April 2025

BASIC ASSESSMNET REPORT

PROPOSED UPGRADE OF NATIONAL ROAD R30 SECTION 8 FROM KLERKSDORP (KM 0.0) TO BUFFELSVALLEI (KM 37.0) AND ASSOCIATED BORROW PITS WITHIN DR KENNETH KAUNDA DISTRICT MUNICIPALITY IN THE NORTH WEST PROVINCE.

DFFE REFERENCE: Not yet Issued

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ACRONYMS AND ABBREVIATIONS:

BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries & Environment
DMRE	Department of Mineral Resource and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPR	Environmental Management Programme
EN	Endangered
GPS	Global Positioning System
Ha	Hectare
HIA	Heritage Impact Assessment
I&AP	Interested and/or Affected Party
IPPs	Independent Power Producers
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature (IUCN)
LEDET	Limpopo Economic Development, Environment and Tourism
LIHRA	Limpopo Provincial Heritage Resources Authority
MAE	Mean Annual Evaporation
MAMSL	Metres Above Mean Sea Level
MAP	Mean Average Precipitation
NDP	National Development Plan
NEMA	National Environmental Management Act (1998)
NEMWA	National Environmental Management: Waste Act (2008)
NWA	National Water Act (1998)
REDZ	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement
VU	Vulnerable
WEPS	Wholesale Electricity Pricing System
WUL	Water Use Licence
WULA	Water Use Licence Application

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CONTACT DETAILS

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EAP CV attached as Appendix 1

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1 INTRODUCTION

Earthlink Environmental Services (Pty) Ltd has been appointed by the South African National Roads Agency Limited (SANRAL) to facilitate the application process for an environmental authorization required for the proposed upgrade of National Road R30, Section 8. This upgrade will extend from Klerksdorp (km 0.0) to Buffelsvallei (km 37.0) and include associated borrow pits within the jurisdiction of the Dr. Kenneth Kaunda District Municipality in the North West Province.

The proposed project aims to improve the road infrastructure to support regional development, enhance transportation efficiency, and ensure compliance with road safety standards. The project will involve various activities, including road widening, resurfacing, upgrading intersections, and establishing borrow pits to source construction materials. These activities will be conducted in adherence to environmental regulations to minimize potential impacts on the surrounding environment.

This Environmental Impact Assessment (EIA) report has been compiled to present a detailed analysis of the potential environmental impacts associated with the proposed project. The report outlines the scope of the project, identifies environmental sensitivities, and assesses the implications of the planned activities. It further provides mitigation measures to ensure sustainable development while balancing the need for infrastructure enhancement with environmental preservation.

The technical data, project details, and other relevant information presented in this report have been sourced directly from the Applicant's project team. The information provided forms the basis for the environmental assessment and aligns with the applicable legislative and regulatory frameworks.

1.1 Project Locality

The proposed upgrade of National Road R30, Section 8, spans a distance of approximately 37 kilometers, beginning at Klerksdorp (km 0.0) and extending to Buffelsvallei (km 37.0). This route traverses various rural and agricultural areas within the jurisdiction of the Dr. Kenneth Kaunda District Municipality in the North West Province. The project will involve critical improvements to the road infrastructure, including the establishment of borrow pits to source construction materials required for the construction process.

These areas consist of agricultural, residential, and natural zones that may be environmentally sensitive, requiring thorough assessment and mitigation measures.

This upgrade seeks to improve regional transportation safety, efficiency, and accessibility, benefiting local communities and industries. The project will be conducted in accordance with environmental regulations, ensuring a sustainable approach to infrastructure development.

