

**PROPOSED UPGRADE OF THE NDABAKAZI INTERCHANGE BETWEEN THE N2 AND
THE R409, NEAR BUTTERWORTH**

AMATHOLE DISTRICT MUNICIPALITY, EASTERN CAPE

ECOLOGICAL IMPACT ASSESSMENT

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ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

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LIST OF ABBREVIATIONS

CBA	Critical Biodiversity Area
CES	Coastal & Environmental Services
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
DEDEAT	Department of Economic Development Environmental Affairs and Tourism
ECBCP	Eastern Cape Biodiversity Conservation Plan
ECO	Environmental Control Officer
EMP	Environmental Management Plan
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
NEMA	National Environmental Management Act
PNCO	Provincial Nature Conservation Ordinance
RDB	Red Data Book
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Frame
SPC	Species of Possible Concern
SSC	Species of Special Concern
STEP	Subtropical Thicket Ecosystem Programme

CONTENT OF THE SPECIALIST REPORT

The contents of this specialist report complies with the legislated requirements as described in Appendix 6 of the National Environmental Management Act (No 107 of 1998; NEMA) Regulations of 2014 and updated in 2017 (GN R. 326 of 2017) as listed below:

Appendix 6

Specialist Reports

1. (1) A specialist report prepared in terms of these Regulations must contain—
 - (a) details of—
 - (i) the specialist who prepared the report; and
 - (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;
 - (b) a declaration that the specialist is independent in a form as may be specified by the competent authority;
 - (c) an indication of the scope of, and the purpose for which, the report was prepared;
 - (cA) an indication of the quality and age of base data used for the specialist report;
 - (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
 - (d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;
 - (e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
 - (f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
 - (g) an identification of any areas to be avoided, including buffers;
 - (h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
 - (i) a description of any assumptions made and any uncertainties or gaps in knowledge;
 - (j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;
 - (k) any mitigation measures for inclusion in the EMPr;
 - (l) any conditions for inclusion in the environmental authorisation;
 - (m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;
 - (n) a reasoned opinion—
 - (i) whether the proposed activity, activities or portions thereof should be authorised;
 - (iA) regarding the acceptability of the proposed activity or activities; and
 - (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
 - (o) a description of any consultation process that was undertaken during the course of preparing the specialist report;
 - (p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
 - (q) any other information requested by the competent authority.
- (2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.

THE PROJECT TEAM

1. (1) A specialist report prepared in terms of these Regulations must contain—
(a) details of—
(i) the specialist who prepared the report; and
(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority

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A signed specialist declaration and full curriculum vitae's are attached in Appendix B.

Project Expertise

Relevant projects CES has worked on include:

Name of project	Description of responsibility	Date completed
Waterfall Citrus Farm EIA for the development of a new citrus farm outside Peddie, Eastern Cape	Ecological Impact Assessment	April 2018
Indwe Biodiversity Study on the development of a new essential oils farm outside Kidds Beach, East London, Eastern Cape	Biodiversity study for an essential oil farming development	December 2017
Earth Free (Pty) Ltd Biodiversity study for a housing development in Kei Road, Eastern Cape	Biodiversity study for a housing development extension	October 2017
City of Johannesburg Biodiversity Assessment and Conservation management Plans for 4 Nature Reserves	Vegetation and Ridgeline Biodiversity Study	January - April 2017
Terreco Butterworth Bypass Alternatives EIA (EC)	Botanical Impact Assessment	Oct 2016
Terreco Idutywa Bypass Alternatives EIA (EC)	Botanical Impact Assessment	Oct 2016
SANRAL N2 between Tetyana & Sitebe Komkulu EIA (EC)	Ecological Impact Assessment	June 2015
Laman Mining renewal of Mining License (EC)	Botanical Impact Assessment	February 2015
ACSA East London Airport Vegetation Study (EC)	Botanical Impact Assessment	February 2014
SANRAL R61 Baziya to Mthatha EIA (EC)	Ecological Impact Assessment	November 2014
SANRAL Rehabilitation of the N9, Middelburg (EC)	Ecological Impact Assessment	June 2013

Declarations

Role on Study Team	Declaration of independence
Report Writing and Mapping	I, Caryn Clarke , declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.
Project Management and Report Review	I, Roy de Kock , declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

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1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The South African National Roads Agency SOC Ltd. (SANRAL) is proposing the construction of the new Ndabakazi Interchange between the N2 and the R409, near Butterworth within the Amathole District Municipality of the Eastern Cape Province (see Figure 1.1 below).

The proposed Ndabakazi Interchange development will consist of the upgrading of the existing N2 and R409 roads at the intersection as well as the construction of a new N2 bridge over the R409 with corresponding interchanges. These improvements will include extensive earth and drainage works, layer works, new surfacing, road repairs, road construction, construction of reinforced concrete structures, improvements/construction of drainage structures and vertical geometric improvements for the new N2 Bridge.

In particular, the project will consist of the following:

1.1.1 EXISTING ROADS:

- Increasing the road reserve width from 30m to a minimum of 50m wide;
- General widening of the existing road cross section for passing lanes and 3.0m surfaced shoulders. The main carriageway is 10.4m and needs to be increased to 20.8m;
- Widening and/or new construction of existing drainage structures.

1.1.2 NEW INTERCHANGE (CALLED THE NDABAKAZI INTERCHANGE):

- Construction of a new bridge on the N2 over the R409;
- Substantial vertical geometric improvements will be required for the new N2 Bridge;
- Rehabilitation of pavement structure on existing alignment and construction of new pavement on new alignment, all for which suitable material will need to be sourced;
- Cut faces requiring stabilisation.

1.1.3 TEMPORARY DEVIATIONS:

- Temporary traffic diversion routes will be used during the construction phase of the Ndabakazi Interchange (refer to Figure 1.1);
- The temporary diversion routes will largely follow existing gravel roads through the adjacent community areas located alongside the existing N2 and proposed Ndabakazi Interchange;
- All temporary diversion routes will be surfaced.
- Temporary diversion routes 1 (as shown in Figure 1.1) will require a Water Use License Application (WULA), as the route crosses a drainage channel and a wetland area. In addition, majority of the temporary diversion routes fall within 500 m of a wetland. A WULA will be submitted to the Department of Water Affairs and Sanitation (DWS) as required and will run concurrently with the Basic Assessment Process.

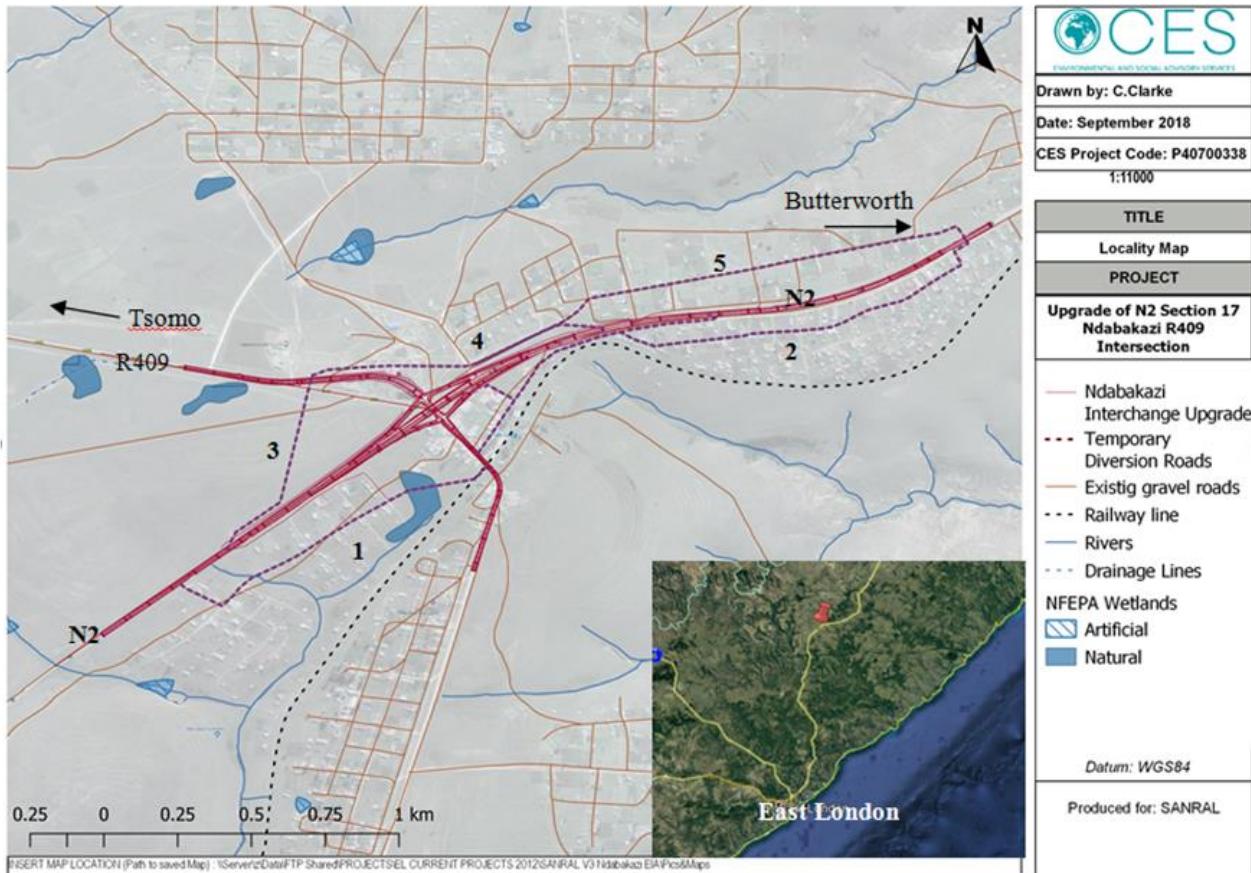


Figure 1.1: Proposed upgrading of the Ndabakazi Interchange.

1.1.4 SITE ACCESS

The proposed development is located within Section 17 along the National Route N2, therefore access to the site already exists.

The proposed temporary diversion routes (Figure 1.1 above) will largely follow existing gravel roads through the adjacent community areas located alongside the existing N2 and proposed Ndabakazi-R409 Interchange.

1.1.5 ALTERNATIVES

The following alternatives apply to the Ndabakazi N2-R409 Interchange Upgrade:

Site Alternative:

The site alternative assessed refers to the construction of the new Ndabakazi Interchange at the existing N2-R409 intersection. No other site alternatives have been assessed as the proposed development takes place on an existing national road. Therefore route/site alternatives are not deemed reasonable or feasible.

No-Go alternative:

It is mandatory to consider the no-go (no development) alternative in the EIA process. In context of this project it implies the consideration that the proposed Ndabakazi N2-R409 Interchange Upgrade will not be constructed.

1.2 OBJECTIVES

The objectives of the ecological assessment were to:

- Provide a general description of the natural vegetation of the specific area to be developed and adjacent areas that will be impacted.
- Provide a general description of the indigenous fauna of the area, using a habitat approach and based on the natural vegetation of the site.
- Identify plant and animal species of conservation concern (SCC) and suitable species for rehabilitation.

1.3 APPROACH

The study site and surrounding areas were assessed using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. This included the consideration of:

- The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997);
- The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA);
- NEMBA List of Ecosystems in need of Protection;
- NEMBA List of Threatened or Protected Species;
- NEMBA List of Alien Invasive Species;
- The National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEMPA);
- The National Biodiversity Strategy and Action Plan (NBSAP) (2015);
- The National Spatial Biodiversity Assessment (2004, currently being reviewed and updated) (NSBA);
- The National Biodiversity Framework (2008) (NBF); and
- The National Protected Area Expansion Strategy (2008) (NPAES);

Further to the above, site visits were conducted on 14 September 2018 in order to assess the actual ecological state, current land-use, identify potential sensitive ecosystems and identify plant species associated with the proposed project activities. The site visits also served to inform potential impacts of the proposed project and how significantly it would impact on the surrounding ecological environment.

1.4 TERMS OF REFERENCE

The following terms of reference were used as a guideline for the objectives of this study:

- Identify and map the main vegetation types and plant communities;
- Identify and record the main plant species that occur within the project area;
- Where possible identify any Species of Conservation Concern (SCC);
- Identify any significant landscape features or rare or important vegetation/faunal associations such as seasonal wetlands, seeps or rocky areas that might support rare or important vegetation/faunal associations;
- Identify the main animal communities associated with the plant communities such as mammals, birds, fish (in the streams) and reptiles;
- Describe the likelihood of other SCC occurring in the vicinity, or identify areas likely to contain SCC species;
- Assess the condition of the site in terms of current or previous land uses;
- Provide a general overview of the project area in terms of connectivity, corridors, rivers and streams and ecological viability in relation to the surrounding region;
- Place the project area within the biodiversity context of the wider area (i.e. provide the “bigger picture”);
- Identify (as far as is possible from the data collected) the principal ecological processes evident within the project site and its relative importance in determining the biodiversity characteristics present;

- An assessment of the potential direct and indirect impacts resulting from the proposed development and associated infrastructure, both on the footprint and the immediate surrounding area during construction and operation;
- A detailed description of appropriate mitigation measures that can be adopted to reduce negative impacts for each phase of the project where required.

1.5 ASSUMPTIONS AND LIMITATIONS

This report is based on information that is currently available and, as a result, the following limitations and assumptions are implicit:

- The report is based on a project description taken from design specifications for the proposed construction of the Ndabakazi Interchange.
- Descriptions of the natural environments is based on limited fieldwork and available literature.
- Species of conservation concern (SCC) are difficult to find and difficult to identify, thus species described in this report do not comprise an exhaustive list. It is likely that additional SCC will be found during construction and operation of the development.
- The ecology of the site was assessed on a sample basis.

2 RELEVANT LEGISLATION

The following legislation is relevant when considering ecological impacts identified during the Planning and Design, Construction, Operation and Decommissioning Phase of the Ndabakazi Interchange.

Table 2.1. Environmental legislation considered in the preparation of the Ecological Report

Title of Environmental legislation, policy or guideline	Implications for the Ndabakazi Interchange Development
Constitution Act (108 of 1996)	<p>Obligation to ensure that the proposed development will not result in pollution and ecological degradation; and</p> <p>Obligation to ensure that the proposed development is ecologically sustainable, while demonstrating economic and social development.</p>
National Environmental Management Act (NEMA) (107 of 1998)	<p>The developer must apply NEMA principles, the fair decision-making and conflict management procedures that are provided for in NEMA.</p> <p>The developer must apply the principles of Integrated Environmental Management and consider, investigate and assess the potential impact of existing and planned activities on the environment, socio-economic conditions and the cultural heritage.</p>
National Environment Management: Biodiversity Act (10 of 2004)	<p>The National Environment Management: Biodiversity Act (NEMBA) provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection.</p> <p>In terms of the Biodiversity Act, the developer has a responsibility for:</p> <ul style="list-style-type: none"> • The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (including The Endangered and Threatened Ecosystem Regulations, Government Notice R. 1002 dated 9th December 2011); • Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity; • Limit further loss of biodiversity and conserve endangered ecosystems <p>NEMBA's permit system is further regulated in the NEMBA Threatened or Protected Species Regulations Government Notice R. 152 of 2007. The NEMBA Alien and Invasive Species List (Government Notice R 599 of 2014) define Alien and Invasive species that are regulated by the NEMBA Alien and Invasive Species Regulations (Government Notice 98 of 2014).</p>
National Water Act (36 of 1998)	<p>Provides details of measures intended to ensure the comprehensive protection of all water resources, including the water reserve and water quality. Section 21 of the NWA describes activities defined as a water use under the Act. These activities may only be undertaken subject to the application for, and issue of, a Water Use License (WUL) or general authorisation (GA).</p>
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	<p>The purpose of the National Environmental Management: Protected Areas Amendment Act (NEMPA) is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.</p>
National Forests Act (Act No. 84 of 1998)	<p>The objective of this Act is to monitor and manage the sustainable use of forests. In terms of Section 12 (1) (d) of this Act and GN R. 1012 (promulgated under the National Forests Act), no person may, except with a licence:</p> <ul style="list-style-type: none"> • Cut, disturb, damage or destroy a protected tree; or

Title of Environmental legislation, policy or guideline	Implications for the Ndabakazi Interchange Development
	<ul style="list-style-type: none"> • Possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree. <p>The list of protected trees, 1976 List of Protected Trees (Government Gazette No. 9542, Schedule A), in the 1998 National Forest Act (NFA), as amended in December 2016, should be consulted.</p>
Conservation of Agricultural Resources Act (Act No. 43 Of 1983)	<p>The Conservation of Agricultural Resources Act (CARA) aims to control over-utilisation of the natural agricultural resources to promote the conservation of soil, water sources and vegetation through the combat of weeds and invader plants. Regulations 15 and 16 under this Act, which relate problem plants, were amended in March 2001. The Act provides a list of declared weeds and invader plants as well as indicators of bush encroachment. In terms of weeds and invader plants:</p> <ul style="list-style-type: none"> • A land user shall control any category 1 plants that occur on any land or inland water surface; • No person shall, except for the purposes of a biological control reserve: <ul style="list-style-type: none"> ○ Establish, plant, maintain, multiply or propagate weeds and invader plants; ○ Import or sell propagating material of category weeds and invader plants; and ○ Acquire propagating material of weeds and invader plants.

