nor are expected to occur on the impacted sites. This study also investigated any presence of any significant wetland/freshwater resources on or within close proximity to the development sites, however no such features were found during the survey.

It was concluded that, from an ecological impact point of view, the proposed development should not have an unacceptably significant negative impact on environmental features of the site and surrounds if specialist recommendations are taken into consideration and effectively implemented.

Summary of recommendations as listed in the report and additional recommendations to be implemented are listed below:

Construction, Operational/Maintenance and Rehabilitation phases -

- The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer, both during the construction, operational/maintenance and decommission/rehabilitation phases.
- Clearly demarcate the proposed development footprint area before any construction commences and undertake construction (including construction camp and associated stockpiling) only in demarcated development footprint area to minimise edge effects. Demarcations must occur under the supervision of and approved by ECO. Demarcation must be clearly visible and effective and no-go area must remain demarcated throughout construction phase.

- Undertake all construction and operational/maintenance development activities only in identified and specifically demarcated areas as proposed.
- Personnel should be restricted to the construction camp site and immediate construction areas only.
- Remove and conserve topsoil layer and overburden material for rehabilitation after construction activities have ceased within proposed development areas, where possible and required.
- Implement site specific erosion and storm water runoff management measures to prevent (or if prevention is not possible limit) any erosion from occurring on the development footprint area and surrounds.
- Proper waste bins to be provided during construction and operation and all waste to be regularly (at least once a week) removed to municipal landfill site.
- If any fuel or hazardous materials is spilled on site it must be treated as according to EMP requirements.
- The cement mixing area must be within a demarcated area and no cement mix runoff water escapes from cement mixing area.
- The landowner/s must adhere to his/her legal obligations to actively eradicate and manage alien tree infestations present on the applicable and surrounding properties.
- Conduct tortoise search and rescue operations daily while site clearance is underway (before clearance commences on a day to day basis) and move all tortoises to surrounding impacted areas.
- Rehabilitate all areas that were disturbed outside of the proposed development areas immediately and implement mitigation measures to prevent associated impacts from re-occurring.
- During operation/maintenance no areas outside of the proposed development footprint areas may be disturbed and only existing access routes etc. may be used.
- Construction and operational phase storm water management measures must be implemented to prevent any erosion or significant increase in storm water runoff from occurring.
- All infrastructures must remain clear of build-up, debris as waste so as to prevent any damming of stormwater which may lead to additional impacts such as erosion etc. The municipality will be responsible for the maintenance and upkeep of all infrastructure proposed throughout the construction, operational/maintenance and decommissioning/rehabilitation phases of the proposed development.
- Should any signs of erosion or artificial recharge be observed the municipality must implemented rectification and preventions measures immediately and consult with the appointed ECO before implementing these measures.
- Only use vegetation indigenous to the area to rehabilitate impacted/decommissioned areas and implement ongoing monitoring of the rehabilitated areas until successful rehabilitation has taken place.
- After topsoil has been replaced ongoing monitoring and removal of alien vegetation regrowth must be conducted to ensure effective rehabilitation of indigenous vegetation.
- Decommissioned areas must be rehabilitated and planted with indigenous vegetation immediately after built structures have been removed.
- Monitor rehabilitation of areas impacted outside of the proposed development areas or decommissioned areas on a 6 monthly basis until effective/successful rehabilitation has been obtained.
- If erosion is detected during or after rehabilitation implement erosion rectification and preventions measures must be implemented as guided by an ECO

- Even though this study only focussed on the three sections as located within the 100m high water mark areas, as according to the scope of the survey conducted, it is recommended that the mitigation measures as proposed within this report also be implemented along the entire proposed 5km route to be paved and expanded and that this be included as part of the Environmental Authorisation requirements.

Eco Impact is of the opinion, and based on the survey and desk study done, that the proposed development activities; if designed and implemented according to the recommendations as provided in this report, will not have an unacceptable significantly negative impact on the environmental aspects of the site and surrounds as assessed in this report.

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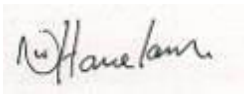
APPENDIX A: Declaration of Independence

THE SPECIALIST

Note: Duplicate this section where there is more than one specialist.

I **Nicolaas Willem Hanekom**, as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
    - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
    - am not independent, but another specialist that meets the general requirements set out in Regulation 13 of GN No. 326 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the Applicant, the Department and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations, 2014 (as amended).