Figure 1 below show the regional locality of the road

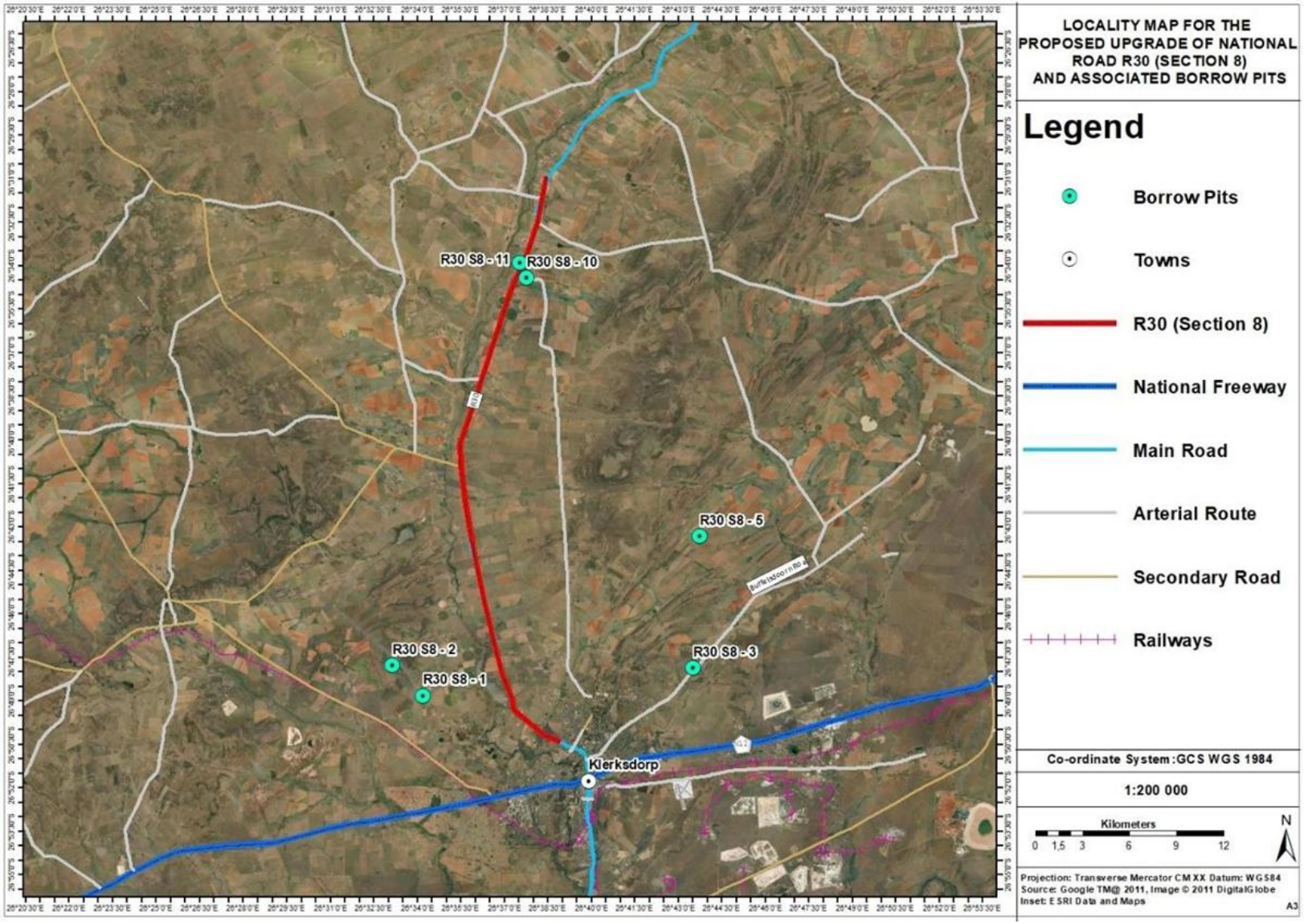

Figure 1: Regional Locality map

2 PROJECT DESCRIPTION

South African National Road Agency SOC Limited (SANRAL) proposes to upgrade Road R30 section 8, from Klerksdorp (KM 0.0) to Buffelsvallei (KM 37.0) within Dr Kenneth Kaunda District Municipality in the Northwest Province. The project is aimed at improving the road geometry by adding surfaced shoulders and rehabilitating the existing pavement structure to enable it to carry a 20-year design traffic load.

The major aspects of this project include the following:

- Improving the existing 37km single carriageway road,
- Increasing the existing road reserve width from 30m to a range of 40 m to 45 m, with a maximum of 50m where required,
- Strengthening the existing pavement,
- Improving the existing road cross-section to adhere to SANRAL standards, from an existing road formation width of 7.6m to 13.4m comprising of 3.7 m lanes and 3 m surfaced shoulders,
- Vertical and horizontal geometric improvements that follow the existing alignment, aiming to achieve a design speed of 120km/h,
- Widening and (or) replacement of 1 river bridge and some major and minor culverts.
- The route has 8 major culverts and 97 minor culverts.
- Improving two major intersections to adhere to SANRAL standards, located at km 19.2 and km 35.4,
- Possible treatment of up to 1m width over and above the required width of final travel way to accommodate two-way through traffic during construction,
- Possible temporary bypass roads during construction where drainage structures need to be upgraded,
- Entry into eleven (11) potential borrow pits for sourcing G5 – G9 material during construction,
- A total of twelve (12) possible hard rock quarries within a 10 to 20 km radius from the route were identified.
- Stockpile areas and vegetation clearance outside road reserve in excess of 1 Hectare.
-

The material to be used during construction will be sourced from the borrow pits to be acquired. The Applicant will obtain relevant authorisations from DMRE before opening any borrow pit. A water use authorisation for construction (section 21 c & I) of the bridges and culverts will be applied for with Department of Water and Sanitation.

Table 1 below gives the coordinates of the project components

Table 1: The affected property coordinates	
Affected Property	The road passes through Portion 0 Farm BRAKSPRUIT
Road coordinates:	*Start:* 26°50'24.3"S, 26°38'54.8"E Middle: 26°40'54.1"S, 26°35'29.8"E End point: 26°30'46"S, 26°38'37.6"E
SGID Code:	T0IP00000000037000000

Figure 2 below show the layout map of the proposed activity and associated infrastructure.

MAJOR STRUCTURES

The major cross drainage structures along the route are in a fair to good condition, noting minimal structural damage or construction defects with the general structure. The eight (8) major culverts and the bridge to be widened were assessed against the current road Class 2. The table below summarises the major structures.

Table 2: Improvement Strategy for Major Structures

Culvert No.	**PROPOSED STRUCTURE NO / WIDTH X HEIGHT X LENGTH**	**Coordinates**
C4412	3 / 1.8 X 1.2 X 21.819 LENGTHENING SKEW: = 0° SLOPE: = 0.06 % MAX FILL = 1.282 m	26°33'5.63"S 26°37'58.40"E
C0360	3 / 1.8 X 1.5 X 18.856 LENGTHENING SKEW: = 1.0° SLOPE: = 0.15% MAX FILL = 0.610 m	26°44'48.25"S 26°36'8.20"E
C0361	4 / 4.5 X 1.5 X 17.755 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0..42m	26°42'1.32"S 26°35'41.03"E
NCTN1	4 / 4.5 X 1.5 X 17.755 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0.58m	26°42'0.49"S 26°35'40.98"E
C0382	4 / 4.5 X 1.6 X 17.752 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0.277 m	26°38'29.81"S 26°36'3.09"E