The following policies are relevant to the project:

Municipal Policy

- Mnquma Integrated Development Plan (IDP) and Spatial Development Frame (SDF) (2018/19).
- Mnquma Environmental Management Plan (EMP) (2012).
- Amathole District Municipality Spatial Development Framework Review (2018/19)

Eastern Cape Province

- Eastern Cape Biodiversity Conservation Plan (2007)
- The Eastern Cape Provincial Spatial Development Plan (November 2011)
- The Provincial Growth and Development Plan (2004 - 2014)
- The Provincial White Paper on Transport for Sustainable Development (2001)
- The Rural Transport Plan Strategic Framework (2004)

3 ASSESSMENT METHODOLOGY

1. (1) A specialist report prepared in terms of these Regulations must contain—
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;

The aim of this assessment is to identify areas of ecological importance and to evaluate these in terms of their conservation importance. In order to do so, the ecological sensitivity of areas is assessed as well as the SCC that may occur in habitats present in the area.

To a large extent, the condition and sensitivity of the vegetation will also determine the presence of animal species of special concern and areas with high faunal biodiversity. It is for this reason that the assessment focuses on the vegetation aspects of the site and includes only a small section on the fauna recorded from and expected to live on the site.

It is not the aim of this report to produce a complete list of all animal and plant species occurring in the region, but rather to examine a representative sample. It is however, important to note areas of high sensitivity as well as species of special concern have been identified as far as possible, either from records from the site or a review of their habitat requirements and whether or not these habitats occur within the site. The aim of this study is to identify areas of high sensitivity and those that may be subject to significant impacts from the project. Aspects that would increase impact significance include:

- Presence of plant and animal SCCs;
- Vegetation types (which also constitute faunal habitats) of conservation concern;
- Threatened Ecosystems;
- Areas of high biodiversity; and
- The presence of process areas:
 - Ecological corridors
 - Wetlands (including rivers)
 - Complex topographical features (especially steep and rocky slopes that provide niche habitats for both plants and animals).

3.1 SPECIES OF CONSERVATION CONCERN

Plant SCC in terms of the project area is defined as:

- Plant species listed in the revised South African Red Data Books (Driver et al 2009);
- Plants listed in the Cape Nature and Environmental Conservation Ordinance (No. 19 of 1974; NECO/PNCO)
- Plant species listed in the NEMBA Threatened or Protected Species List (G.NR. 256 of 2015)
- Species included in other international lists (e.g., 2010 International Union for Conservation of Nature (IUCN) Red List of Threatened Plants).

Animal SCC in terms of the project area is defined as:

- Animal species listed in the Endangered or Vulnerable categories in the revised South African Red Data Books (SA RDB – amphibians, du Preez and Carruthers, 2009; reptiles, Branch 1988; birds, SA Birding, 2008; terrestrial mammals, Apps, 2017); and/or
- Species included in other international lists (e.g., 2010 International Union for Conservation of Nature (IUCN) Red List of Threatened Animals).

3.1.1 DEFINITIONS

The following definitions of the conservation status of plant and animal SSC are provided:

The South African (SA) Red List system contains nine categories, with the main purpose of classifying species from lowest (Least Concern) to highest (Critically Endangered) threat in terms of risk of extinction (see Figure 3.1). Species that are at high risk of extinction are placed in one of three categories: Vulnerable (VU), Endangered (EN) or Critically Endangered (CR). If a species is classified into one of these three categories, it is considered as a SCC.

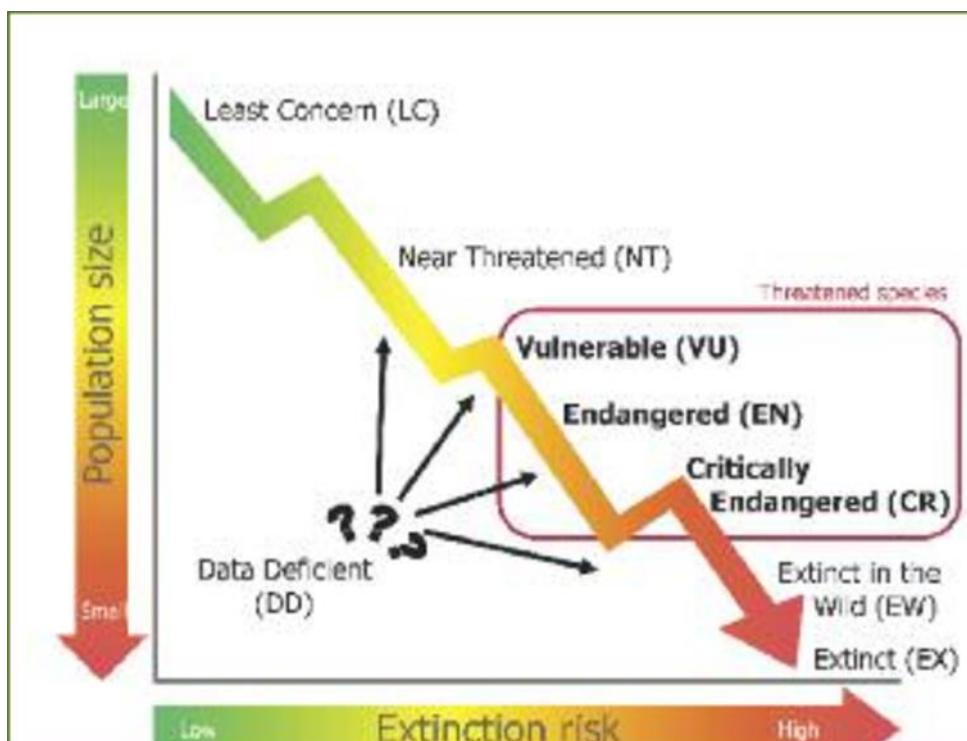


Figure 3.1: The SA Red List system categorizes species according to their risk of extinction (Source: SA Red Data Guidelines).

A species' classification is guided by five criteria relating to different biological factors that indicate danger of extinction (Table 3.1). A species should always be evaluated against all five criteria, but available data only need to meet the requirements for at least one criterion in order to classify a species as threatened. A species is always classified in the highest category of threat for which it meets the quantitative thresholds of at least one criterion.

Table 3.1: Biological indicators of extinction risk as contained in each of the five SANBI criteria

Criterion	Biological indicator	Risk factor	Quantitative thresholds		
			CR	EN	VU
A	Large and rapid reduction in population size relative to the life history of the species	Proportion by which population is reduced	>80%	>50%	>30%
B	Small geographic range and decline, population fluctuation or fragmentation	Extent of occurrence (EOO) Area of occupancy (AOO)	<100 km ² <10 km ²	<5 000 km ² <500 km ²	<20 000 km ² <2 000 km ²
C	Small population size and decline	Population size Number of mature individuals in largest subpopulation Proportion of population in largest subpopulation	<250 <50 >90%	<2 500 <250 >95%	<10 000 <1 000 100%
D	Critically small population size or very restricted distribution	Population size Area of occupancy (AOO) Number of locations	<50	<250	<1 000 <20 km ² Five or fewer
E	Quantitative analysis of extinction risk	Probability of extinction over a specified time period	50%	20%	10%

The following management guidelines for threatened species are provided in Table 3.2 below (Source: SA Red Data Guidelines):

Table 3.2: Guidelines for the management of the various categories

Status	Criterion*	Guidelines for Recommendation
^a Please notify the Threatened Species Programme immediately and provide details of the location, size and threats to the subpopulation. The fact that a subpopulation of the species was found at a site zoned for development means that its Red List status has to be reviewed and is likely to be upgraded.		
* Refer to Table 2.2 for criteria descriptions		
^a Critically Endangered	E	No further loss of natural habitat should be permitted as the species is on the brink of extinction, and all other known subpopulations have been lost. The subpopulation in question is likely to be newly discovered and the only remaining subpopulation of this species.
Critically Endangered	A,B,C,D	No further loss of natural habitat should be permitted as the species is on the verge of extinction.
Endangered	B,C,D	No further loss of habitat should be permitted as the species is likely to go extinct in the near future if current pressures continue. All remaining subpopulations have to be conserved if this species is to survive in the long term.
Endangered	A	If the species has a restricted range (< 2 000 km ²), recommend no further loss of habitat. If range size is larger, the species is possibly long-lived but widespread, and limited habitat loss may be considered under certain circumstances, such as the implementation of an offset whereby another viable, known subpopulation is formally conserved in terms of the National Environmental Management: Protected Areas Act (Act 57 of 2003), and provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
^a Vulnerable	D	This species either constitutes less than 1 000 individuals or is known from a very restricted range. No further loss of habitat should be permitted as the species' status will immediately become either Critically Endangered or

Status	Criterion*	Guidelines for Recommendation
		Endangered, should habitat be lost.
Vulnerable	B,C	The species is approaching extinction but there are still a number of subpopulations in existence. Recommend no further loss of habitat as this will increase the extinction risk of the species.
Vulnerable	A	If the species has a restricted range, < 2 000 km ² , recommend no further loss of habitat. If range size is larger, the species is possibly long-lived but widespread, and limited habitat loss may be considered under certain circumstances, such as the implementation of an offset whereby another viable, known subpopulation is formally conserved in terms of the Protected Areas Act, and provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
^a Data Deficient	D	This species is very poorly known, with insufficient information on its habitat, population status or distribution to assess it. However, it is highly likely to be threatened. If a Data Deficient species will be affected by a proposed activity, the subpopulation should be well surveyed, and the data sent to the Threatened Species Programme. The species will be reassessed and the new status of the species, with a recommendation, will be provided within a short timeframe.
Data Deficient		There is uncertainty regarding the taxonomic status of this species, but it is likely to be threatened. Contact the taxonomist working on this group to resolve its taxonomic status; the species will then be reassessed by the Threatened Species Programme.
^a Near Threatened	D	Currently known from fewer than 10 locations, therefore preferably recommend no loss of habitat. Should loss of this species' habitat be considered, then an offset that includes conserving another viable subpopulation (in terms of the Protected Areas Act) should be implemented, provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
Near Threatened	B,C	The species is approaching thresholds for listing as threatened but there are still a number of subpopulations in existence and therefore there is need to minimise loss of habitat. Conservation of subpopulations is essential if they occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
Near Threatened	A	If the species has a restricted range, < 2 000 km ² , then recommend no further loss of habitat. If range size is larger, the species is possibly long-lived but widespread, and limited habitat loss may be considered. Conservation of subpopulations is essential if they occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant biodiversity conservation plan or (iii) on a site associated with additional ecological sensitivities.
^a Critically Rare		This is a highly range-restricted species, known from a single site, and therefore no loss of habitat should be permitted as it may lead to extinction of the species. The Threatened Species Programme is not aware of any current threats to this species and should be notified without delay.
^a Rare		The species is likely to have a restricted range, or be highly habitat specific,

Status	Criterion*	Guidelines for Recommendation
		or have small numbers of individuals, all of which makes it vulnerable to extinction should it lose habitat. Recommend no loss of habitat. The Threatened Species Programme is not aware of any current threats to this species and should be notified without delay.
Declining		The species is declining but the population has not yet reached a threshold of concern; limited loss of habitat may be permitted. Should the species is known to be used for traditional medicine and if individuals will not be conserved <i>in situ</i> , plants should be rescued and used as mother stock for medicinal plant cultivation programmes.

3.1.2 SAMPLING PROTOCOL

Vegetation

The entire length of the proposed Ndabakazi Interchange development was inspected to evaluate vegetation and ecosystems and to provide more detailed information on the communities present. The site inspection took into account the amount of time available for the study and limitations such as the seasonality of the vegetation.

Vegetation communities were described according to the dominant species recorded from each type. These were mapped and assigned a sensitivity score. All animal species observed during the site assessment was listed.

Animals

The assessment of animals was based on a general observation of species noted onsite during the site assessment, but with particular consideration of known potential animal SCC.

3.2 VEGETATION MAPPING

Mucina and Rutherford (2012) developed the National Vegetation Map as part of a South African National Biodiversity Institute (SANBI) funded project: “It was compiled in order to provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before.” This map (also called the SANBI VegMap) was developed using a wealth of data from several contributors and has allowed for the best national vegetation map to date, the last being that of A Cocks developed over 50 years ago. This SANBI VegMap project has two main aims:

- to determine the variation in and between units of southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region; and
- to compile a vegetation map. The aim of the map was to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason, the collective expertise of vegetation scientists from universities and state departments were harnessed to make this project as comprehensive as possible.

The SANBI VegMap describes each vegetation type in detail, along with the most important species including endemic species and those that are biogeographically important. This is the most comprehensive data for vegetation types in South Africa. In this study the SANBI VegMap is used to inform anticipated site conditions regarding the vegetation type occurring on the property.

The updated SANBI VegMap (2018) includes the Subtropical Thicket Ecosystem Planning (STEP) Project, which aims to identify priority areas that would ensure the long-term conservation of the subtropical thicket biome and to ensure that the conservation of this biome is considered in the policies and practices of the private and public sector that are responsible for land-use planning and the management of natural resources in the region (Pierce *et al.* 2005). STEP looked specifically at the thicket biome and provided a finer scale map of the project area than the previous SANBI VegMap (Mucina and Rutherford, 2012).

Vegetation classified as forest and its specific forest type classification is listed in the National Forestry Act (NFA). These maps were used to identify any forests within or near to the study site. The site visit was then used to identify any additional forest vegetation not identified in the BFA Maps.

3.3 SENSITIVITY ASSESSMENT

This section of the report explains the approach to determining the ecological sensitivity of the study area on a broad scale. The approach identifies zones of high, medium and low sensitivity according to a system developed by CES and used in numerous proposed development studies. It must be noted that the sensitivity zonings in this study are based solely on ecological (primarily vegetation) characteristics and social and economic factors have not been taken into consideration. The sensitivity analysis described here is based on 10 criteria which are considered to be of importance in determining ecosystem and landscape sensitivity. The method predominantly involves identifying sensitive vegetation or habitat types, topography and land transformation (Table 3.3).

Although very simple, this method of analysis provides a good, yet conservative and precautionary assessment of the ecological sensitivity.

Table 3.3. Criteria used for the analysis of the sensitivity of the area

CRITERIA		LOW SENSITIVITY	MODERATE SENSITIVITY	HIGH SENSITIVITY
1	Topography	Level or even	Undulating; fairly steep slopes	Complex and uneven with steep slopes
2	Vegetation - Extent or habitat type in the region	Extensive	Restricted to a particular region / zone	Restricted to a specific locality / site
3	Conservation status of fauna / flora or habitats	Well conserved independent of conservation value	Not well conserved, moderate conservation value	Not conserved - has a high conservation value
4	Species of special concern - Presence and number	None, although occasional regional endemics	No endangered or vulnerable species, some indeterminate or rare endemics	One or more endangered and vulnerable species, or more than 2 endemics or rare species
5	Habitat fragmentation leading to loss of viable populations	Extensive areas of preferred habitat present elsewhere in region not susceptible to fragmentation	Reasonably extensive areas of preferred habitat elsewhere and habitat susceptible to fragmentation	Limited areas of this habitat, susceptible to fragmentation
6	Biodiversity contribution	Low diversity or species richness	Moderate diversity, and moderately high species richness	High species diversity, complex plant and animal communities
7	Visibility of the site or landscape from other vantage points	Site is hidden or barely visible from any vantage points with the exception in some cases from the sea	Site is visible from some or a few vantage points but is not obtrusive or very conspicuous	Site is visible from many or all angles or vantage points

CRITERIA		LOW SENSITIVITY	MODERATE SENSITIVITY	HIGH SENSITIVITY
8	Erosion potential or instability of the region	Very stable and an area not subjected to erosion	Some possibility of erosion or change due to episodic events	Large possibility of erosion, change to the site or destruction due to climatic or other factors
9	Rehabilitation potential of the area or region	Site is easily rehabilitated	There is some degree of difficulty in rehabilitation of the site	Site is difficult to rehabilitate due to the terrain, type of habitat or species required to reintroduce
10	Disturbance due to human habitation or other influences (alien invasive species)	Site is very disturbed or degraded	There is some degree of disturbance of the site	The site is hardly or very slightly impacted upon by human disturbance

A map was drawn up and with the aid of a satellite image so that the sensitive regions and vegetation types could be plotted.

3.4 BIODIVERSITY CONSERVATION

3.4.1 EASTERN CAPE BIODIVERSITY CONSERVATION PLAN (ECBCP)

The ECBCP addresses the urgent need to identify and map critical biodiversity areas and priorities for conservation in the Province. It also provides land use planning guidelines, recommending biodiversity-friendly activities in priority areas.

ECBCP is a first attempt at detailed, low-level conservation mapping for land-use planning purposes. The aim of ECBCP is to map critical biodiversity areas through a systematic conservation planning process. The current biodiversity plan includes the mapping of priority aquatic features, land-use pressures, critical biodiversity areas and develops guidelines for land and resource-use planning and decision-making.

The main outputs of the ECBCP are “critical biodiversity areas” (CBAs), which are allocated the following management categories:

- CBA 1 = Maintain in a natural state
- CBA 2 = Maintain in a near-natural state

Land use outputs not classified as CBAs are called Biodiversity Land Management Classes (BLMCs) and are allocated the following management categories.

- BLMC 3 (CBA3) = Functional Landscapes
- BLMC 4 (CBA 4) = Towns & Settlements, Woodlots & Plantations, Cultivated Land

ECBCP maps the CBAs based on extensive biological data and input from key stakeholders. Although ECBCP is mapped at a finer scale than the National Spatial Biodiversity Assessment (Driver et al., 2005) it is still, for the large part, inaccurate and “coarse”. Therefore, it is imperative that the status of the environment, for any proposed development MUST first be verified before the management recommendations associated with the ECBCP are considered (Berliner and Desmet, 2007). It is also important to note that in absence of any other biodiversity plan, the ECBCP has been adopted by DEDEAT as a strategic biodiversity plan for the Eastern Cape.