Pri.Sci.Nat (Ecological Science) 400274/11 — 08 June 2018

Signature of the specialist: — Date:

Eco Impact Legal Consulting (Pty) Ltd

Name of company (if applicable):

APPENDIX B: Impact Assessment Methodology

Below is the assessment methodology utilized in determining the significance of the potential impacts on the biophysical environment, and where applicable the possible alternatives. The methodology is broadly consistent with that described in the Department of Environmental Affairs' Guideline Document on the EIA Regulations (1998) and as provided by the Shangoni Management Services.

For each potential impact, the significance is determined by specified factors as in Table 1. Significance is described prior to mitigation as well as with the most effective mitigation measure(s) in place.

The mitigation described in the document represents the full range of plausible and pragmatic measures that must be implemented.

Despite the attempts at providing a completely objective and impartial assessment of the environmental implications of proposed activities, the specialist can never completely escape the subjectivity inherent in attempting to define significance.

Recognising this, potential subjectivity in the current process is addressed as follows:

- Be clear about the difficulty of being completely objective in the determination of significance;
- Develop an explicit methodology for assigning significance to impacts and outlining this methodology in detail. Having an explicit methodology not only forces the assessor to come to terms with the various facets contributing toward determination of significance, thereby avoiding arbitrary assignment, but also provides the reader of the report with a clear summary of how the assessor derived the assigned significance; and
- Wherever possible, differentiating between the likely significance of potential environmental impacts as experienced by the various affected parties.

Although these measures may not totally eliminate subjectivity, they do provide an explicit context within which to review the assessment of impacts.

Table 1: Assessment criteria for the evaluation of impacts

Criteria	Description		
Nature	a description of what causes the effect, what will be affected, and how it will be affected.		
	Type	**Score**	**Description**
Extent (E)	None (No)	1	Footprint
	Site (S)	2	On site or within 100 m of the site
	Local (L)	3	Within a 20 km radius of the centre of the site
	Regional (R)	4	Beyond a 20 km radius of the site
	National (Na)	5	Crossing provincial boundaries or on a national / land wide scale
Duration (D)	Short term (S)	1	0 – 1 years
	Short to medium (S-M)	2	2 – 5 years
	Medium term (M)	3	5 – 15 years
	Long term (L)	4	> 15 years
	Permanent(P)	5	Will not cease
Magnitude (M)	Small (S)	0	will have no effect on the environment
	Minor (Mi)	2	will not result in an impact on processes
	Low (L)	4	will cause a slight impact on processes
	Moderate (Mo)	6	processes continuing but in a modified way
	High (H)	8	processes are altered to the extent that they temporarily cease
	Very high (VH)	10	results in complete destruction of patterns and permanent cessation of processes.
Probability (P) the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned	Very improbable (VP)	1	probably will not happen
	Improbable (I)	2	some possibility, but low likelihood
	Probable (P)	3	distinct possibility
	Highly probable (HP)	4	most likely
	Definite (D)	5	impact will occur regardless of any prevention measures
Significance (S)	Determined through a synthesis of the characteristics described above: **S = (E+D+M) x P** Significance can be assessed as low, medium or high		
Low: < 30 points:	The impact would not have a direct influence on the decision to develop in the area		
Medium: 30 – 60 points:	The impact could influence the decision to develop in the area unless it is effectively mitigated		
High: > 60 points:	The impact must have an influence on the decision process to develop in the area		
No significance	When no impact will occur or the impact will not affect the environment		
Status	Positive (+)		Negative (-)
The degree to which the impact can be reversed	Completely reversible (R)	90-100%	The impact can be mostly to completely reversed with the implementation of the correct mitigation and rehabilitation measures.
	Partly reversible (PR)	6-89%	The impact can be partly reversed providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Irreversible (IR)	0-5%	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact may cause irreplaceable loss of resources	Resource will not be lost (R)	1	The resource will not be lost or destroyed provided that mitigation and rehabilitation measures as stipulated in the EMP are implemented
	Resource may be partly destroyed (PR)	2	Partial loss or destruction of the resources will occur even though all management and mitigation measures as stipulated in the EMP are implemented
	Resource cannot be replaced (IR)	3	The resource cannot be replaced no matter which management or mitigation measures are implemented.
The degree to which the impact can be mitigated	Completely mitigatible (CM)	1	The impact can be completely mitigated providing that all management and mitigation measures as stipulated in the EMP are implemented
	Partly mitigatible (PM)	2	The impact cannot be completely mitigated even though all management and mitigation measures as stipulated in the EMP are implemented. Implementation of these measures will provide a measure of mitigatibility
	Un-mitigatible (UM)	3	The impact cannot be mitigated no matter which management or mitigation measures are implemented.