NCTN2	4 / 4.5 X 1.6 X 17.752 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0.277 m	26°38'29.06"S 26°36'3.27"E
NCTN3	3 / 4.5 X 1.6 X 17.752 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0.277 m	26°38'28.23"S 26°36'3.56"E
C4412	4 / 4.5 X 1.8 X 18.238 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0.381m	26°33'5.68"S 26°37'58.38"E
NCTN4	3 / 4.5 X 1.6 X 17.752 NEW CULVERT SKEW: = 0° SLOPE: = 1.0 % MAX FILL = 0.277 m	26°33'3.76"S 26°37'58.98"E

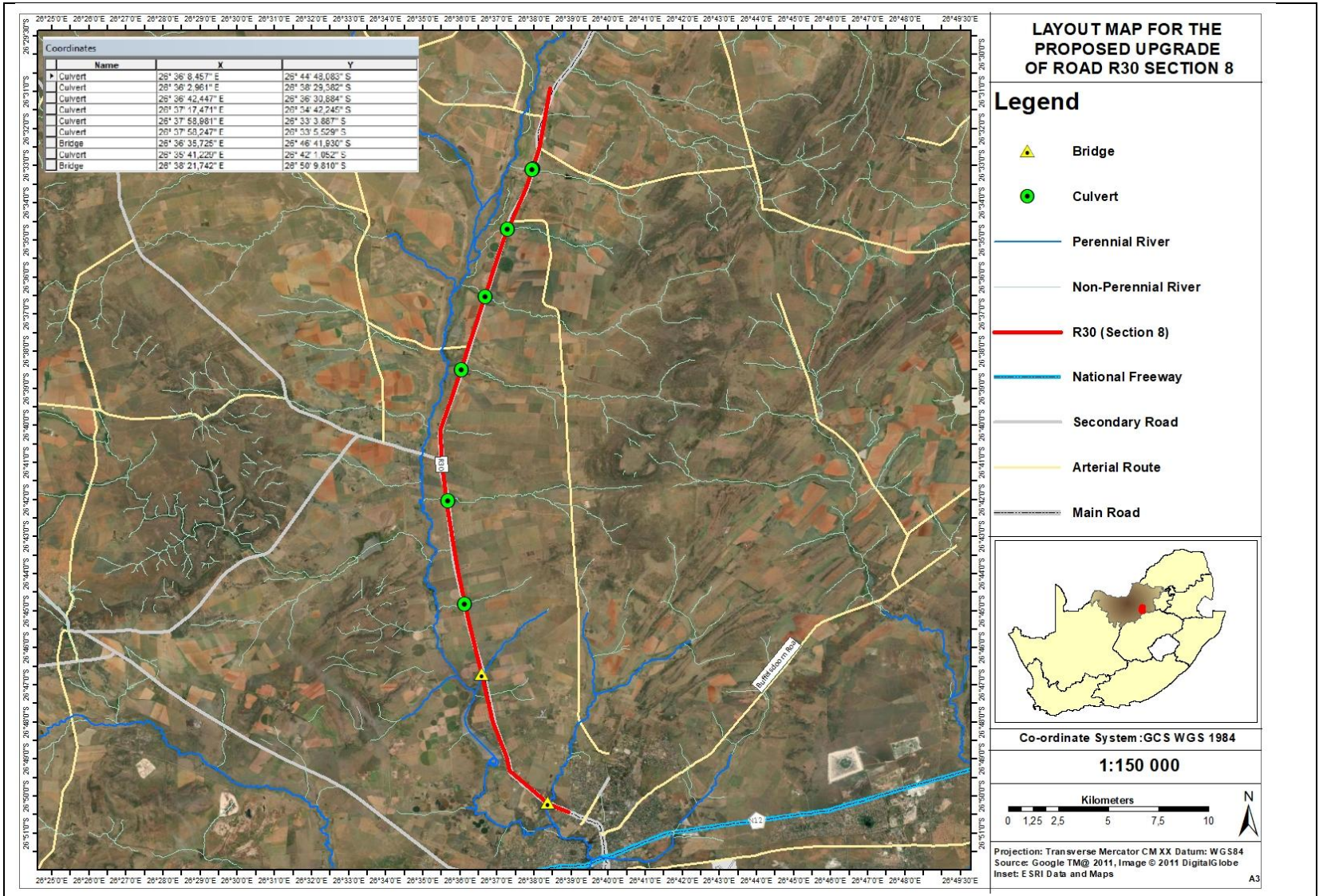

Figure 2: Layout Map

3 POLICY AND LEGISLATIVE FRAMEWORK

This Chapter provides an overview of the policy and legislative context within which the upgrade of R30 road Section 8 is applicable.

3.1 Environmental Legislation

The National Environmental Management Act (NEMA), 1998 (Act 107 of 1998, as amended) is South Africa's overarching environmental legislation, and contains a comprehensive legal framework to give effect to the environmental rights contained in section 24 of The Constitution. Section 2 of NEMA contains environmental principles that form the legislated foundation for sustainable environmental management in South Africa.

3.1.1 National Environmental Management Act, EIA Regulations (2014)

Environmental Authorisation (EA) is required in terms of the EIA Regulations (2014, as amended 2017), published in terms of section 24(5) read with section 44 of the National Environmental Management Act (NEMA, Act No. 107 of 1998), as certain of the listed activities are triggered, as indicated in Table 3 below.