3.4.2 NEMBA LIST OF THREATENED ECOSYSTEMS

The National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA) has released a national list of ecosystems that are threatened and in need of protection (GN. 1002 of 2011).

3.5 PROTECTED AREAS

The National Environmental Management Protected Areas Act (No 57 of 2003; NEMPA) was developed to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. All protected areas within 15km of the study site will be listed. Impacts will be identified, and mitigations proposed.

The goal of the National Protected Areas Expansion Strategy (NPAES) is to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to climate change. It sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. The NPAES has classified protected areas into three categories: formally protected areas, informally protected areas and focus areas. Focus areas are large, intact and unfragmented areas suitable for the creation or expansion of large protected areas.

3.6 IMPACT ASSESSMENT

3.6.1 IMPACT RATING METHODOLOGY

To ensure a direct comparison between various specialist studies, a standard rating scale has been defined and will be used to assess and quantify the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed. Five factors need to be considered when assessing the significance of impacts, namely:

- Relationship of the impact to **temporal scales** - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
- Relationship of the impact to **spatial scales** - the spatial scale defines the physical extent of the impact.
- The severity of the impact - the **severity/beneficial scale** is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.
- The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.
- The **likelihood** of the impact occurring - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident) and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.
- Each criterion is ranked with scores assigned as presented in Table 3-2 to determine the **overall significance** of an activity. The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood are then read off the matrix presented in Table 3-3, to determine the overall significance of the impact. The overall significance is either negative or positive.

The significance scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of a social nature need to reflect the values of the affected society.

Cumulative Impacts

Cumulative impacts affect the significance ranking of an impact because the impact is taken in consideration of both onsite and offsite sources. For example, pollution making its way into a river from a development may be within acceptable national standards. Activities in the surrounding area may also create pollution which does not exceed these standards. However, if both onsite and offsite activities take place simultaneously, the total pollution level may exceed the standards. For this reason, it is important to consider impacts in terms of their cumulative nature.

Seasonality

Although seasonality is not considered in the ranking of the significance, it may influence the evaluation during various times of the year. As seasonality will only influence certain impacts, it will only be considered for these, with management measures being imposed accordingly (i.e. dust suppression measures being implemented during the dry season).

Table 3.4. Significance Rating Table.

Temporal Scale (The duration of the impact)	
Short term	Less than 5 years (many construction phase impacts are of a short duration).
Medium term	Between 5 and 20 years.
Long term	Between 20 and 40 years (from a human perspective almost permanent).
Permanent	Over 40 years or resulting in a permanent and lasting change that will always be there.
Spatial Scale (The area in which any impact will have an affect)	
Individual	Impacts affect an individual.
Localised	Impacts affect a small area of a few hectares in extent. Often only a portion of the project area.
Project Level	Impacts affect the entire project area.
Surrounding Areas	Impacts that affect the area surrounding the development
Municipal	Impacts affect either the Local Municipality, or any towns within them.
Regional	Impacts affect the wider district municipality or the province as a whole.
National	Impacts affect the entire country.
International/Global	Impacts affect other countries or have a global influence.

Will definitely occur	Impacts will definitely occur.
Degree of Confidence or Certainty (The confidence with which one has predicted the significance of an impact)	
Definite	More than 90% sure of a particular fact. Should have substantial supportive data.
Probable	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

Table 3.5 Impact Severity Rating.

Impact severity (The severity of negative impacts or how beneficial positive impacts would be on a particular affected system or affected party)	
Very severe	Very beneficial
An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example, the permanent loss of land.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. For example, the vast improvement of sewage effluent quality.
Severe	Beneficial
Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. For example, the clearing of forest vegetation.	A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example, an increase in the local economy.
Moderately severe	Moderately beneficial
Medium to long term impacts on the affected system(s) or party(ies), which could be mitigated. For example, constructing the sewage treatment facility where there was vegetation with a low conservation value.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. For example, a 'slight' improvement in sewage effluent quality.
Slight	Slightly beneficial
Medium or short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. For example, a temporary fluctuation in the water table due to water abstraction.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect	Don't know/Can't know
The system(s) or party(ies) is not affected by the proposed development.	In certain cases, it may not be possible to determine the severity of an impact.

Table 3.6 Overall Significance Rating.

Overall Significance (The combination of all the above criteria as an overall significance)	
VERY HIGH NEGATIVE	VERY BENEFICIAL

These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in **severe** or **very severe** effects, or **beneficial** or **very beneficial** effects.

Example: The loss of a species would be viewed by informed society as being of VERY HIGH significance.

Example: The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with VERY HIGH significance.

HIGH NEGATIVE	BENEFICIAL
These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.	
MODERATE NEGATIVE	SOME BENEFITS
These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.	
LOW NEGATIVE	FEW BENEFITS
These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.	
NO SIGNIFICANCE	
There are no primary or secondary effects at all that are important to scientists or the public.	
DON'T KNOW	
In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.	

Example: The effect of a particular development on people's psychological perspective of the environment.

4 DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

The study site and surrounding areas were described using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans, followed by a site visit in order to assess the actual ecological state, current land-use, identify potential sensitive ecosystems and identify plant species associated with the proposed project activities.

4.1 DESKTOP INVESTIGATION

4.1.1 TOPOGRAPHY

The Eastern Cape Province contains a wide variety of landscapes, from the stark Karoo (the semi-desert region of the central interior) to mountain ranges and gentle hills rolling down to the sea. The climate and topography give rise to the great diversity of vegetation types and habitats found in the region. The mountainous area on the northern border forms part of the Great Escarpment. Another part of the escarpment lies just north of Bisho, Somerset East and Graaff-Reinet. In the south of the province, the Cape Folded Mountains start between East London and Port Elizabeth and continue westward into the Western Cape. Similarly, to KwaZulu-Natal, the Eastern Cape is characterised by a large number of short, deeply incised rivers flowing parallel to each other.

The topography of the surrounding environment for the N2 Ndabakazi - Interchange ranges from 735 m to 770 m. Steeper gradients can be found to the east and west of the existing N2 along drainage channels.

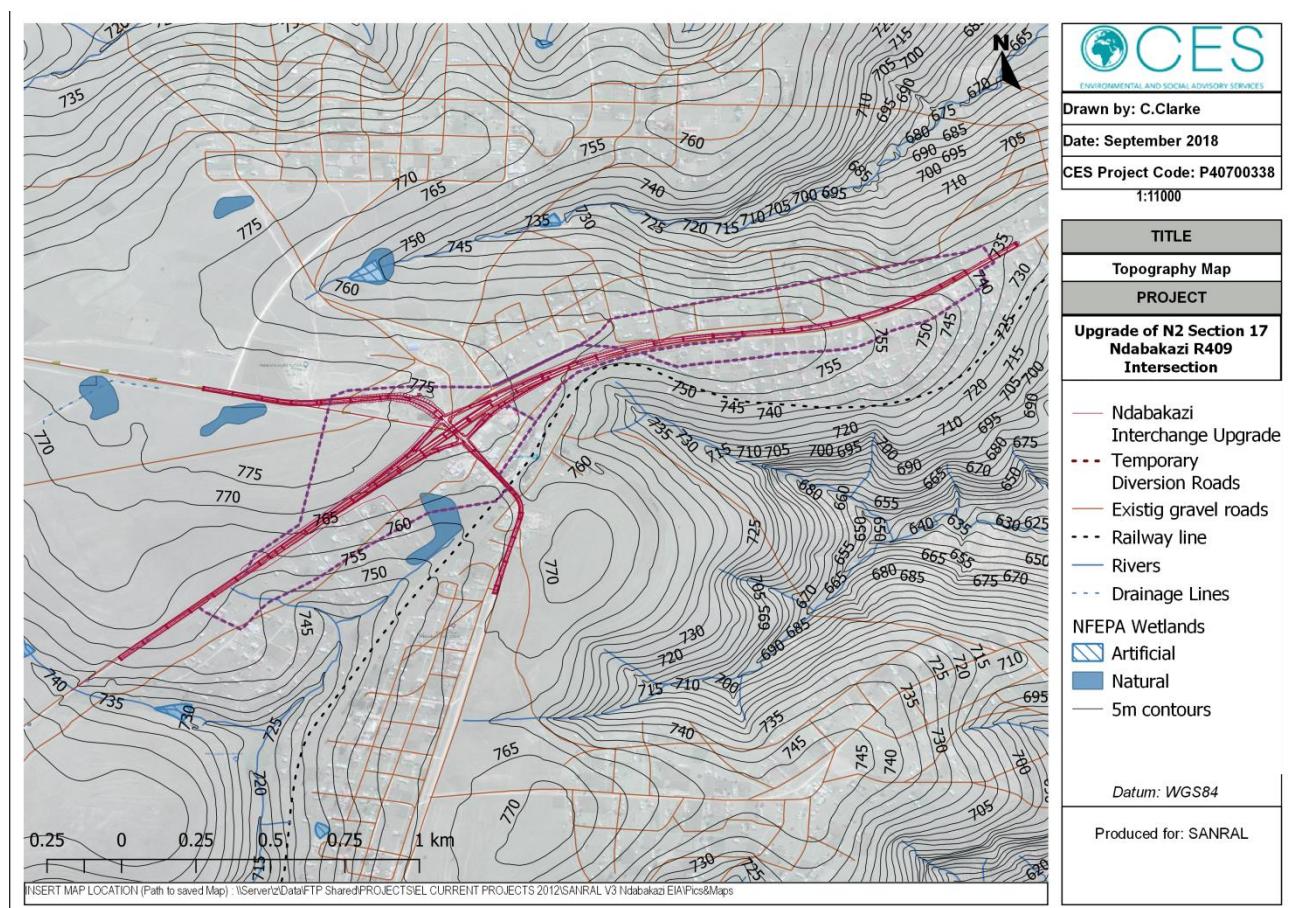


Figure 4.1: General topography of the study area.

4.1.2 GEOLOGY AND SOILS

The proposed site for the N2 Ndabakazi - Interchange is mainly underlain by red and grey mudstones and sandstone of the Tarkastad Subgroups of the Beaufort Group and the Karoo Super Group.

4.1.3 CLIMATE

The nearest available climate data for the Ndabakazi region was that of the adjacent town of Butterworth located 13 km to the north. Butterworth normally receives about 596mm of rain per year, with most rainfall occurring mainly during summer. The chart below (lower left) shows the average rainfall values for Butterworth per month. It receives the lowest rainfall (8mm) in June and the highest (89mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Butterworth range from 19.2°C in July to 25.6°C in February. The region is the coldest during July when the temperature drops to 6.2°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.

4.1.4 SURFACE HYDROLOGY

Watercourses

The proposed construction of the Ndabakazi Interchange traverses a non-perennial watercourse/drainage line (known as the Ndabakazi river), located to the south east of the existing interchange, as indicated in Figure 4.2 below. The Ndabakazi river does not have a Present Ecological State (PES) or Ecological Importance and Sensitivity (EIS) rating and is not considered to be a National Freshwater Ecosystem Priority Areas (NFEPA) river.

Wetlands

The South African National Biodiversity Institute (SANBI) compiled a National Wetland Inventory, which aims to map and classify (i.e. type) the major wetlands and water bodies in the country at a coarse spatial scale. A wetland classification system is required for application to the National Wetland Inventory, so that different types of wetlands can be distinguished for management and conservation purposes.

This classification system is intended to be used throughout the country for a number of different applications, largely with a view to facilitating common usage of terminology amongst wetland scientists and managers. However, at the same time, it is envisaged that further refinements to the classification system may be necessary in the future, to address problems that may be encountered in its application by a wide range of different users for a number of different purposes. As such, the classification system presented in this report should not be seen as the final word but, rather, as a “living” work in progress that will be continuously improved.

The following wetland types were identified on site (Figure 4.2):

- **Bench flat** - a near-level wetland area (i.e. with little or no relief) with little or no gradient, situated on a plain or a bench in terms of landscape setting. The primary source of water is precipitation, with the exception of flats along the coast (usually in a plain setting) where the water table (i.e. groundwater) may rise to the surface or near to the surface in areas of little or no relief because of the location near to the base level of the land surface represented by the presence of the ocean. Dominant hydrodynamics are bidirectional vertical fluctuations, although there may be limited multidirectional horizontal water flow in some cases. Water exits in a flat through evaporation and infiltration.

- Slope seep** - seeps are located on gently to steeply sloping land and dominated by the colluvial (gravity-driven), unidirectional movement of water and material down-slope. Seeps are often located on the side-slopes of a valley but they do not typically extend onto a valley floor. Water inputs are primarily via subsurface flows from an up-slope direction. Seeps are often associated with diffuse overland flow during and after rainfall events. It is important to note that a seep can share a boundary with a distinct river channel and feed into the channel via diffuse surface flow or subsurface flow.

A temporary traffic diversion route, located to the south east of the existing interchange, proposes to traverse a bench flat NFEPA wetland. According to the NFEPA 2011 database, this wetland is considered to be in a heavily to critically modified ecological condition (WETCON = Z1).

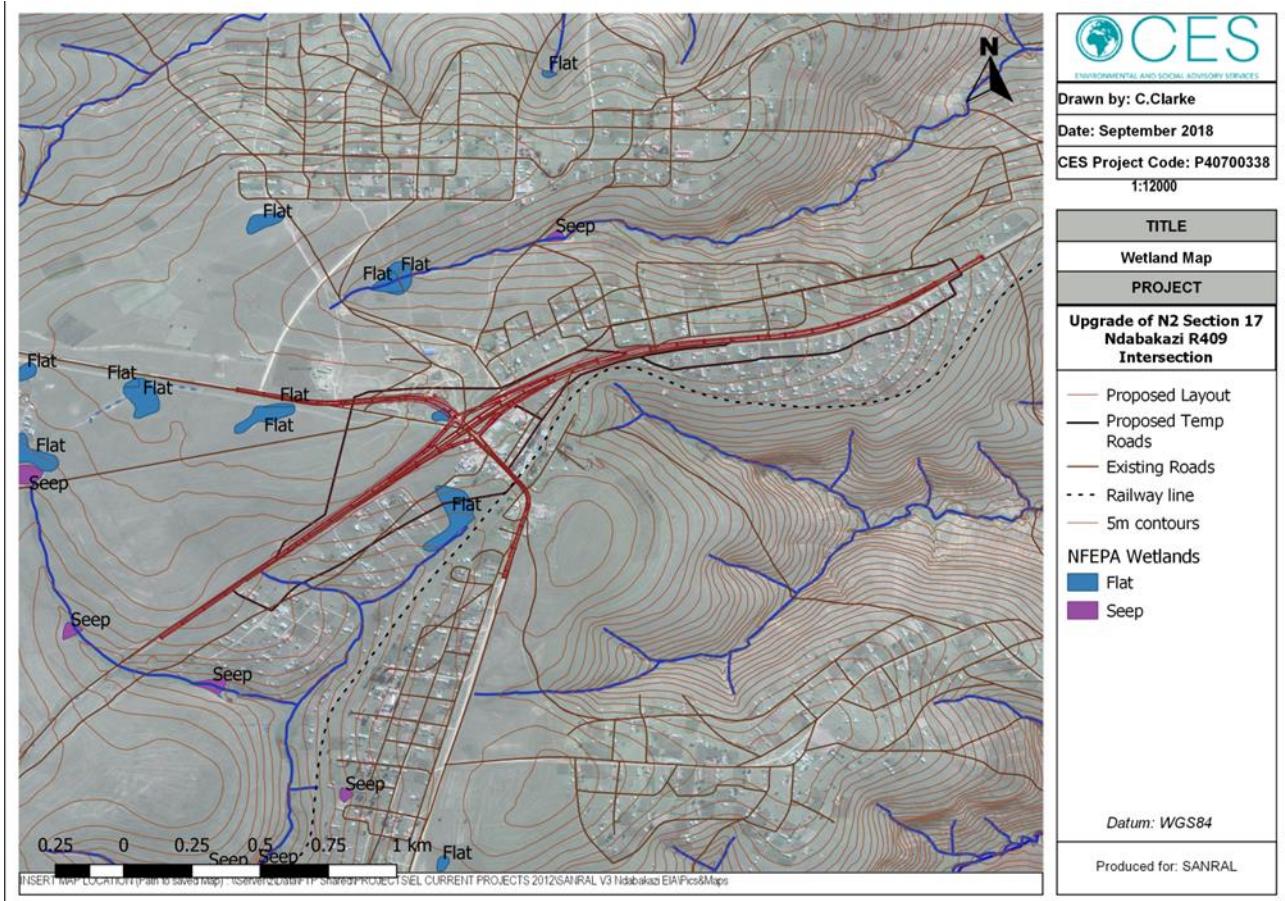


Figure 4.2: Wetland map of the study area.

4.1.5 LAND USE

The surrounding area of the proposed Ndabakazi Interchange is largely classified as a low-density urban area surrounded by cultivated land and degraded grassland.