Table 3: Applicable listed activities (EIA Regulations 2014, as amended)

Activity No(s):	Relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended	Reasons for triggering
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The proposed road upgrade involves the upgrade of major culverts and a bridge within watercourses and more than 10 cubic metres of material is expected to be deposited and infilled.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The road upgrade will require vegetation clearance outside road reserve in excess of 1 Hectare.
56	The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre – (i) where the existing reserve is wider than 13,5 meters	The widening of the road will exceed 6 metres. The Upgrade of National Road 30 section 8 between Klerksdorp km 0.0 to Buffelsvallei km 37.0 within Dr Kenneth Kaunda District Municipality, North-West Province

Activity No(s):	Relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended	Reasons for triggering
		The existing road reserve width from 30 m to a range of 40 m to 45 m, with a maximum of 50m where required.
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. <u>h. North-West</u> i. World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; ii. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation; iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999); iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; v. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or vi. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.	Clearance of over 300m^2 of indigenous vegetation within CBA 1 will be required.

Activity No(s):	Relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended	Reasons for triggering
14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or **(ii) infrastructure or structures with a physical footprint of 10 square metres or more;** where such development occurs— (a) within a watercourse; h. North West iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;	The project include structure of more than 10 square meters (bridges and culverts) within the critical biodiversity (CBA 1).
18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.	The proposed road upgrade will include the widening of the road will exceed 6 metres.
23	The expansion of— ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more.	One bridge and 8 major culverts will need to be expanded or replaced. The footprint will be expanded by more than 10 square metres.

The proposed development requires that a Basic Assessment process be undertaken and the Department of Forestry, Fisheries and the Environment are the Competent Authorities (CA).

3.1.2 National Water Act (1998)

In order to ensure sustainable water, use for the benefit of all water users, the National Water Act (NWA), 1998 (Act 36 of 1998) aims to manage the nation's water resources. In order to achieve this, integrated resource management and the preservation of water resource quality are essential.

3.1.2.1 Water Use Licence

In terms of the National Water Act, Act No. 36 of 1998 (NWA) a water use licence is required for:

(a) taking water from a water resource;
(b) storing water;
(c) impeding or diverting the flow of water in a watercourse;
(d) engaging in a stream flow reduction activity contemplated in section 36;
(e) engaging in a controlled activity identified as such in section 37 (1) or declared under section 38 (1);
(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
(g) disposing of waste in a manner which may detrimentally impact on a water resource;
(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
(i) altering the bed, banks, course or characteristics of a watercourse;
(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
(k) using water for recreational purposes.

The proposed upgrade is expected to require a water use authorization, likely under a General Authorisation, as the project's activities within watercourses trigger Section 21(c) and (i) of the National Water Act. A separate application for this authorization will be submitted to the Department of Water and Sanitation (DWS).
Other provisions of the NWA have been considered, specifically relating to Part 4 (Section 19), which deals with pollution prevention, in particular situations where pollution of a water resource occurs or might occur as a result of activities on land.

3.2 Other Legislation

The following table outlines other legislation which will or may be applicable to the project, but do not require any permits or licences.

Table 4: Other applicable legislation

LEGISLATION	PERTAINS TO
The Constitution Act (No 108 of 1996)	Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not

LEGISLATION	PERTAINS TO
	infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment.
National Environmental Management Act (No. 107 of 1998) (NEMA)	This piece of legislation is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. The national environmental management principles state that the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.
Conservation of Agricultural Resources Act (1983)	As per the Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983), Conservation is defined as: "*in relation to the natural agricultural resources, includes the protection, recovery and reclamation of those resources*;" The objectives of the CARA, as stated in section 2 of the Act, entitled "Objects of Act", are: "*The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants*."
National Environmental Management: Air Quality Act (No 39 of 2004)	Air Quality Management in South Africa is primarily regulated through the National Environmental Air Quality Act (NEMAQA) {Act 39 of 2004, as amended}. The object of this Act is: (a) to protect the environment by providing reasonable measures for— (i) the protection and enhancement of the quality of air in the Republic; (ii) the prevention of air pollution and ecological degradation; and (iii) securing ecologically sustainable development while promoting justifiable economic and social development; and

LEGISLATION	PERTAINS TO
	(b) generally, to give effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.
National Environmental Management: Biodiversity Act (No 10 of 2004)	The National Environmental Management: Biodiversity Act (Act 10 Of 2004) (NEMBA) is the primary legislation governing biodiversity management in South Africa. Section 2: "Objectives of the Act", states the following: 2. The objectives of this Act are- a) within the framework of the National Environmental Management Act, to provide for- i. the management and conservation of biological diversity within the Republic and of the components of such biological diversity. ii. the use of indigenous biological resources in a sustainable manner; and iii. the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources; b) to give effect to ratified international agreements relating to biodiversity which are binding on the Republic; c) to provide for co-operative governance in biodiversity management and conservation; and to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.
National Environmental Management: Waste Amendment Act (No 26 of 2014)	Waste management activities
	Licensing of waste management activities
	Institutional and planning matters
	Compliance and enforcement
National Heritage Resources Act (No 25 of 1999)	The NHRA aims to promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations. a) The Act protects as cultural heritage resources such as: Archaeological artefacts, rock structures, structures and sites older than 100 years; b) Ethnographic art objects (e.g. prehistoric rock art) and ethnography; c) Objects of decorative and visual arts; d) Military objects, structures and sites older than 75 years;

LEGISLATION	PERTAINS TO
	e) Historical objects, structures and sites older than 60 years; f) Proclaimed heritage sites; g) Graveyards and graves older than 60 years; h) Meteorites and fossils; and i) Objects, structures and sites or scientific or technological value.
National Forests Act (No 84 of 1998), as amended by the Forestry Laws Amendment Act (No 35 of 2005)	Various tree species that are protected per Government Notice No. 1012 under section 12(I)(d) of the National Forests Act, 1998 (Act No. 84 of 1998). In terms of section1 5(1) of the National Forests Act, 1998 "no person may cut, disturb, damage or destroy any protected tree or 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, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated)". These include camel and grey camel thorn for example. Permits from the department of forestry will be required for the removal thereof.
Noise Regulations	The Noise Control Regulations (R 154 GG 13717 of 10 January 1992) promulgated in terms of ECA, defines: • Nuisance noise, as "any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person" • Disturbing noise, as "any noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more". Regulation 4 states 'No person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof.'
Occupational Health and Safety Act (No 85 of 1993)	General duties of employers to their employees
	General duties of employers and self-employed persons to persons other than their employees

4 NEED AND DESIRABILITY

The proposed upgrade of Road R30 Section 8 is both necessary and desirable, as it addresses critical infrastructure needs, promotes economic growth, and ensures improved safety and accessibility for communities in the Dr. Kenneth Kaunda District Municipality. By implementing the project with environmental considerations and compliance, it will contribute to sustainable development in the North West Province.

The subsection below gives in detail the need and desirability of the project.

4.1 Need for the Project

The proposed upgrade of Road R30 Section 8 from Klerksdorp (km 0.0) to Buffelsvallei (km 37.0) addresses critical infrastructure requirements to improve transportation efficiency and safety in the region. The need for this project can be summarised as follows:

- **Increased Traffic Demand:** The existing road infrastructure is insufficient to handle the current and projected traffic volumes, particularly with increased heavy vehicle traffic due to economic activities in the area.
- **Road Safety Concerns:** The current road geometry and narrow carriageway width contribute to safety risks for road users. Enhancements, such as improved cross-sections and widened shoulders, will reduce accident rates and provide a safer travel experience.
- **Pavement Deterioration:** The existing pavement structure is nearing the end of its design life and is no longer capable of handling current traffic loads. Strengthening the pavement will ensure the road can carry a 20-year design traffic load.
- **Regional Connectivity:** Road R30 serves as a critical corridor linking Klerksdorp and Buffelsvallei and facilitates access to surrounding towns and agricultural areas. Upgrading this route will support economic growth and enhance regional integration.
- **Drainage and Flooding Issues:** Inadequate drainage infrastructure contributes to localized flooding and road damage during heavy rains. Improved drainage systems, including the widening and replacement of culverts and bridges, are necessary to mitigate these issues.

4.2 Desirability of the Project

The desirability of the project is aligned with social, economic, and environmental benefits for the region and beyond:

- **Economic Growth and Development**: Improved Road infrastructure will enhance access for goods and services, promote regional trade, and support economic activities, including agriculture, mining, and tourism.
- **Improved Accessibility**: Upgrading the road will improve mobility for communities along the route, providing better access to essential services such as education, healthcare, and markets.

- **Reduction in Travel Time and Costs**: Enhanced Road geometry and improved traffic flow will result in reduced travel times, lower fuel consumption, and minimized vehicle maintenance costs for road users.
- **Sustainability and Compliance:** The project will incorporate measures to minimize environmental impacts, such as adherence to water use license requirements and implementing mitigation measures for vegetation clearance and biodiversity protection.
- **Alignment with Strategic Plans**: The upgrade aligns with national and provincial strategic objectives, including those outlined in SANRAL's road infrastructure plans and the North West Provincial Growth and Development Strategy, which emphasize infrastructure development as a catalyst for economic and social growth.
- **Improved Safety Standards**: Upgraded intersections, widened shoulders, and adherence to SANRAL design standards will create a safer roadway for all users, including pedestrians and cyclists.

5 ALTERNATIVES CONSIDERED

5.1 Project alternatives

No project alternatives were investigated within the ambit of this EIA. The project proposal, viz. road, major culverts and bridge upgrades are in line with surrounding land use and development trends. The Applicant, SANRAL through their regional site inspections that form part of their normal business practices, it has been found that a new surface and upgrade of infrastructure on road-R30 section 8 to improve its grade and safety for the affected communities who uses the roads.

5.2 Site Alternatives

No layout alternatives have been investigated as the proposed layout goes in line with the need for the upgrade of road R30 section 8 and associated bridge and culverts.

5.3 No- Go Alternative

The 'no-go' alternative refers to the scenario in which the proposed activity does not take place, and the site remains as it is.

If the no-go alternative is taken, the impacts that can be anticipated to be associated with the proposed road upgrade would not come to pass and the conditions and trends on the property can be expected to remain as per the status quo. Impacts that can be expected to be experienced in case of the no-go alternative being selected include the following:

Table 5: Potential impacts that may be associated with the no-go option

Potential Impact	Status	Extent	Magnitude	Likelihood	Significance
Bio-physical aspects					
No construction-phase increase in soil erosion and sedimentation of watercourses	Neutral	Local	Medium	Highly probable	Low
Long-term levels and trends of erosion and of sedimentation of drainage lines remain unchanged	Neutral	Local	Low	Highly probable	Low
No habitat destruction and/or fragmentation	Neutral	Local	Medium	Definite	Low-Medium