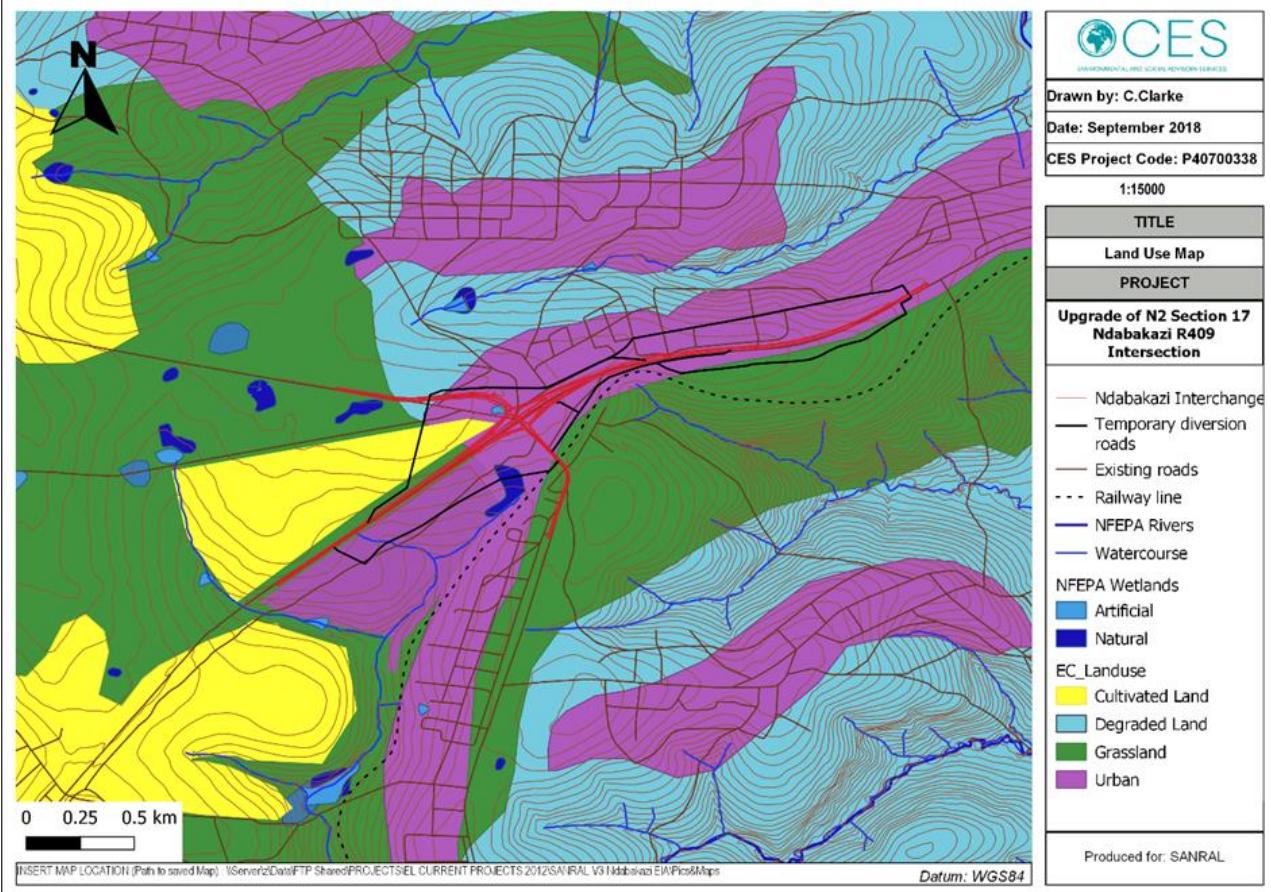


Figure 4.3: Land use of the study area.

4.1.6 VEGETATION AND FLORISTICS

The study area falls within one vegetation type, namely the Mthatha Moist Grassland (South Africa Vegetation Map (SA VEGMAP) (2018). Bhisho Thornveld is also found within the region and surrounds the development site.

Mthatha Moist Grassland (Gs14)

Mthatha Moist Grassland is distributed in the Eastern Cape Province along the plains between Mthatha and Butterworth parallel to the coastline and excluding the river valleys that intrude landwards into this unit.

The undulating plains and hills support species poor, sour, wiry grassland with *Eragrostis plana* and *Sporobolus africanus*, dominated by *Themeda triandra*. In terms of the conservation status, the SA VEGMAP (2018) classify Mthatha Moist Grassland as an “Endangered” vegetation type and is listed as a NEMBA Vulnerable Threatened Ecosystem. The conservation target for this vegetation type is 23%. More than 40% of Mthatha Moist Grassland has been transformed for cultivation, plantations or dense rural settlements.

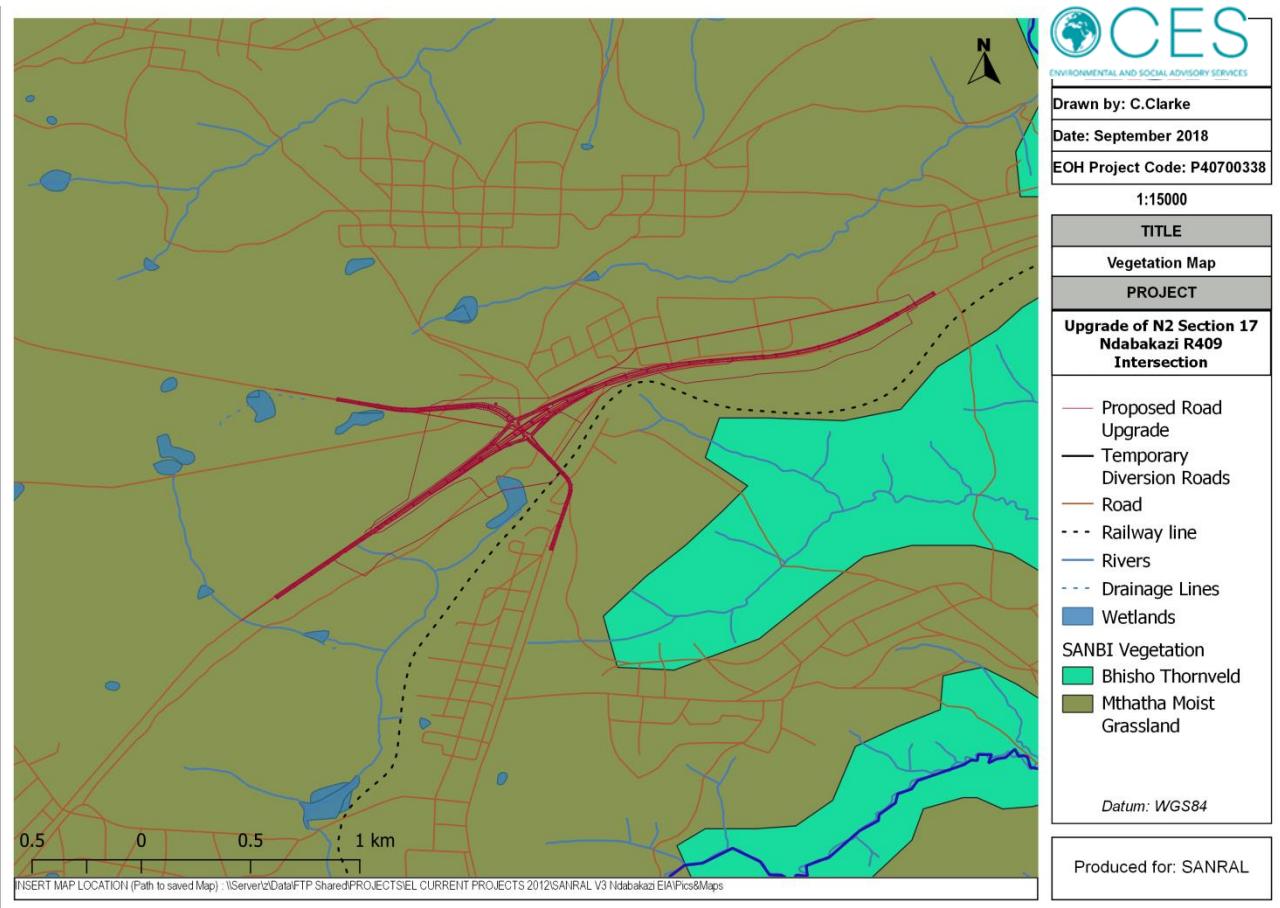


Figure 4.4: SANBI Vegetation Map of the study area

4.1.7 BIODIVERSITY CONSERVATION

NEMBA Threatened Ecosystems (2011)

The National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA) has released a national list of ecosystems that are threatened and in need of protection (GN. 1002 of 2011). According to NEMBA (2004), Mthatha Moist Grassland is classified as having a **VULNERABLE** ecosystem threat status.

Subtropical Thicket Ecosystem Programme (STEP)

The STEP Conservation Priority Map classifies areas into a number of categories, based on plant and animal biodiversity of the planning domain, with emphasis on Thicket biomes (Pierce, 2003). The Conservation Priority map for the study area is presented in Figure 4.3. STEP classifies the vegetation type of the study site as Inland Thornveld, with Butterworth Savanna Thicket falling adjacent to the area (Figure 4.5). In terms of the conservation status of the thicket type, STEP classifies this region as CURRENTLY NOT VULNERABLE. STEP has now been incorporated into the updated SA VEGMAP (2018).

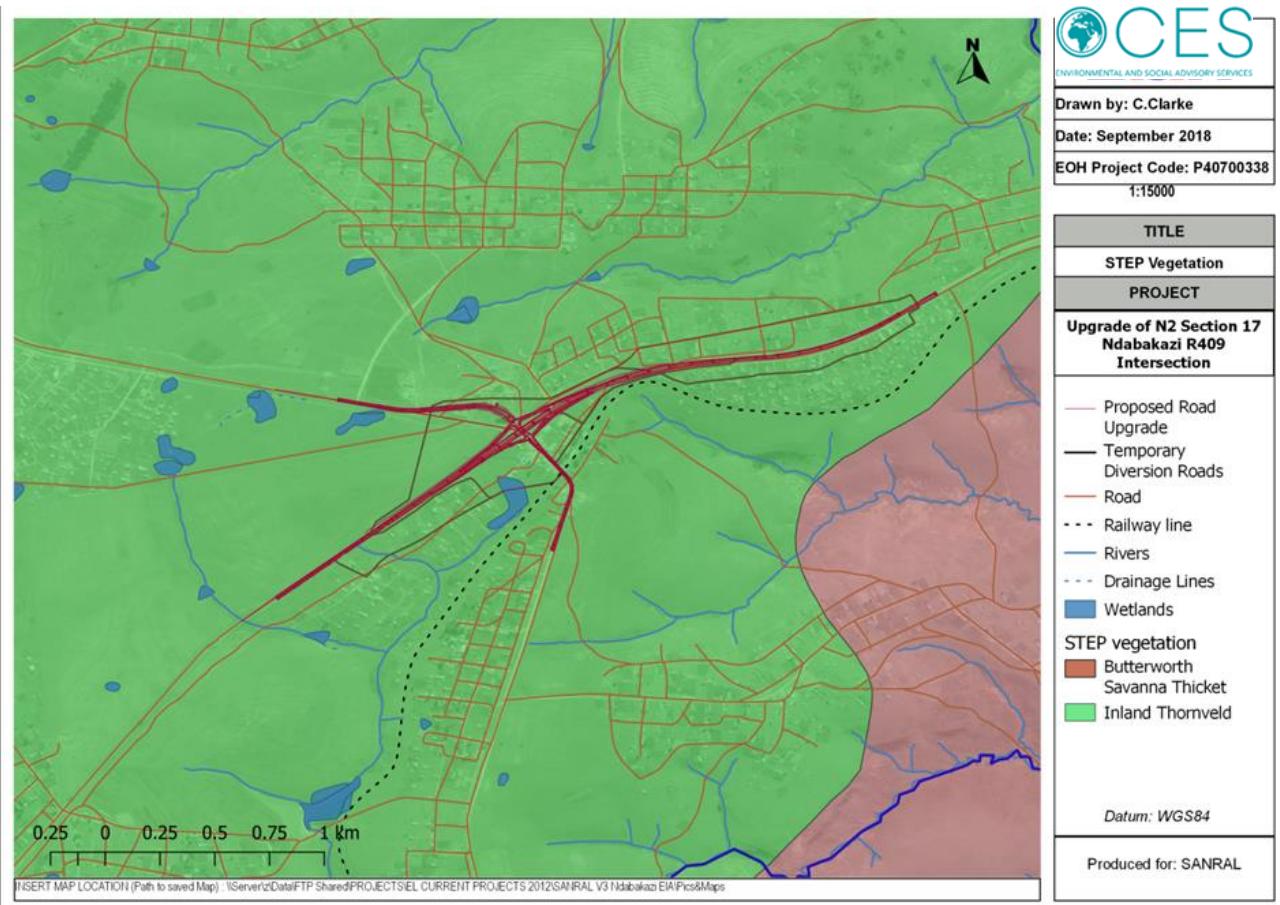


Figure 4.5: STEP thicket types of the study area.

Protected Areas

There are no known National, Provincial or locally protected areas found within the general study area. In addition, the proposed Ndabakazi Interchange does not fall within any National Protected Expansion Areas as per NPAES (2008).

Eastern Cape Biodiversity Conservation Plan (ECBCP)

The Ndabakazi Interchange falls within terrestrial areas that are classified as CBA 2. Furthermore, a portion of the proposed intersection upgrade falls within Aquatic areas classified as CBA 2 (Figure 4.6).

The CBA 2 areas have a corresponding BLMC 2 category as described in the ECBCP Handbook. BLMC class 2 denotes 'Near Natural Landscape' and has an associated '*recommended land use objective*' of '*maintaining biodiversity in a near natural state with minimal loss of ecosystem integrity and no transformation of natural habitats should be permitted.*' To this effect, recommended land uses for BLMC 2 include conservation, game farming and communal livestock.

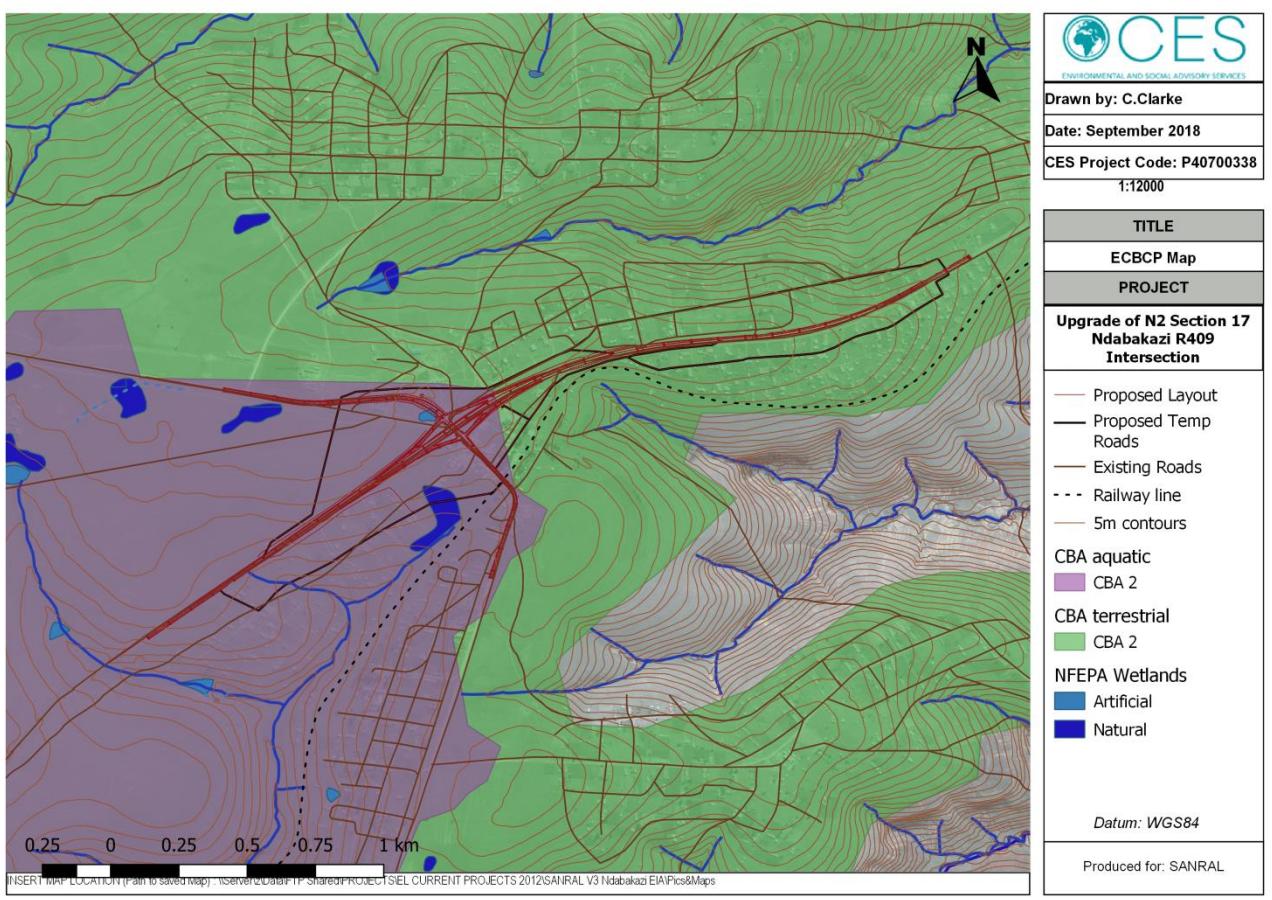


Figure 4.6: ECBCP map of study area.

Plant SCC's: Rare, Endangered or Threatened species

Plant species of conservation concern (SCC) comprise those species that are either threatened (Critically Endangered, Endangered, Vulnerable), rare or declining. The South African National Biodiversity Institute (SANBI) Plants of Southern Africa (POSA) plant database (<http://posa.sanbi.org>) was consulted, along with the categories indicated in the SANBI Threatened Species Programme website (<http://redlist.sanbi.org/species.php?species>) to identify potential SCC's within the proposed study area.

In addition to SANBI, the international IUCN Red Data list, DAFF protected trees, the Provincial Nature Conservation Ordinance (PNCO), and CITES, was consulted to compile a detailed list of plant SCC's that may potentially be found within the study area. The results are summarised in Table 4.1 while a full species list appears in Appendix A.