Potential Impact	Status	Extent	Magnitude	Likelihood	Significance
No removal of protected plant species	Neutral	Local	Low	Highly probable	Very low
No faunal fatalities resulting from construction-related activities	Neutral	Local	Low	Definite	Low
No disruption of the activities of fauna on and around the site due to e.g. noise	Neutral	Local	Low	Highly probable	Low
No trapping / hunting / killing fauna by labourers out of fear or for food	Neutral	Local	Low	Highly probable	Low
No roadkilll within t he development	Neutral	Local	Low	Definite	Low
Socio-economic aspects					
No disturbance of archaeological material	Neutral	Local	Unknown	Definite	Unknown
No creation of employment or sustaining of jobs in construction-related fields	Neutral	Local	Medium-High	Definite	Medium-High
No supporting local businesses through local procurement of materials, equipment & services	Neutral	Local to Sub-region al	Medium-High	Highly probable	Medium-High
No increase in criminal activity and/or rowdiness	Neutral	Local	Unknown	Highly probable	Low-Medium
No job creation (long term)	Neutral	Local	Low-Medium	Highly probable	Low-Medium
No decrease in shortage of electricity	Neutral	Local	Medium-high	Highly probable	Medium-high
No visual impacts of construction activities	Neutral	Local	Medium-High	Definite	Medium
No visual impact of the development	Neutral	Local	Medium-High	Definite	Medium
No noise associated with increased traffic (heavy vehicles) during construction	Neutral	Local	Low	Definite	Low
No noise associated with construction activities	Neutral	Local	Low--medium	Definite	Low

Potential Impact	Status	Extent	Magnitude	Likelihood	Significance
Long-term ambient noise level remains unchanged		Local	Low	Highly probable	Very low

6 PUBLIC PARTICIPATION

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

6.1 Public comment periods

6.1.1 Site Notices

The commencement of the Basic Assessment process was advertised on site notices placed on site (see Appendix 5).

6.1.2 Newspaper advertisement and I&AP email Notification

The commencement and availability of the Basic Assessment report was advertised in the newspaper and the registered I&APs were notified by email. Please see Appendix 5.

6.1.3 Availability of Basic Assessment

The draft Basic Assessment report was emailed to the registered I&Aps for the 30-days commenting period from **05 May 2025 to 04 June 2025.** This is a draft report, and no comments have been received so far. Comments to be received within the 30 days comment period will be sent to DFFE with the Final Basic Assessment report.

6.1.4 Public Meeting

No public meeting was conducted as no objections were anticipated, given that the project pertains to service delivery. Any comments received during the 30-days comment period will be forwarded to DFFE along with the Final Basic Assessment Report.

6.1.5 Raised Issues

This is a draft report, and no comments have been received yet. Any comments submitted during the 30-day comment period will be forwarded to DFFE along with the Final Basic Assessment Report.

7 DESCRIPTION OF THE RECEIVING ENVIRONMENT

7.1 Climate

7.1.1 Rainfall

The region predominantly experiences rainfall during the summer months, often in the form of afternoon thunderstorms. Average annual rainfall ranges between 400 mm and 600 mm, with December and January being the wettest months. In contrast, the winter months are dry, with minimal to no precipitation.

7.1.2 Temperature

Summers (October to March) are typically warm to hot, with daytime temperatures ranging from 28°C to 35°C. Heatwaves frequently occur during the peak summer months. Winters (May to August) are mild to cool, with daytime temperatures ranging between 15°C and 22°C. Nighttime temperatures during winter can occasionally drop below freezing in colder periods.

7.2 Site Geology and Soils

The area consists of aeolian and colluvial sand overlying sandstone, mudstone and shale of the Karoo Supergroup (mostly the Ecca Group) as well as older Ventersdorp Supergroup andesite and basement gneiss in the north. Soil forms are mostly Avalon, Westleigh and Clovelly. Dominant land type Bd, closely followed by Bc, Ae and Ba.

7.3 Topography

The topography along the R30 section 8, from Klerksdorp to Buffelsvallei, within the Dr Kenneth Kaunda District Municipality, is characterized by gently undulating terrain typical of the North West Province. The landscape features broad plains interspersed with low hills and occasional ridges. The elevation changes are gradual, allowing for relatively consistent slopes along the road alignment. Soil conditions in the region vary, with a mix of sandy and clay-rich soils, which may influence drainage and pavement performance. The area's open grasslands and scattered vegetation contribute to minimal natural obstructions, making it conducive to the planned road geometry improvements.

7.4 Surface Hydrology

The aquatic sensitivity of the proposed site is classified as VERY HIGH in the Screening Report, which was confirmed to be "High" due to the watercourses within 500m of the road upgrade. The National Freshwater Ecosystems Priority Areas (NFEPA) identifies important wetlands in South Africa (Figure 3). The National Freshwater Ecosystems Priority Areas (NFEPA) identifies important wetlands in South Africa. The study site falls

under the Middle Vaal Water Management Area (WMA). The road is spread between the quaternary catchments C24E, C24G and C24H. Figure 3 and Figure 4 is a specific representation of the watercourses/wetlands that are found along section 8 of the road R30.

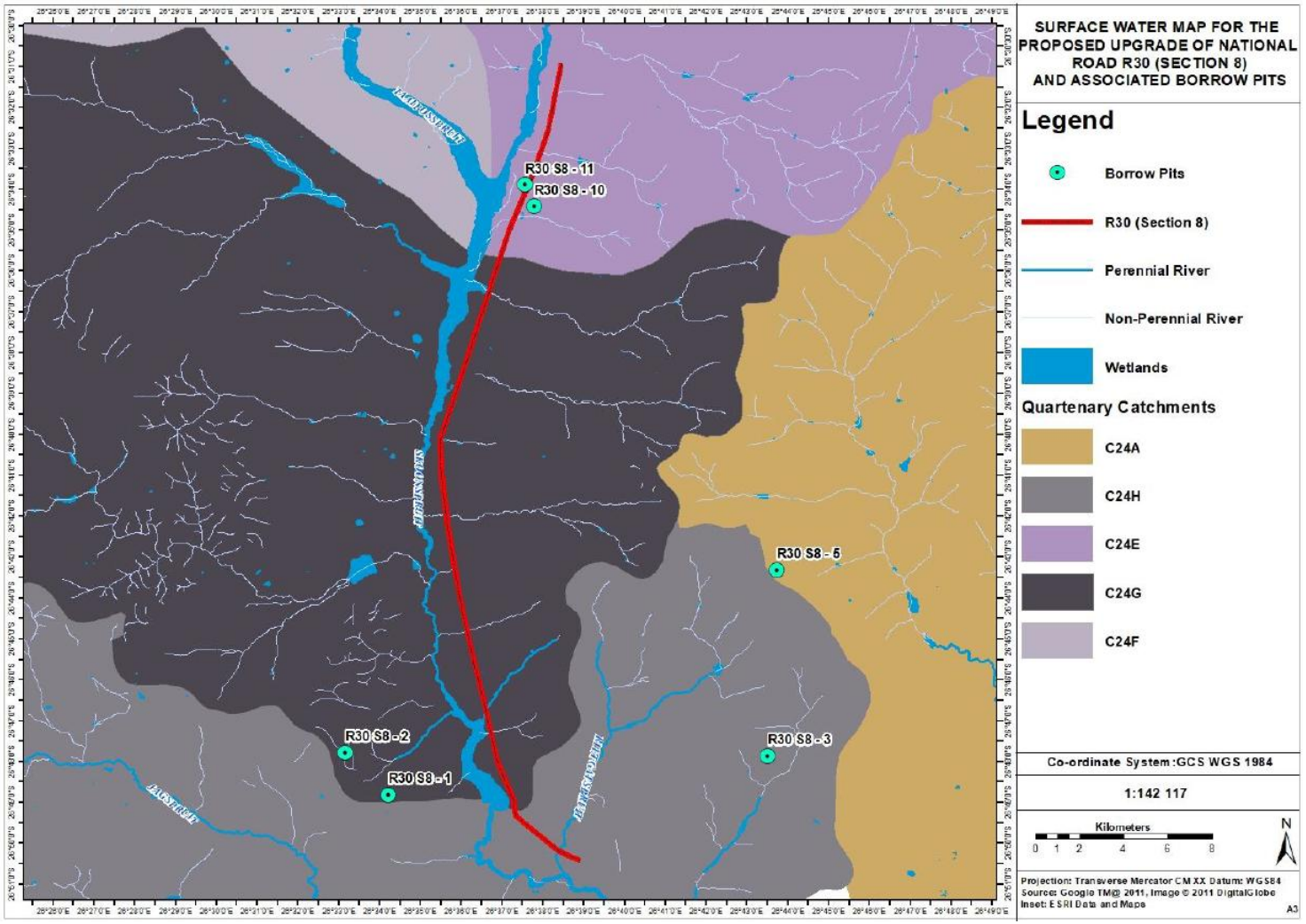

Figure 3: Surface Water Map 1

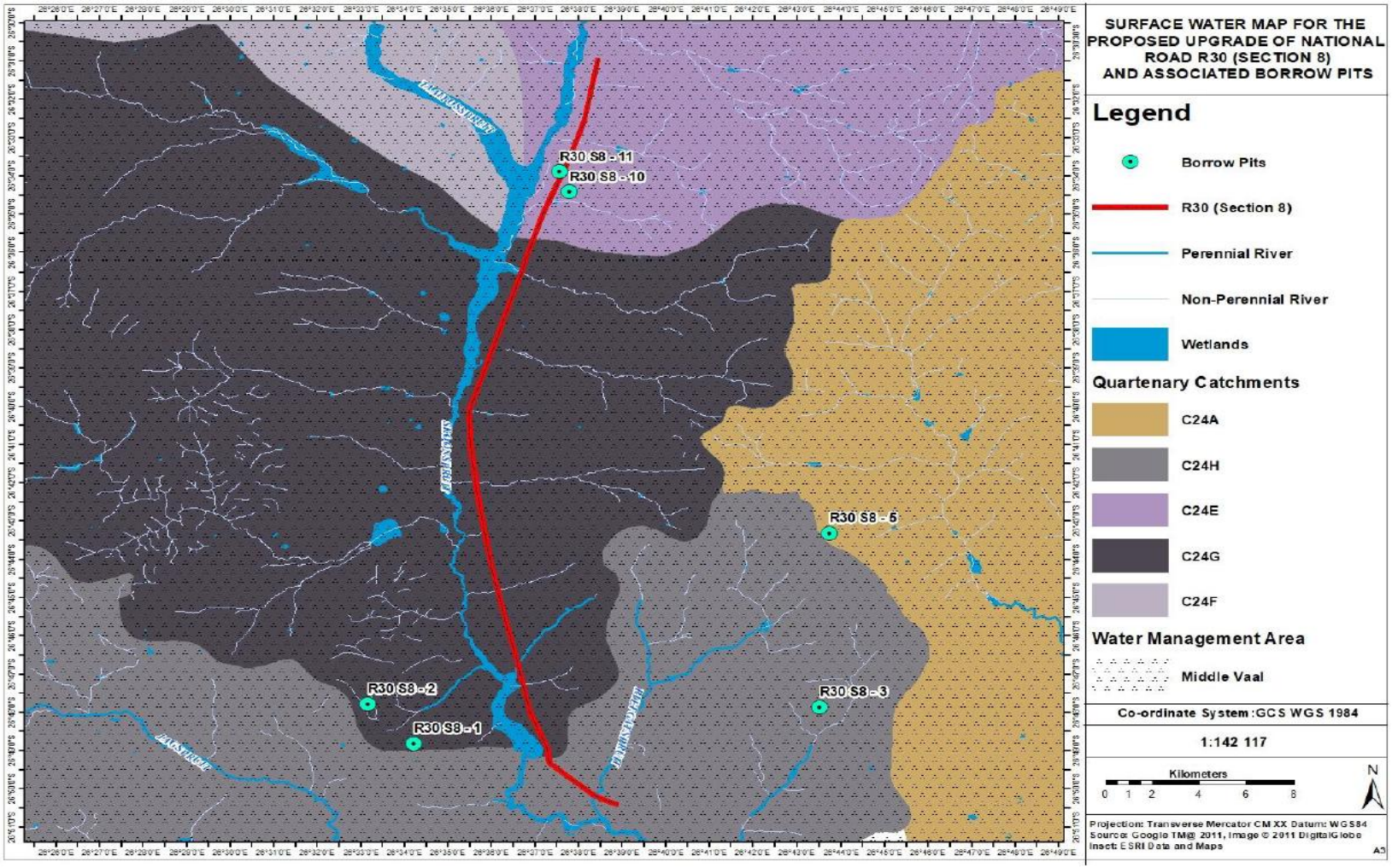

Figure 4: Surface Water Map 2.

7.4.1 Wetland features

The R30 Road Section 8 is located within the regulated area (500m) of a number of watercourses and artificial wetlands (dams) along the road (Figure 5 to Figure 6). The major natural watercourse was observed along the Northern