Table 4.1: List of potential plant SCC that may be found onsite

FAMILY	SPECIES	SANBI RED LIST	PNCO
ASPHODELACEAE	<i>Haworthia cymbiformis</i> var. <i>setulifera</i>	Not Evaluated	PNCO (Protected)
	<i>Aloe maculata</i>	LC	PNCO (Protected)
IRIDACEAE	<i>Gladiolus ochroleucus</i>	LC	PNCO (Protected)
ORCHIDACEAE	<i>Disa crassicornis</i>	LC	PNCO (Protected)
	<i>Eulophia streptopetala</i>	LC	PNCO (Protected)
SCROPHULARIACEAE	<i>Diascia racemulosa</i>	LC	PNCO (Protected)

Alien invasive species

Table 4.2 below details the potential listed alien invasive vegetation, as per the NEMBA List of Alien Invasive Species (Government Notice R 599 of 2014), likely to occur within the study area.

Table 4.2: List of potential Alien Invasive Species that are likely to be found onsite (Source: POSA Website)

Family	Species	Conservation Status	CARA	NEMBA: Alien Invasives
ASTERACEAE	<i>Xanthium spinosum</i>	Invasive	1	1b
FABACEAE	<i>Acacia mearnsii</i>	Invasive	2	2
	<i>Acacia melanoxylon</i>	Invasive	2	2
	<i>Acacia saligna</i>	Invasive	2	1b
Solanaceae	<i>Solanum mauritianum</i>	Invasive	2	1b

4.2 SITE INVESTIGATION

While National level vegetation maps have described broad vegetation types, local conditions and micro-habitats (rainfall, soil structure, rocky outcrops, etc.) can result in variations in plant composition. A site investigation was therefore conducted on the 14 September 2018 in order to confirm desktop findings, to assess the actual ecological state, current land-use, identify potential sensitive ecosystems and identify plant species associated with the proposed project activities. The site visit also served to inform potential impacts of the proposed project and how significantly it would impact on the surrounding ecological environment.

4.2.1 PLANT SPECIES OBSERVED

Based on site investigations, the areas adjacent to the proposed N2 Ndabakazi - Interchange consists of degraded grassland situated on flat areas. The most common grasses identified were *Themeda triandra*, *Eragrostis plana* and *Sporobolus africanus*. The surrounding undeveloped areas are used for cultivation and grazing land and is considered degraded. The proposed development area is almost entirely surrounded by existing low-urban density development (as shown in Figure 4.3 above).

Below is a photo sequence showing the vegetative condition of the study area during the site investigation.



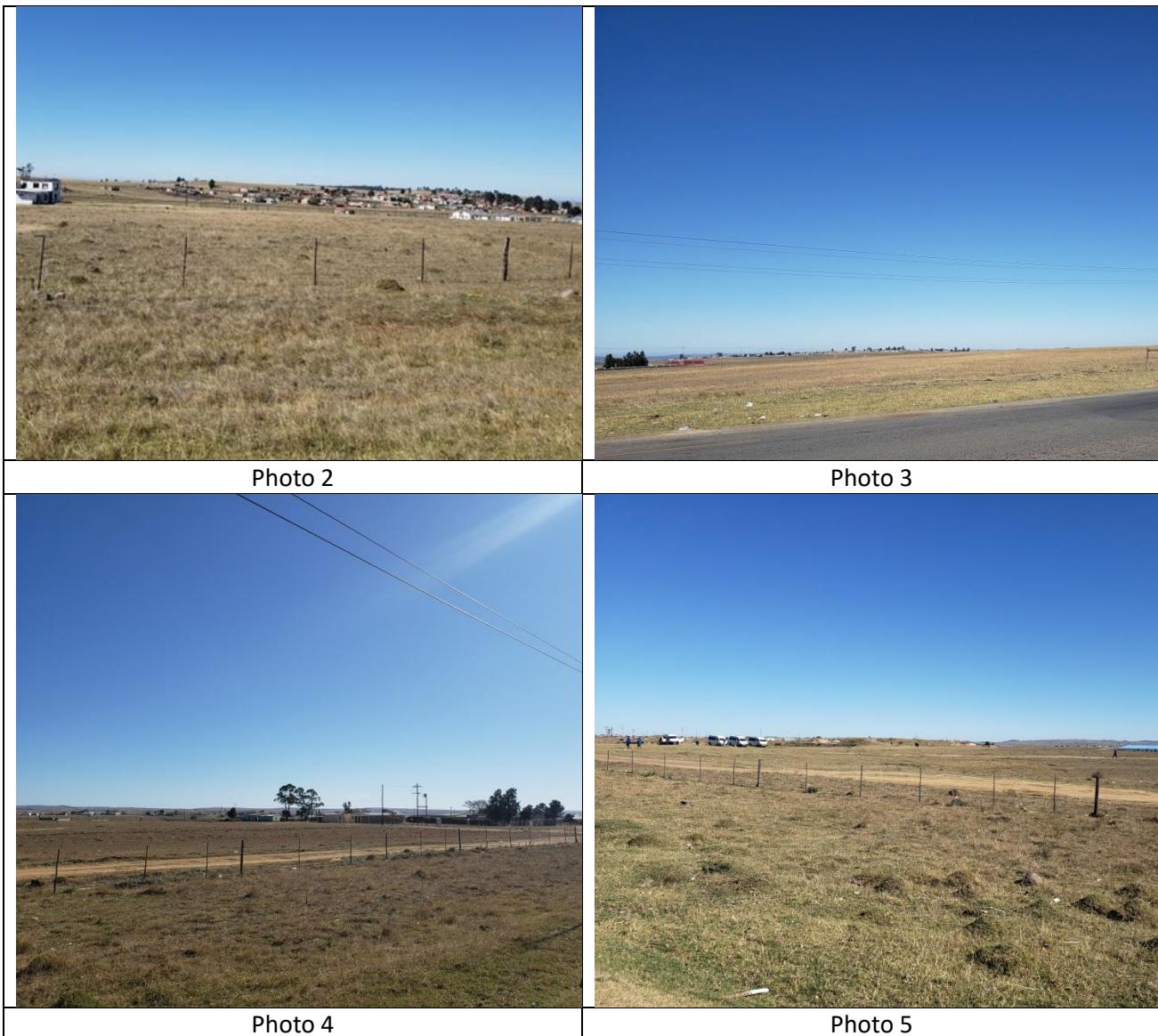


Figure 4.7: Site photos of the surrounding natural vegetation

The plant species identified at the study site have been grouped in Table 4.3 below.

Table 4.3 Plant species identified in the study area.

FAMILY	GENUS	SPECIES	ECOLOGY	STATUS
Asphodelaceae	<i>Aloe</i>	<i>maculata</i>	Not Indigenous; Naturalised;	- SANBI Red List: Least Concern - PNCO (Protected)
Asteraceae	<i>Helichrysum</i>	<i>rugosum</i>	Not Indigenous; Naturalised;	- SANBI Red List; Least Concern
	<i>Senecio</i>	<i>coronatus</i>	Not Indigenous; Naturalised;	- SANBI Red List; Least Concern
Poaceae	<i>Eragrotis</i>	<i>plana</i>	Not Indigenous; Naturalised;	- SANBI Red List; Least Concern
Poaceae	<i>Sporobolus</i>	<i>africanus</i>	Not Indigenous; Naturalised;	- SANBI Red List; Least Concern
Poaceae	<i>Themeda</i>	<i>triandra</i>	Not Indigenous; Naturalised;	- SANBI Red List; Least Concern

FAMILY	GENUS	SPECIES	ECOLOGY	STATUS
Rubiaceae	Richardia	<i>humistrata</i>	Not Indigenous; Naturalised;	- SANBI Red List; Least Concern
Solanaceae	<i>Solanum</i>	<i>mauritianum</i>	Invasive	- NEMBA Category 1b

4.2.2 PLANT SPECIES OF CONSERVATION CONCERN OBSERVED

A patch of *Aloe maculata* was found on site at GPS coordinates: S 32° 20.945' E28° 2.049' (Figure 4.8). These Aloes are protected under the Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974). This Ordinance protects Endangered (Schedule 3) and Protected (Schedule 4) Species. A permit from the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) (the Provincial Authority) is required for the removal or destruction of species listed in the Schedules prior to construction.

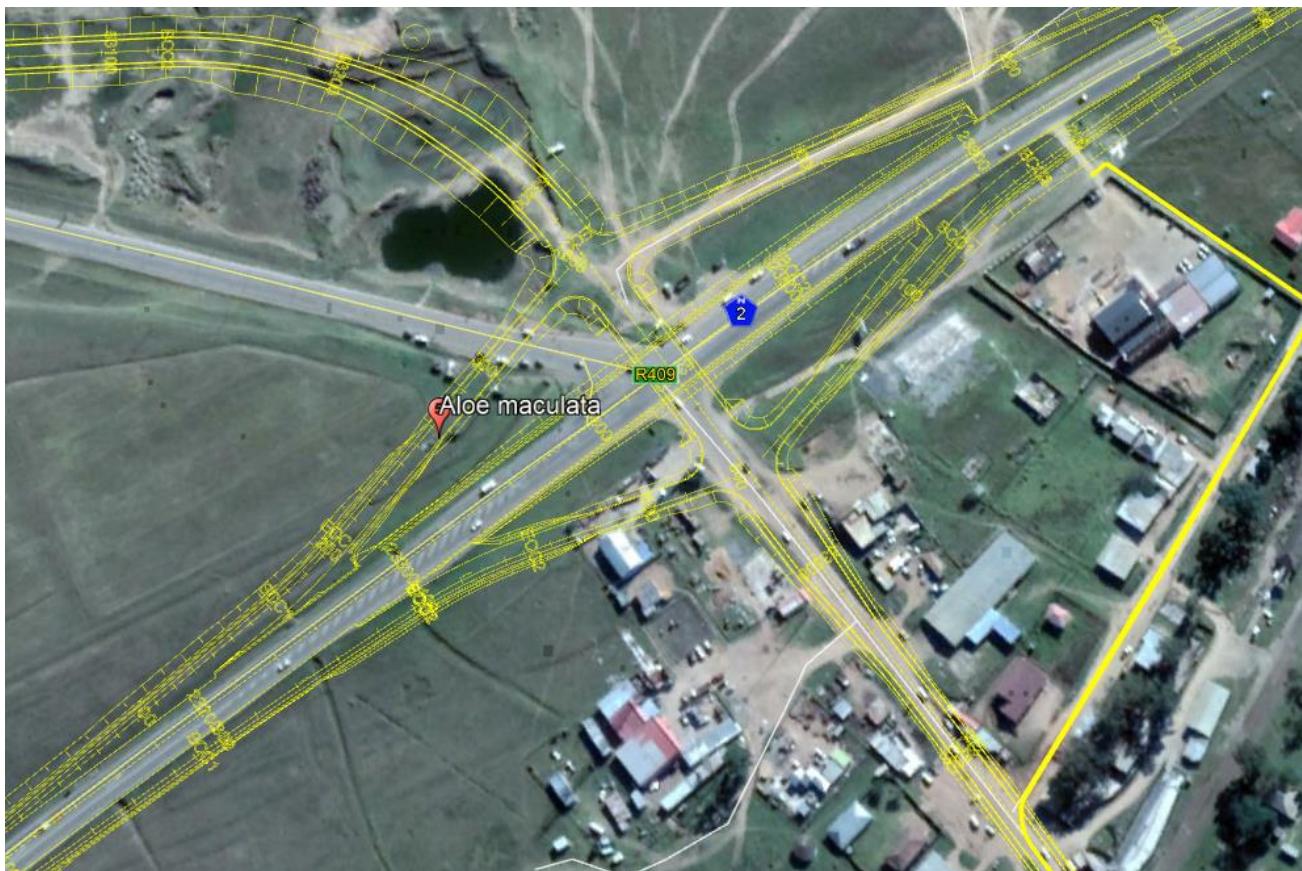




Figure 4.8: *Aloe maculata* found within the study area (GPS coordinates: 32°20.945' S; 28° 2.049' E).

4.2.3 ANIMAL SPECIES

No amphibians, reptiles, terrestrial invertebrates, birds and nesting areas, as well as large mammals were observed onsite during the site investigation. Small mammals such as rodents, ground squirrels, bats and a variety of insects and reptiles are expected to occur on site. There might be some animal species associated with the wetland areas.

4.2.4 WATER BODIES

Various existing water bodies were found on site as shown in Figure 4.2 above. Two natural bench flat wetlands are in close proximity to the proposed development (photos 1 and 2 below).

A temporary access road is proposed to pass through one of the natural bench flat wetlands on the eastern side of the proposed development (photo 2). According to the National Freshwater Ecosystem Priority Areas (NFEPA) 2011 database, this wetland is considered to be in a heavily to critically modified ecological condition (WETCON = Z1). This was confirmed by the site visit, conducted on the 14 September 2018, which found the wetland area to have been encroached by cultivation and a vehicular access track passing through it.

The same temporary access road (which follows an existing gravel road) also traverses a drainage line (known as the Ndabakazi river), located to the south east of the existing interchange. The Ndabakazi river does not have a Present Ecological State (PES) or Ecological Importance and Sensitivity (EIS) rating and is not considered to be a National Freshwater Ecosystem Priority Areas (NFEPA) river. The site visit confirmed the area was largely transformed by urban development and cultivation.

A man-made dam (old borrow pit) is located to the west of the existing N2-R409 interchange. Several non-perennial drainage channels are located to the east of the proposed development.

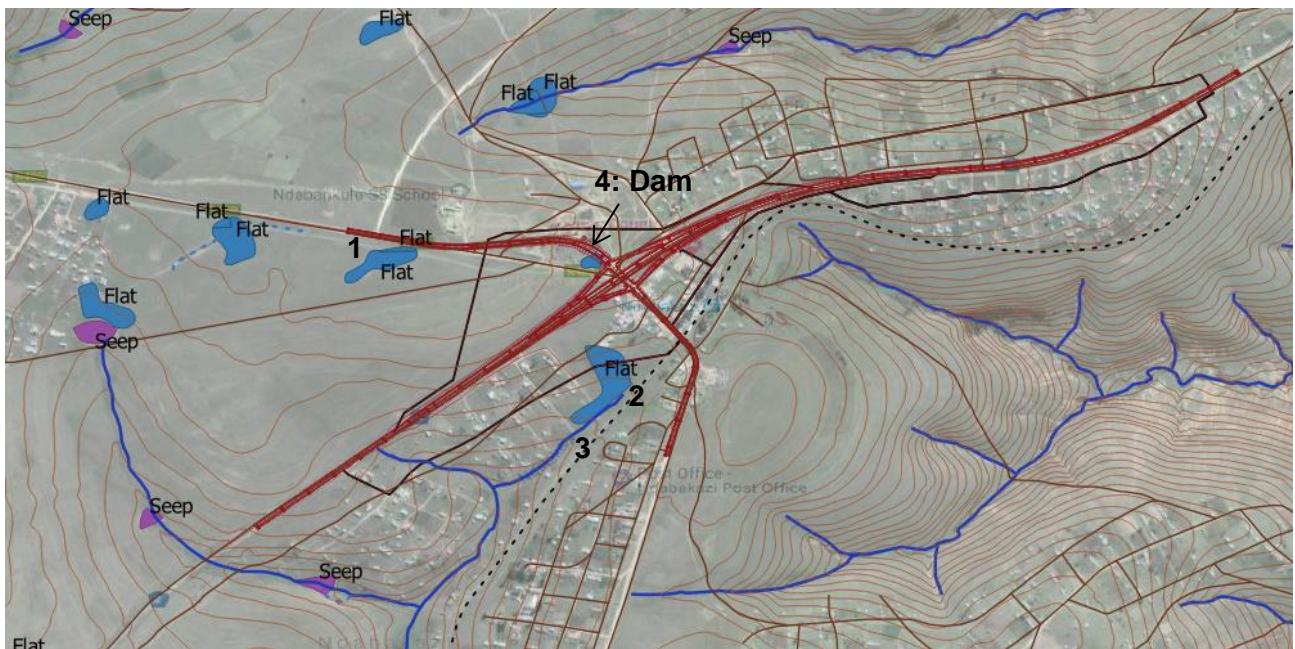


Photo 1: Bench Flat Wetland (Taken in January 2019)



Photo 2: Bench Flat Wetland (Taken in September 2018)



Photo 3: Drainage channel downstream of the bench flat wetland (photo 2)



Photo 4: Dam

Figures 4.9: Photos of waterbodies present within the study area.

5 SENSITIVITY ASSESSMENT

A site assessment was conducted in order to confirm desktop information and infer accurate descriptions of the current ecological integrity of the site at a more detailed level. A further objective is to assist in impact identification and assessment. This study discusses fauna, flora and potential sensitive ecosystems.

5.1 CONSERVATION AND SPATIAL PLANNING TOOLS

Several conservation planning tools are available for the study area. These tools allow for the potential identification of any sensitive and important areas from an ecological perspective at the early stage of a development and allow for the fine-tuning of plans and infrastructure layouts.

The following tools identified as relevant to the project are summarised below:

- SANBI Vegetation threat status;
- Land cover;
- Rivers and wetlands;
- NEMBA Protected Ecosystems; and
- ECBCP CBA's.

5.2 SANBI VEGETATION THREAT STATUS

Mthatha Moist Grassland (as identified in the SA VEGMAP, 2018) occurs along portions of the road upgrade and development, which is classified as Endangered. According to NEMBA (2004), Mthatha Moist Grassland is classified as having a Vulnerable ecosystem threat status.

The site visit confirmed that the development footprint of the road development, which falls within the Mthatha Moist Grassland, is largely transformed by the existing roads (tarred and gravel), surrounding urban development and cultivated land.

5.3 LAND COVER

Three applicable land covers were identified namely:

- Degraded grassland – Mthatha Moist Grassland;
- Cultivated land; and
- Low-density urban development.

Site observations and Google Earth imagery show that the site and its immediate surrounding area, classified as grasslands, has been largely transformed mostly by urban development and cultivated land.

5.4 WATERCOURSES AND WETLANDS

The site investigation found the watercourse and NFEPA wetland, located south east of the existing interchange, to be degraded, with the NFEPA wetland considered to be in a heavily to critically modified ecological condition (WETCON = Z1 (NFEPA, 2011)). The Ndabakazi river (a non-perennial drainage line) does not have a Present Ecological State (PES) or Ecological Importance and Sensitivity (EIS) rating and is not considered to be a National Freshwater Ecosystem Priority Areas (NFEPA) river. The site visit confirmed the area was largely transformed by urban development and cultivation.

Despite this, all surrounding watercourses and natural wetlands within the study are considered to be highly sensitive. Artificial wetlands (Ndabakazi dam) and areas within 32 m of natural wetlands, artificial wetlands; and rivers were considered moderately sensitive.

5.5 ECBP CBA'S

The study area falls within a terrestrial CBA 2, with a portion falling within an aquatic CBA 2. The site visit confirmed that the proposed road development footprint was found to be largely transformed by existing roads (tarred and gravel), surrounding urban development and cultivated land.

5.6 SENSITIVITY ALLOCATION

Sensitivity maps were developed based on the methodology presented in Table 5.1 below, for the study area. The allocation of criteria was based on both the desktop biophysical description of the site as well as observations made during the site visit.

Table 5.1: Sensitivity criteria

CRITERIA		LOW SENSITIVITY	MODERATE SENSITIVITY	HIGH SENSITIVITY
1	Topography	Level or even	Undulating; fairly steep slopes	Complex and uneven with steep slopes
2	Vegetation - Extent or habitat type in the region	Extensive throughout the region	Restricted to a particular region / zone	Restricted to a specific locality / site
3	Conservation status of fauna / flora or habitats	Well conserved/independent of conservation value	Not well conserved, moderate conservation value (degraded Mthatha Moist Grassland)	Not conserved - has a high conservation value
4	Species of conservation concern - Presence and number	None, although occasional regional endemics	No Species of Conservation Concern, some indeterminate or rare endemics	One or more Species of Conservation Concern, or more than 2 endemics or rare species
5	Habitat fragmentation leading to loss of viable populations	Extensive areas of preferred habitat present elsewhere in region not susceptible to fragmentation	Reasonably extensive areas of preferred habitat elsewhere and habitat susceptible to fragmentation	Limited areas of this habitat, susceptible to fragmentation
6	Biodiversity contribution	Low diversity or species richness	Moderate diversity, and moderately high species richness	High diversity and species richness
7	Erosion potential or instability of the region	Very stable and an area not subjected to erosion	Some possibility of erosion or change due to episodic events (areas with steeper gradients)	Large possibility of erosion change to the site or destruction due to climatic or other factors
8	Rehabilitation potential of the area or region	Site is easily rehabilitated	There is some degree of difficulty in rehabilitation of the site	Site is difficult to rehabilitate due to the terrain, type of habitat or species required to reintroduce
9	Disturbance due to human habitation or	Site is very disturbed or degraded	There is some degree of disturbance of the site	The site is hardly or very slightly impacted upon by

CRITERIA		LOW SENSITIVITY	MODERATE SENSITIVITY	HIGH SENSITIVITY
	other influences (alien invasive species)			human disturbance
10	Ecological function	Habitat widely represented in the landscape not specifically harbouring any unique habitat features...etc.	Intermediate role in ecological function	Key habitat involved in ecological processes (ecological corridors and network areas or key niche habitats)
11	Ecological Services	Little to no ecological services	Some ecological services (Ndabakazi dam and arable land)	Various ecological services. Areas should be conserved.

The proposed Ndakakazi Interchange largely falls on already developed land (within the N2 national road and R409 road reserve).

A small patch of *Aloes* found on the western side of the interchange have a **HIGH** sensitivity rating and should be avoided if possible. Portions of the proposed temporary diversion roads which fall within undeveloped areas containing degraded grassland (of the Mthatha Moist Grassland vegetation unit) has been allocated a **Moderate** sensitivity rating. Portions of the temporary traffic diversion roads which pass through developed urban areas, with patches of severely degraded grassland areas have been allocated a **LOW** sensitivity rating.

The Ndabakazi dam, located on the western side of the existing Interchange has been allocated a **Moderate** sensitivity rating, as it currently provides the community with ecological services and is a water source to the community for various purposes.

A small portion (less than 130m) of the proposed temporary diversion road, located on the south eastern side of the exiting Interchange, transverse areas of **HIGH** sensitivity, namely, a watercourse (non-perennial drainage line, i.e. the Ndabakazi River) and a degraded NFEPA wetland.

Table 5.2: Sensitive assessment of the study area

SENSITIVE ENVIRONMENT	DESCRIPTION	RISK
Aquatic Environment	• Watercourses • Wetlands	HIGH
Species of Conservation Concern	A patch of <i>Aloe maculata</i> was found on site	HIGH
Grasslands	The proposed development falls within the Mthatha Moist Grassland, considered ENDANGERED and has a high degree of transformation (more than 40%). The site visit found that the undeveloped areas containing grassland have been transformed by cultivation and access tracks.	Moderate
	Developed urban areas containing patches of severely degraded grassland.	LOW

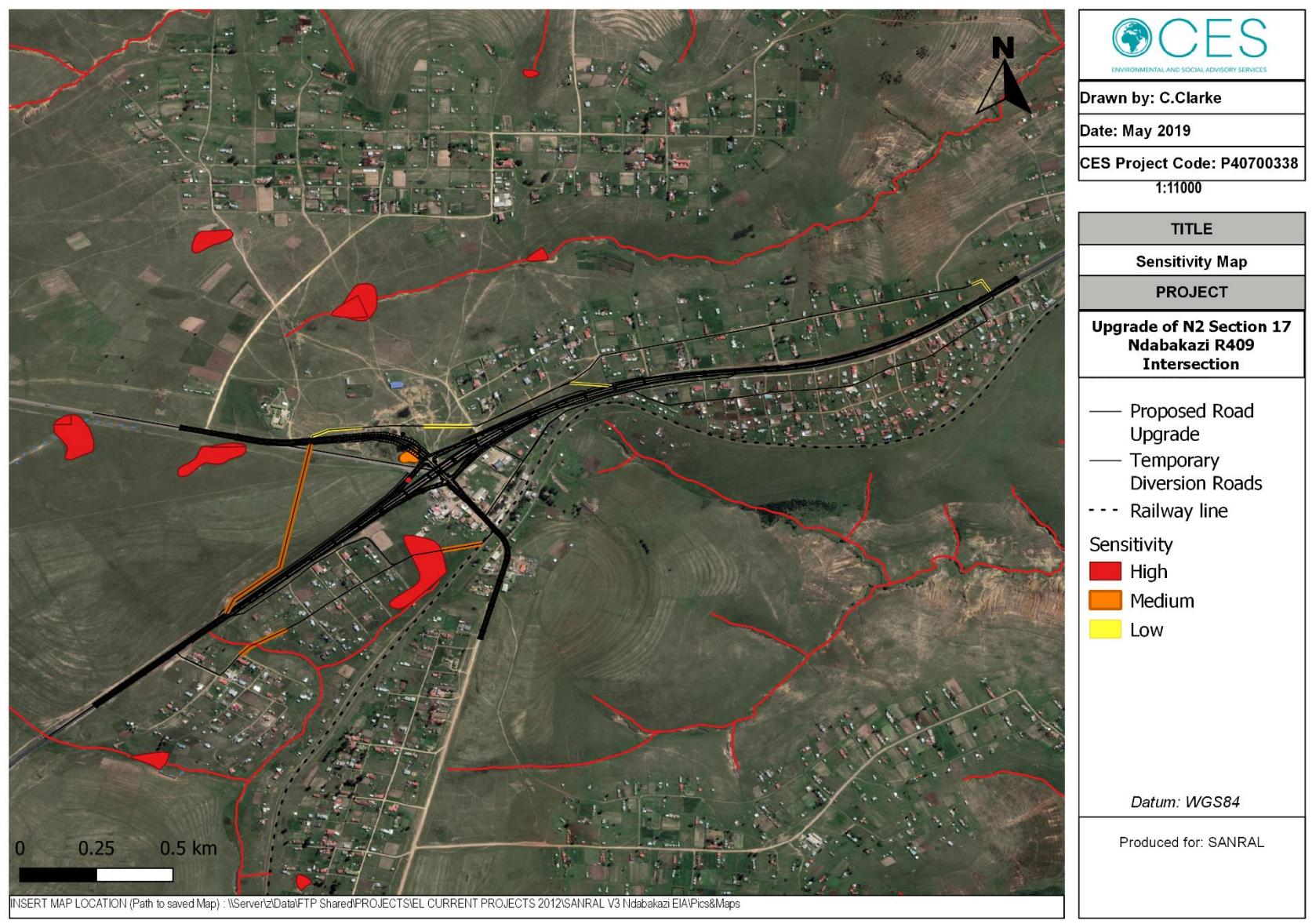


Figure 5.1: Sensitivity map of the study area.

6 IMPACT IDENTIFICATION AND ASSESSMENT

6.1 IDENTIFIED IMPACTS

Ecological impacts were identified during the Planning and Design, Construction and Operation Phase of the proposed N2 Ndabakazi - Interchange are described below. These included the consideration of direct, indirect and cumulative impacts that may occur.

Table 6.1: Technical scope of the impacts identified during all phases of the proposed Ndabakazi Interchange

THEME	POTENTIAL ISSUES	SOURCE OF ISSUE	POTENTIAL RECEPTORS	PHASE		
				PLANNING & DESIGN	CONSTRUCTION	OPERATIONAL
	Changes to fluvial geomorphology and hydrology	Earthworks, stormwater infrastructure design and construction	Surrounding water courses and wetlands	X	X	X
	Loss of Natural vegetation (grassland)	Vegetation clearance, footprint creep	Flora in study area, endangered grasslands	X	X	
	Species of Conservation Concern (SCC)	Vegetation clearance	SCC in study area	X	X	
	Control of alien plant species	Inappropriate alien vegetation management plan	Disturbed areas	X	X	X

6.2 IMPACT ASSESSMENT

The impacts identified in Section 6.1 are assessed in terms of the criteria described in Section 3.46 and are summarised in the tables below (Table 6.2 – 6.5).

Table 6.2. Assessment and mitigation of impacts identified in the Planning and Design Phase.

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
PLANNING & DESIGN PHASE									
Changes to fluvial geomorphology and hydrology	During the planning and design phase, the inappropriate design of stormwater management infrastructure and culverts may cause the degradation of watercourses, wetlands and associated natural habitats and sensitive aquatic systems.	Direct Cumulative	Localised	Long Term	Possible	Moderately severe	MODERATE NEGATIVE	<ul style="list-style-type: none"> The road engineer must ensure that appropriate stormwater structures are designed in line with both SANRAL and DWS requirements. Any upgraded culverts must be designed in such a manner so as not to impede or divert base flows or increase upstream flood inundation. Construction activities to take place within or within 32 m of any watercourse, or 500m of wetlands, obtain authorisation from DWS prior to construction. 	LOW NEGATIVE
Loss of natural vegetation (grassland)	During the planning and design phase, the inappropriate design of the road upgrade will lead to the unnecessary loss of grasslands	Direct, Indirect, Cumulative	Project Level	Long Term	Definite	Moderately severe	MODERATE NEGATIVE	<ul style="list-style-type: none"> The road design and layout must have as minimal impact on the natural vegetation (grassland) as possible. 	LOW NEGATIVE

Final Ecological Impact Assessment

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	(although degraded), classified as Mthatha Moist Grassland (Endangered).								
Loss of Species of Conservation Concern (SCC)	During the planning and design phase the inappropriate design and alignment of the Ndabakazi Interchange will lead to the loss of identified and unidentified plant and animal SCC.	Direct	Project Level	Permanent	Definite	Moderately severe	HIGH NEGATIVE	<ul style="list-style-type: none"> A walkthrough must be done by a suitably qualified individual to confirm the occurrence of SCC's in the study area, prior to the commencement of construction. Should it be impossible for the road layout to avoid identified plant SCCs (aloes), these plant SCCs must be relocated to outside the construction footprint prior to commencement of activities, to a nearby location deemed appropriate by the suitably qualified individual during the walkthrough. The relevant permits must be obtained from the competent 	MODERATE NEGATIVE

Final Ecological Impact Assessment

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
								authority, prior to removal, in order to relocate any plant SCCs.	
Control of alien plant species	During the planning and design phase, inadequate planning for the removal and management of alien vegetation could result in the invasion of alien vegetation in both terrestrial and riparian areas during the construction and operation phase.	Indirect	Localised	Long Term	Probable	Severe	HIGH NEGATIVE	<ul style="list-style-type: none"> During the planning and design phase an Alien Vegetation Management Plan must be complied to reduce the establishment and spread of undesirable alien plant species. 	MODERATE NEGATIVE

Table 6.3. Assessment and mitigation of impacts identified in the Construction Phase.

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
CONSTRUCTION PHASE									
Changes to fluvial geomorphology and hydrology	During the construction phase activities within licensed watercourses/drainage channels may impede the flow of watercourses, affecting the local hydrology, should it not be undertaken in the correct manner.	Direct Cumulative	Localised	Medium term	Possible	Severe	HIGH NEGATIVE	<ul style="list-style-type: none"> Construction activities within licensed water crossings must adhere to the conditions of the Water Use License obtained prior to construction. All work within the watercourses and drainage channels should be completed during the dry season, when flows are at their lowest, if possible. Temporary access roads through wetlands must be rehabilitated to the satisfaction of the DWS and ECO once construction is completed. 	MODERATE NEGATIVE
Loss of natural vegetation (grassland)	During the construction phase, uncontrolled clearing of the surrounding grassland (although already degraded) will lead to the further loss of Mthatha Moist	Direct Cumulative	Project level	Medium term	Definite	Moderately severe	MODERATE NEGATIVE	<ul style="list-style-type: none"> The construction footprint must be surveyed and demarcated prior to construction commencing to ensure that there is no unnecessary loss 	LOW NEGATIVE

Final Ecological Impact Assessment

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	Grassland (Endangered).							<p>of natural vegetation outside the approved road upgrade footprint.</p> <ul style="list-style-type: none"> • Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and revegetation must be undertaken. 	
Loss of Species of Conservation Concern (SCC)	During the construction phase the clearing of natural vegetation may lead to the destruction of habitats and the loss of identified and unidentified plant SCC.	Direct Indirect Cumulative	Localised	Permanent	Possible	Moderately severe	MODERATE NEGATIVE	<ul style="list-style-type: none"> • Identified plant SCC's (aloes) must be relocated immediately outside of the construction and operational footprint, as determined during the walkthrough exercise undertaken by the suitably qualified individual. 	LOW NEGATIVE
Control of alien plant species	During the construction phase, poor continuous rehabilitation of disturbed areas may lead to the permanent degradation of ecosystems as well as allow for alien vegetation species to expand.	Direct Indirect Cumulative	Localised	Long Term	Probable	Moderately Severe	MODERATE NEGATIVE	<ul style="list-style-type: none"> • All temporarily impacted areas must be rehabilitated back to their original condition. • Only topsoil from the immediate area must be used for rehabilitation. • All temporarily impacted areas must 	LOW NEGATIVE

Final Ecological Impact Assessment

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
								be restored as per the Rehabilitation Management Plan.	

Table 6.4. Assessment and mitigation of impacts identified in the Operation Phase.

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	EXTENT	DURATION	LIKELIHOOD	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
OPERATION PHASE									
Changes to fluvial geomorphology and hydrology	During the operational phase, inadequate management and maintenance of stormwater infrastructure and culverts may cause the degradation of watercourses, wetlands and associated natural habitats and sensitive aquatic systems.	Direct Cumulative	Localised	Medium term	Possible	Moderately Severe	Moderate Negative	<ul style="list-style-type: none"> The Storm Water Management Plan must be implemented, and infrastructure monitored and maintained by SANRAL, during the operation phase. 	LOW NEGATIVE

Table 6.5. Assessment of the No-Go alternative.

ISSUE	DESCRIPTION OF IMPACT	NATURE OF IMPACT	SPATIAL SCALE (EXTENT)	TEMPORAL SCALE (DURATION)	CERTAINTY SCALE (LIKELIHOOD)	SEVERITY / BENEFICIAL SCALE	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
Proposed Ndabakazi Interchange	Should the upgrade does not proceed, none of the negative impacts to the receiving environment identified for the planning and design, construction and operational phases above will take place.	Direct	Localised	Permanent	Definite	Moderately severe	Beneficial	No mitigation required	Beneficial

SANRAL is proposing the construction of the new Ndabakazi Interchange between the N2 and the R409, near Butterworth, within the Amathole District Municipality of the Eastern Cape Province. The proposed Ndabakazi Interchange development will consist of the upgrading of the existing N2 and R409 roads at the intersection as well as the construction of a new N2 bridge over the R409 with corresponding interchanges. These improvements will include extensive earth and drainage works, layer works, new surfacing, road repairs, road construction, construction of reinforced concrete structures, improvements/construction of drainage structures and vertical geometric improvements for the new N2 Bridge.

7.1 ALTERNATIVES

No site alternatives have been assessed as the proposed development takes place on the existing N2 national road. Therefore route/site alternatives are not deemed reasonable and feasible. The preferred Layout Alternative 1 is deemed acceptable as it takes into consideration the location of existing watercourses, natural and artificial wetlands (as much as practically possible) and proposes the least impactful alignment and construction of associated infrastructure for the upgrading, widening and realignment the Ndabakazi Interchange.

The No-go Alternative refers to the current status quo and the risks and impacts associated with it. The ‘No-Go’ alternative will allow for the continuation of the status quo (existing risks and impacts associated with it) with no further impacts to the surrounding natural environment stemming from the proposed development. However, as the proposed development will largely fall within existing road reserves, the ‘No-Go’ alternative was not preferred considering the overall aim and objective of the proposed development is to improve road safety at the Ndabakazi Interchange, which is known to be dangerous for pedestrians and road users.

7.2 IMPACT ASSESSMENT SUMMARY

All HIGH impacts can be mitigated to a MODERATE or LOW significance level with the implementation of appropriate mitigation measures (contained in section 7.3 below).

Table 7.1 Assessment of pre- and post-mitigation impact significance.

STAGES	PRE-MITIGATION			POST-MITIGATION		
	LOW	MODERATE	HIGH	LOW	MODERATE	HIGH
Planning and Design	0	2	2	2	2	0
Construction	0	3	1	3	1	0
Operation	0	1	0	1	0	0
NO-GO	0	1(+)	0	0	1(+)	0
TOTAL	0	6 (1+)	3	6	4(1+)	0

7.3 RECOMMENDATIONS FOR THE PROPOSED NDABAKAZI INTERCHANGE

All the mitigation measures provided below are to be implemented in the Planning and Design, Construction, Operation and Decommissioning Phases of the proposed Ndabakazi Interchange development.

7.3.1 PLANNING AND DESIGN

- The road engineer must ensure that appropriate stormwater structures are designed in line with both SANRAL and DWS requirements.
- Any upgraded culverts must be designed in such a manner so as not to impede or divert base flows or increase upstream flood inundation.
- Construction activities to take place within or within 32 m of any watercourse, or 500m of wetlands, obtain authorisation from DWS prior to construction.
- The road design and layout must have as minimal impact on the natural vegetation (grassland) as possible.
- A walkthrough must be done by a suitably qualified individual to confirm the occurrence of SCC's in the study area, prior to the commencement of construction.
- Should it be impossible for the road layout to avoid identified plant SCCs (aloes), these plant SCCs must be relocated to outside the construction footprint prior to commencement of activities, to a nearby location deemed appropriate by the suitably qualified individual during the walkthrough.
- The relevant permits must be obtained from the competent authority, prior to removal, in order to relocate any plant SCCs.
- During the planning and design phase an Alien Vegetation Management Plan must be complied to reduce the establishment and spread of undesirable alien plant species.

7.3.2 CONSTRUCTION

- Construction activities within licensed water crossings must adhere to the conditions of the Water Use License obtained prior to construction.
- All work within the watercourses and drainage channels should be completed during the dry season, when flows are at their lowest, if possible.
- Temporary access roads through wetlands must be rehabilitated to the satisfaction of the DWS and ECO once construction is completed.
- The construction footprint must be surveyed and demarcated prior to construction commencing to ensure that there is no unnecessary loss of natural vegetation outside the approved road upgrade footprint.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and revegetation must be undertaken.
- Identified plant SCC's (aloes) must be relocated immediately outside of the construction and operational footprint, as determined during the walkthrough exercise undertaken by the suitably qualified individual.
- All temporarily impacted areas must be rehabilitated back to their original condition.
- Only topsoil from the immediate area must be used for rehabilitation.
- All temporarily impacted areas must be restored as per the Rehabilitation Management Plan.

7.3.3 OPERATION

- The Storm Water Management Plan must be implemented, and infrastructure monitored and maintained by SANRAL, during the operation phase.

7.4 ENVIRONMENTAL STATEMENT AND OPINION OF THE SPECIALIST

The ecological impacts of all the aspects of the proposed Ndabakazi Interchange development were considered and deemed to be ecological acceptable, provided that the mitigation measures provided in this report are implemented. Even though small pockets of moderate to highly sensitive areas (grassland and aquatic features) were identified within the study area, these areas are not considered to represent a fatal flaw as the much of the proposed development footprint and nearby surrounding areas have been transformed by urban development, cultivation and grazing.

As the proposed Ndabakazi Interchange development will largely involve the upgrade the existing N2-R409 Interchange (as well as the use and upgrading of existing gravel roads for the temporary traffic diversion routes), the impact on the surrounding natural vegetation (grasslands) and aquatic features will be minimal.

8 REFERENCES

Berliner D and Desmet P. Eastern Cape Biodiversity Conservation Plan. 2007. Department of Water Affairs and Forestry Project No. 2005-012

Branch, W.R., 1988. Terrestrial reptiles and amphibians. In: *A Field Guide to the Eastern Cape Coast*, R. A. Lubke, F. W. Gess and M. N. Bruton (eds.), Grahamstown Centre for the Wildlife Soc. S. Afr., 251-264.

International Union for Conservation of Nature (IUCN). 2009. Red List of Threatened Species. IUCN Species Survival Commission, Cambridge Available from: <http://www.iucnredlist.org/> (Accessed 26/07/2012).

Mucina, L., Scott-Shaw, C.R., Rutherford, M.C., Camp, K.G.T., Matthews, W.S., Powrie, L.W. and Hoare, D.B., 2006. Indian Ocean Coastal Belt In: The vegetation of South Africa, Lesotho and Swaziland, Mucina L and Rutherford (eds.). South African National Biodiversity Institute, Pretoria.

Pierce, S.M., 2003. The STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Terrestrial Ecology Research Unit Report No. 47. University of Port Elizabeth, South Africa.

APPENDIX A: VEGETATION LIST

Family	Species	Threat status	Lifecycle	Growth forms
ACANTHACEAE	<i>Barleria obtusa</i>	LC	Perennial	Dwarf shrub, herb, shrub
AMARYLLIDACEAE	<i>Crinum macowanii</i>	PNCO (Protected)	Perennial	Geophyte
AMARYLLIDACEAE	<i>Crinum moorei</i>	Red Data (VU)	Perennial	Geophyte
ANTHERICACEAE	<i>Chlorophytum cooperi</i>	LC	Perennial	Herb
APOCYNACEAE	<i>Asclepias gibba var. gibba</i>	PNCO (Protected)	Perennial	Herb
APOCYNACEAE	<i>Ceropegia africana subsp. barklyi</i>	PNCO (Protected)	Perennial	Climber, geophyte, succulent
APOCYNACEAE	<i>Pachycarpus reflectens</i>	PNCO (Protected)	Perennial	Herb, succulent
ASPARAGACEAE	<i>Asparagus oxyacanthus</i>	LC	Perennial	Shrub
ASPARAGACEAE	<i>Asparagus suaveolens</i>	LC	Perennial	Shrub
ASPHODELACEAE	<i>Aloe africana</i>	PNCO (Protected)	Perennial	Succulent, tree
ASPHODELACEAE	<i>Aloe barberae</i>	PNCO (Protected)	Perennial	Succulent, tree
ASPHODELACEAE	<i>Aloe tenuior var. tenuior</i>	PNCO (Protected)	Perennial	Shrub, succulent
ASPHODELACEAE	<i>Bulbine abyssinica</i>	LC	Perennial	Geophyte, herb, succulent
ASPHODELACEAE	<i>Bulbine frutescens</i>	LC	Perennial	Dwarf shrub, succulent
ASPHODELACEAE	<i>Haworthia cymbiformis var. setulifera</i>	PNCO (Protected)	Perennial	Succulent
ASPHODELACEAE	<i>Trachyandra affinis</i>	LC	Perennial	Geophyte, succulent
ASTERACEAE	<i>Arctotis arctotoides</i>	LC	Perennial	Herb
ASTERACEAE	<i>Denekia capensis</i>	LC	Perennial	Herb
ASTERACEAE	<i>Helichrysum psilolepis</i>	LC	Perennial	Herb
ASTERACEAE	<i>Hilliardiella hirsuta</i>	LC	Perennial	Herb
ASTERACEAE	<i>Senecio retrorsus</i>	LC	Perennial	Herb
ASTERACEAE	<i>Xanthium spinosum</i>	Not Evaluated	Annual	Herb
ASTERACEAE	<i>Zinnia peruviana</i>	Not Evaluated	Annual	Herb
BUDDLEJACEAE	<i>Nuxia congesta</i>	LC	Perennial	Shrub, tree
COLCHICACEAE	<i>Colchicum striatum</i>	LC	[No lifecycle defined]	Geophyte
CRASSULACEAE	<i>Crassula multicava subsp. multicava</i>	LC	Perennial	Herb, lithophyte, succulent
CRASSULACEAE	<i>Crassula ovata</i>	LC	Perennial	Shrub, succulent
CRASSULACEAE	<i>Kalanchoe rotundifolia</i>	LC	Perennial	Dwarf shrub, succulent
CYPERACEAE	<i>Ficinia dunensis</i>	LC	Perennial	Cyperoid, herb, mesophyte
EBENACEAE	<i>Diospyros lycioides subsp. sericea</i>	LC	Perennial	Shrub, tree

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Family	Species	Threat status	Lifecycle	Growth forms
ERIOSPERMACEAE	<i>Eriospermum porphyrium</i>	LC	Perennial	Geophyte
FABACEAE	<i>Dichilus strictus</i>	LC	Perennial	Dwarf shrub, herb, shrub
FABACEAE	<i>Eriosema squarrosum</i>	LC	Perennial	Herb
FABACEAE	<i>Erythrina latissima</i>	LC	Perennial	Tree
FABACEAE	<i>Indigofera torulosa var. torulosa</i>	LC	Annual	Herb
FABACEAE	<i>Lotononis stricta</i>	LC	Perennial	Dwarf shrub, shrub
FABACEAE	<i>Schotia afra var. angustifolia</i>	LC	Perennial	Shrub, tree
FABACEAE	<i>Trifolium burchellianum subsp. burchellianum</i>	LC	Perennial	Herb
FABACEAE	<i>Zornia capensis subsp. capensis</i>	LC	Perennial	Herb
GERANIACEAE	<i>Pelargonium bowkeri</i>	LC	Perennial	Geophyte, succulent
HYACINTHACEAE	<i>Drimia capensis</i>	LC	Perennial	Geophyte
ICACINACEAE	<i>Cassinopsis ilicifolia</i>	LC	Perennial	Shrub, tree
IRIDACEAE	<i>Gladiolus ochroleucus</i>	PNCO (Protected)	Perennial	Geophyte, herb
LAMIACEAE	<i>Plectranthus ecklonii</i>	LC	Perennial	Shrub
LAMIACEAE	<i>Plectranthus madagascariensis var. madagascariensis</i>	LC	Perennial	Herb, succulent
LAMIACEAE	<i>Plectranthus spicatus.</i>	LC	Perennial	Herb, succulent
LAMIACEAE	<i>Salvia repens var. keiensis</i>	DDD	Perennial	Herb
LAMIACEAE	<i>Teucrium trifidum.</i>	LC	Perennial	Herb
MALVACEAE	<i>Grewia occidentalis var. occidentalis</i>	LC	Perennial	Shrub, tree
ORCHIDACEAE	<i>Disa crassicornis</i>	PNCO (Protected)	Perennial	Geophyte, herb
ORCHIDACEAE	<i>Eulophia streptopetala</i>	PNCO (Protected)	Perennial	Geophyte, herb, succulent
POACEAE	<i>Agrostis eriantha. var. eriantha</i>	LC	Perennial	Graminoid
POACEAE	<i>Eragrostis cilianensis</i>	LC	Annual	Graminoid
POACEAE	<i>Eragrostis curvula</i>	LC	Perennial	Graminoid
POACEAE	<i>Hyparrhenia dregeana</i>	LC	Perennial	Graminoid
POACEAE	<i>Hyparrhenia hirta</i>	LC	Perennial	Graminoid

Final Ecological Impact Assessment

Family	Species	Threat status	Lifecycle	Growth forms
POACEAE	<i>Themeda triandra</i>	LC	Perennial	Graminoid
POACEAE	<i>Tristachya leucothrix</i>	LC	Perennial	Graminoid
RESTIONACEAE	<i>Thamnochortus glaber</i>	LC	Perennial	Dwarf shrub, restioid
RHAMNACEAE	<i>Scutia myrtina</i>	LC	Perennial	Shrub, tree
ROSACEAE	<i>Rubus pinnatus</i>	LC	Perennial	Scrambler, shrub
ROSACEAE	<i>Rubus rigidus</i>	LC	Perennial	Shrub
RUBIACEAE	<i>Burchellia bubalina</i>	LC	Perennial	Shrub, tree
SCROPHULARIACEAE	<i>Diascia racemulosa</i>	LC	Annual	Herb
SCROPHULARIACEAE	<i>Jamesbrittenia phlogiflora</i>	LC	Perennial	Dwarf shrub
SCROPHULARIACEAE	<i>Nemesia denticulata</i>	LC	Perennial	Herb
SCROPHULARIACEAE	<i>Selago dolosa</i>	LC	Perennial	Dwarf shrub
SCROPHULARIACEAE	<i>Selago hyssopifolia</i> <i>subsp. hyssopifolia</i>	LC	Perennial	Herb
SCROPHULARIACEAE	<i>Selago intermedia</i>	LC	Perennial	Dwarf shrub
SINOPTERIDACEAE	<i>Cheilanthes involuta</i> <i>var. involuta</i>	LC	Perennial	Geophyte, herb, lithophyte
SOLANACEAE	<i>Lycium cinereum</i>	LC	Perennial	Dwarf shrub, shrub
TYPHACEAE	<i>Typha capensis</i>	LC	Perennial	Herb, hydrophyte, hyperhydiate
VISCACEAE	<i>Viscum anceps</i>	LC	Perennial	Parasite, shrub, succulent
ZAMIACEAE	<i>Encephalartos princeps</i>	Red Data (VU) PNCO (Endangered)	Perennial	Shrub, tree

APPENDIX B: CURRICULUM VITAE & DECLARATION

CONTACT DETAILS

Name of Company	CES – Environmental and Social Advisory Services
Designation	East London Branch
Profession	Senior Environmental Consultant
Years with firm	1 (One) Year
E-mail	c.clarke@cesnet.co.za
Office number	+27 (0)43 7267809 / 8313
Nationality	South African
Professional Body	South African Council for Scientific Natural Professionals (SACNASP): Candidate Natural Scientist (500022/14)
Key areas of expertise	<ul style="list-style-type: none">➤ Climate Change➤ Environmental Authorisations (including MPRDA applications)➤ Environmental Management Plans➤ Environmental Compliance Monitoring➤ Geographic Information Systems➤ Licensing and Permit Applications➤ Feasibility Assessments➤ Public Participation Process

PROFILE

Caryn holds a M.Sc. Environmental Science (2012), B.Sc. Hon. Environmental Science (2010), and a B.Sc. Environmental Science and Economics (2009) from Rhodes University. Her M.Sc. thesis was titled “Responses to the linked stressors of Climate Change and HIV/AIDS amongst vulnerable rural households in the Eastern Cape, South Africa”. Her B.Sc. Hon. thesis investigated climate change perceptions, drought responses and views on carbon farming amongst commercial livestock and game farmers within the Great Fish River Valley, Eastern Cape, from which a paper was published in the African Journal of Range and Forage Science 2012, 29(1):13-23. Caryn has further completed a Carbon Footprint Analysis Course (2013).

Caryn’s expertise includes project management, environmental impact assessments including public participation, MPRDA applications, environmental compliance monitoring, various licensing and permit applications, feasibility assessments and GIS mapping. Caryn is a registered Candidate Natural Scientist under the South African Council for Natural Scientific Professions.

**EMPLOYMENT
EXPERIENCE**

- Environmental Consultant, Coastal and Environmental Services
August 2018 – current
- Environmental Consultant, Environmental Impact Management Services (EIMS)
March 2013 – September 2015

**ACADEMIC
QUALIFICATIONS**

- Rhodes University, 2012: M.Sc. (Environmental Science) with distinction
- Rhodes University, 2010: B.Sc. Hon. (Environmental Science) with distinction
- Rhodes University, 2009: B.Sc. (Environmental Science and Economics) with distinctions

COURSES

- *Terra Firma Academy, Johannesburg:
"Carbon Footprint Analysis Course" (2013)*

**CONSULTING
EXPERIENCE**

- Water Use Licensing for the Olivewood Gold Estate, Eastern Cape.
- Water Use Licensing for the Northern Cape Economic Development, Trade and Investment Promotion Agency (NCEDA) SEZ, Upington, Northern Cape.
- Environmental Sensitivity Assessment for the Lesotho Electricity Company 132 kV Mahlasela - Letseng Powerline, Lesotho.
- EIA, Water Use Licensing, and Coastal Discharge Permit for the Wild Coast Abalone Expansion, Eastern Cape.
- Conservation Management Plan for the CDC Wild Coast Mthatha SEZ, Eastern Cape.
- Basic Assessment and Mining License for the SANRAL Heidelberg to Lizmore road upgrade, Western Cape.
- Feasibility Assessment for the DAFF Multispecies Hatchery Development within the Eastern Cape.
- EIA for the proposed WildCoast SEZ Upper Ncise Aquaponics development, Mthatha Dam.
- Market Analysis for the DAFF Richards Bay Marine Cage Culture Aquaculture Feasibility Assessment.
- Basic Assessment for the proposed Eskom Lesokwana substation and associated powerlines, Gauteng.
- Basic Assessment and Water Use Licensing for the proposed SANRAL V3 Ndabakazi and R409 Interchange upgrade;
- Basic Assessment and Water Use Licensing for the proposed Kei Mouth Eco Estate.
- Public Participation for the Silver Wave Energy Exploration Rights;
- Integrated Water Use Licensing for Leiden Coal Mine;
- Integrated Water and Waste Management Plan for Vlakvarkfontein Coal Mine Consolidation;
- Environmental Impact Assessment for AOE Oil Production Right, Nanaga;
- Environmental Management Plan and compliance monitoring for the Noblesfontein Wind Energy Facility;
- Section 24G for the Tankatara Level Crossing to Coega Station service road

upgrade;

- Environmental Impact Assessment for BCMM Sunny South Housing Development;
- Environmental Impact Assessment for the AES Photovoltaic Solar Energy Facility near Aggeneys, Northern Cape;
- Vincent-Berea Local Spatial Development Framework (LSDF);
- Participatory Planning for Informal Settlements: National Upgrading Support Programme (NUSP);
- Basic Assessment for the formalisation of Mdantsane informal settlements;
- Water use License Applications for the formalisation of Mdantsane informal settlements;
- Basic Assessments for the Sidwadeni and Mngazi River Bridge and Access Road;
- Environmental Compliance Monitoring (ECO work) for Lusikisiki Waste Water Treatment Works;
- Environmental Compliance Monitoring for the East London Industrial Development Zone (ELIDZ) 1B West Infrastructure Services
- Environmental Compliance Monitoring for the reconstruction of Fleet Street, East London.
- Environmental Compliance Monitoring for the Sunny South Housing Development, East London.
- Numerous proposals, for example: Nelson Mandela Bay Metro Municipality's request for Environmental Consultant Services, Camdeboo Local Municipality's Integrated Waste Management Plan, Port St John's Environmental Management Plan, and the ELIDZ upgrade of Kemba electrical substation, Berlin, Eastern Cape; ELIDZ request for information; Transnet S24G Rectification process; Nyandeni Local Municipality's request for an Environmental Impact Assessment for the Ndayini Access Road.

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

CARYN CLARKE

Date: January 2019



herewith certifies that

Caryn Lee Clarke

Registration Number: 500022/14

is registered as a

Candidate Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003

(Act 27 of 2003)

in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective **23 July 2014**

Expires **31 March 2020**



Chairperson

Chief Executive Officer



CONTACT DETAILS

Name of Company	EOH Coastal & Environmental Services
Designation	East London Branch
Profession	Principal Environmental Consultant
Years with firm	
E-mail	Roy.dekock@eoh.co.za r.dekock@cesnet.co.za
Office number	+27 (0)43 726 7809
Nationality	South African
Professional body	SACNASP: South African Council for Natural Scientific Profession LaRRSA: Land Rehabilitation Society of South Africa SAAB: South African Association of Botanists
Key areas of expertise	<ul style="list-style-type: none">➤ Terrestrial Ecology➤ Botanical specialist➤ Agricultural & Soil specialist➤ Conservation management➤ Biodiversity Assessment➤ Environmental management➤ Mine management (new applications, site closure and annual auditing compliance)➤ Financial accounting and project feasibility studies➤ Environmental management systems, auditing and due-diligence

PROFILE

Roy is a Principal Consultant holding a BSc Honours in Geology and an MSc in Botany from the Nelson Mandela Metropolitan University in Port Elizabeth. His MSc thesis focused on Rehabilitation Ecology using an open-cast mine as a case study. He is based at the East London branch where he focuses on Ecological and

Agricultural Assessments, Geological and Geotechnical analysis, Environmental Management Plans, mining applications and various environmental impact studies. Roy has worked on numerous projects in South Africa, and Africa.

**EMPLOYMENT
EXPERIENCE**

- October 2012 – Current: Senior Environmental Consultant (EOH Coastal & Environmental Services)
- April 2010 – October 2012: Environmental Consultant (Coastal & Environmental Services)
- June 2008 – March 2010: Laboratory Technician (Nelson Mandela Metropolitan University)
- March 1995 – November 2003: Financial Advisor (ABSA Bank)

**ACADEMIC
QUALIFICATIONS**

*M.Sc. Botany, NMMU, 2010
B.Sc. Hons. Geology, NMMU, 2008
B.Sc. Botany & Geology, NMMU, 2007
Diploma in Marketing, University of Witwatersrand, 2003
PHd Botany / Geology, Nelson Mandela University (current)*

COURSES

Environmental Impact Assessment Course – Rhodes University (2010)

Attended numerous workshops through the Department of Environmental Affairs

**CONSULTING
EXPERIENCE**

Environmental Impact Assessment, Feasibility and Pre-feasibility Assessments

- *Project Management*
Managed numerous projects of various sizes including

budget management, client liaison, timeframe targets, managing junior consultants and sub-consultants.

- *Report writing*
Prepared environmental impact assessment (EIA) reports in terms of relevant EIA legislation and regulations for development proposals including: Infrastructure projects: bulk water and waste water, roads, electrical, mining, ports, aquaculture, renewable energy (solar and wind), industrial processes, housing developments, golf estates and resorts, etc. (2010 – present).
Projects have also included preparation of applications in terms of other statutory requirements, such as water-use and mining license /permit applications.
- *Feasibility assessments*
Managed projects to develop pre-feasibility and feasibility assessments for various projects, including various tourism developments, infrastructure projects, etc.
- *Specialist studies*
Conducting specialist studies for various projects in both South Africa and the rest of Africa (Mozambique, Madagascar, Zambia, Malawi) including:
 - Ecological assessments
 - Agricultural and Soil potential
 - Land use assessments
 - Visual assessments
 - Biodiversity assessments
 - Botanical assessments

Managed the following EIAs:

- Eskom Melkhout 132kV Distribution EIA, Oyster Bay (2011)
- Bizana Mixed-use Development Scoping and full EIR, Bizana; Eastern Cape (2012)
- Toboshane Valley Estate EIA, East London (2011)
- Toboshane Valley Estate Visual Impact Assessment (2011)
- Lushington Park Windfarm Ecological Impact Assessment, East London (2011)
- Red Cap 66kV Power line EIA, St. Francis, Eastern

- cape (2011)
- ADM Sleeper site basic Assessment Report and Soil Contamination Assessment (2012)
- Eskom Mfinizo, Taweni and Hombe Basic Assessment Reports (2011).
- Tsolwana Road upgrade EIA, Tarkastad EIA (2012)
- Centane Road road upgrade EIA, Mazeppa Bay, Eastern Cape (2012)
- Innowind Peddie Solar facility EIA, Eastern Cape (2012)
- Upgrade of the R61 between Baziya and Umtata BAR (2012)
- SANRAL R61 Mthatha to Umngazi EIA (Current)
- Berlin Beef Feedlot EIA (2013)
- SANRAL N2 road upgrade between Tetyana & Sitebe Komkulu; Eastern Cape EIA (2013)
- Cedarville to Mt. Frere road upgrade EIA - Inzame Engineering (2014)
- Amatola District Municipality Office building EIA - Stutterheim (2014)
- ACSA Vegetation removal Management, East London, Eastern Cape (2015)
- DWS Lusikisiki Dam EIA, Eastern Cape (2015)
- ENEL ECO x 4 sites (Eastern Cape, Western Cape, Limpopo)(Current)
- NCEDA SEZ EIA, Upington, Northern Cape (Current)
- SANRAL Heidelberg N2 EIA, Western Cape (Current)
- SANRAL King Williams Town N2 EIA, Eastern Cape (2016)
- SANRAL R56 Matatiele EIA, Eastern Cape (2016)
- SANRAL R72 Birah ECO, Eastern Cape (Current)
- SANRAL N2 Caledon EIA, Western Cape (2016)
- SANRAL Komga R61 EIA, Eastern Cape (Current)
- SANRAL R63 Fort Beaufort EIA, Eastern Cape (Current)

Conducted specialist reports on the following projects:

- Stone Vegetation Assessment, Kaizers Beach

- (2010)
- Eskom 132kV Line Vegetation Assessment, Elloit-Ugie-Sappi (2010)
 - Red Cap 66kV Power line Ecological Impact Assessment, St. Francis, Eastern cape (2011)
 - N9 road upgrade in Middelburg EIA, Eastern Cape (2012)
 - Ecological Impact Assessment in Hombe, Eastern Cape for a new Eskom 132kV power line (2012)
 - Ecological Impact Assessment in Taweni, Eastern Cape for a new Eskom 132kV power line (2011)
 - Ecological Impact Assessment in Mfinizo, Eastern Cape for a new Eskom 132kV power line (2011)
 - Innowind Peddie Solar and Wind facility Agricultural Impact study, Eastern Cape (2012)
 - Innowind Peddie Solar facility Visual Impact study, Eastern Cape (2012)
 - Innowind Peddie Solar facility Ecological Impact study, Eastern Cape (2012)
 - Innowind Qumbu Solar and Wind facility Agricultural Impact study, Eastern Cape (2012)
 - Innowind Qumbu Solar facility Visual Impact study, Eastern Cape (2012)
 - Kangankunde Rare Minerals mine, Malawi, Rehabilitation Management Plan and Mine Closure Plan (2011)
 - Kenmare Moma Titanium mine, Mozambique, Weed Control Plan and Species of Special Concern Management Plan (2011)
 - GS Cimentos limestone mine, Maputo, Mozambique, Rehabilitation Management Plan and Mine Closure Plan (2011)
 - Upgrade of the R61 between Baziya and Umthatha Ecological Impact Assessment (2012)
 - Amatola Water Bulk Water Pipeline Ecological Report - Port Alfred Borehole Extraction & Treatment (2012)
 - Amatola Water Bulk Water Pipeline Ecological Report - Bushmansriver to Cannon Rocks (2013)
 - Ndabakazi Mixed-use Development Ecological Report (2012)
 - Ndabakazi Mixed-use Development Geotechnical

- Assessment (2012)
- Goba water pipeline, Katberg, Eastern Cape Vegetation Assessment (2012)
- SSI Botanical Compliance for EA (2012)
- Terra Wind Middleton Wind Energy Facility Agricultural Impact Assessment (2012)
- SANRAL R61 Mthatha to Baziya Environmental Sensitivity Report (2014)
- SANRAL N2 road upgrade between Tetyana & Sitebe Komkulu; Eastern Cape Ecological Assessment (C2014)
- SANRAL N2 road upgrade between Tetyana & Sitebe Komkulu; Eastern Cape Sensitivity Assessssment (2014)
- Amatola District Municipality Office building Ecological Assessment - Stutterheim (Current)
- Amatola Water Bulk Water Pipeline Ecological Report - Cannon Rocks to Alexandria (2012)
- Ecofarm Sugar Cane expansion, Zambezia, Mozambique, Agricultural Assessment (2015)
- GS Cimmentos Mining, Maputo, Mozambique, Rehabilitation Plan (2016)
- ACSA East London Airport, Vegetation and forest removal (2015)
- SANRAL N2 Caledon EIA – Western Cape (2016)
- Triton Mining Agricultural Assessment – Ancuabe, Mozambique (2015)
- Tete Iron Ore Agricultural Assessemnt – Tete, Mozambique (2016)
- Tete Iron Ore RAP Land assessment - Tete, Mozambique (2017)
- Metal of Africa Graphite Mine – Agricultural Assessment – Pemba, Mozambique (2015)
- SANRAL Butterworth Ring Road – Ecological Assessment (2016)
- SANRAL iDutywa Ring Road - Ecological Assessment (2016)
- City of JHB Rietfontein Biodiversity Study, Gauteng (2017)
- City of JHB Little Falls Biodiversity Study, Gauteng (2017)
- City of JHB Ruimsig Biodiversity Study, Gauteng

- (2017)
- City of JHB Mellville Koppies Biodiversity Study, Gauteng (2017)
- Chalmers S24 Rehabilitation Plan – East London (2016)
- SANRAL Thabazimbi road upgrade – Ecological Study (2016)
- Delta East London Airport – Biodiversity Study (2017)
- Rumdel Vegetation S&R – N2 Tetyana, Eastern Cape (2017)
- Gibb Vegetation S&R – R72 Birah, Eastern Cape (2017)
- Lokisa Palmietvlei S24 Management – Plettenberg Bay, Western Cape (2017)
- NCEDA SEZ Ecological Assessment, Upington Northern Cape (2016)
- Amatola Water, Ndlambe Pipeline, Ecological Assessment, Port Alfred (Current)
- SANRAL Heidelberg N2, Western Cape, Agricultural Assessment (Current)

Renewable energy:

Managed various renewable energy projects including:

- Thomas River Windfarm EIA, Cathcart (2010)
- Chaba Windfarm EIA, Komga; Eastern Cape (2010)
- Lushington Park Windfarm EIA, East London (2011)
- Langa Solar Facility EIA, Berlin (2011)
- Red Cap Kouga WEF, Humansdorp (2013)
- Red Cap Gibson Bay WEF, Tsitsikamma (2015)

Conducted various specialist studies for renewable energy projects including:

- Innowind Grassridge WEF, Groundtruthing Report (2012)
- Red Cap Kouga WEF, Botanical Assessment (2012)
- Innowind Waainek WEF, Management Programmes (2012)

- Innowind Dassiesridge WEF, Agricultural Assessment (2015)
- Innowind Riverbank WEF, Micrositing and Management Plans (2015)
- RES Oyster Bay WEF, Micrositing and Management Plans (2015)
- Enel Gibson Bay WEF, Micrositing and Management Plans (2016)
- Golden Valley WEF, Management Plans (2015)
- G7 Rietkloof WEF, Agricultural Assessment (2016)
- G7 Brandvlei WEF, Agricultural Assessment (2016)

Mining projects:

Managed various mining applications to the DMR including:

- Hard rock quarry licence and EMPr, Middelburg, Eastern Cape (2012)
- Cedarville to Mt. Frere road upgrade Mining licenses - Inzame Engineering (Current)
- Baziya 3 x quarries for SANRAL, Mthatha (2014)
- Tetyana 2 x quarries for SANRAL, Idutya (2015)
- Sand mine Borrow pit permit application, Port Alfred (2015)
- Centane Road borrow pit license applications, Mazeppa Bay, Eastern Cape (2013)
- EC Quarries, rock quarry outside East London License (2015)
- Laman Mining Rock quarry renewal of right (2015)
- SANRAL N2 Tetyana – Dumrana Quarry EIA & Mining, Eastern Cape (2016)
- SANRAL R56 Cedarville Quarry, Eastern Cape (Current)
- SANRAL R61 Komga Mining applications, Eastern Cape (Current)
- SANRAL Heidelberg Moning applications, Western Cape (Current)

Environmental auditing and compliance:

- TNPA Car Berth Dredging ECO, Port of East London (2010)

- Kenmare Moma Titanium mine, Mozambique. Development of Rehabilitation KPI's (2011)
- Eskom Zebra substation ECO, Cradock, Eastern Cape (2011)
- Tsolwana Road upgrade ECO, Tarkastad EIA (Current)
- Centane Road Upgrade ECO, Mazeppa Bay, Eastern Cape (Current)
- N9 road upgrade in Middelburg ECO, Eastern Cape (2015)
- Red Cap Kouga Windfarm ECO, St Francis Bay, Eastern Cape (2014)
- SANRAL R61 Mthatha to Umngazi road upgrade ECO, Eastern Cape (2015)
- Armstrong Transkei Schools Construction Environmental non-compliance & recommendations - Armstrong Engineering (2013)
- SANRAL All Saints to Mthatha road upgrade ECO. (Current)
- ENEL Paleisheuvel Solar farm ECO, Piketberg (Current)
- ENEL Tom Burke Solar farm ECO, Botswana border (Current)
- ENEL Gibson Bay Wind Farm ECO, Oyster Bay (Current)
- ENEL Nojoli Wind Farm ECO, Cookhouse (Current)
- Hatch-Goba R61 Mthatha to Port st Johns ECO (2017)

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

ROY DE KOCK

Date: 1st April 2017



herewith certifies that

Roy de Kock

Registration Number: 400216/16

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003

(Act 27 of 2003)

in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective **21 September 2016**

Expires **31 March 2020**



Chairperson

Chief Executive Officer





environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

(For official use only)

File Reference Number:

NEAS Reference Number:

Date Received:

DEA/EIA/

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

PROPOSED UPGRADE OF THE NDABAKAZI INTERCHANGE BETWEEN THE N2 AND THE R409, NEAR BUTTERWORTH WITHIN THE AMATHOLE DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE
(DEA Ref: 14/12/16/3/3/1/2047)

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name: B-BBEE	Coastal & Environmental Services (Pty) Ltd. Trading as CES		
Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	135%
Specialist name: Specialist Qualifications: Professional affiliation/registration: Physical address:	Caryn Clarke M.Sc. Environmental Science SACNASP: South African Council for Natural Scientific Profession IAIASA: International Association for Impact Assessment South Africa		
Postal address:	25 Tecoma Street, Berea East London 5214		
Postal code: Telephone: E-mail:	P O Box 8145 Nahoon East London 5200 043-7267809 c.clarke@cesnet.co.za	Cell:	0721186684
		Fax:	0864107822

2. DECLARATION BY THE SPECIALIST

I, Caryn Clarke, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist



Name of Company:

Details of Specialist, Declaration and Undertaking Under Oath

23 September 2019

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Cayn Crater, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Ellen

Signature of the Specialist

CCS

Name of Company

23 September 2019

Date

Omnia

Signature of the Commissioner of Oaths

Date

LYNN SMIT

COMMISSIONER OF OATHS

REFERENCE NUMBER: 9/1/8/2 EAST LONDON
25 TECOMA STREET, BERA
EAST LONDON, 5214

23rd September 2019