section of the road during the site inspection (Figure 7). These watercourses were created to support the agricultural activities onsite. The watercourse onsite is fully covered with hydrophytes which includes Phragmites australis (Figure 7), serving as a host of avifauna species.

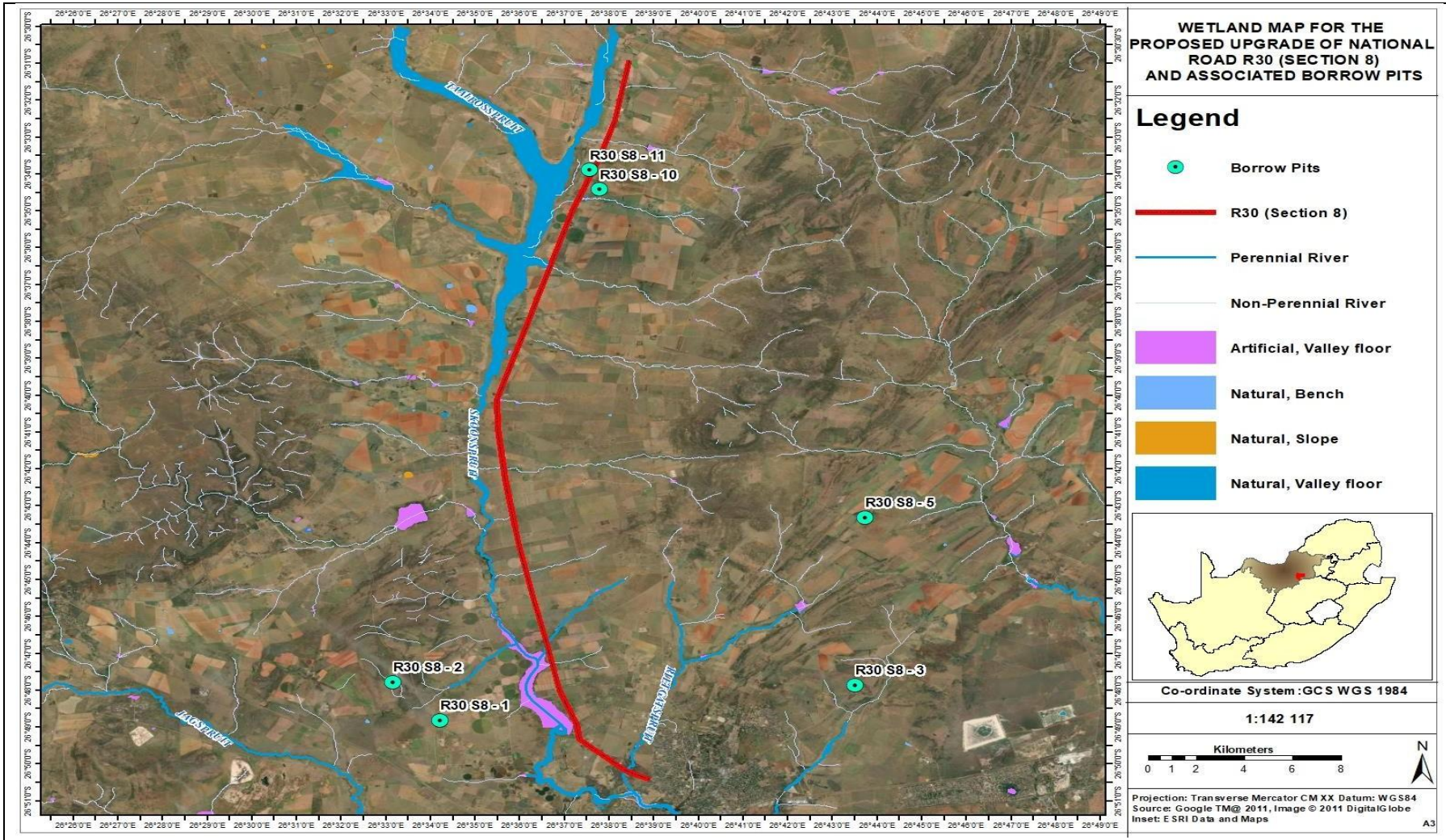

Figure 5: Map of the wetland and watercourses within 500m of the R30 Section 8

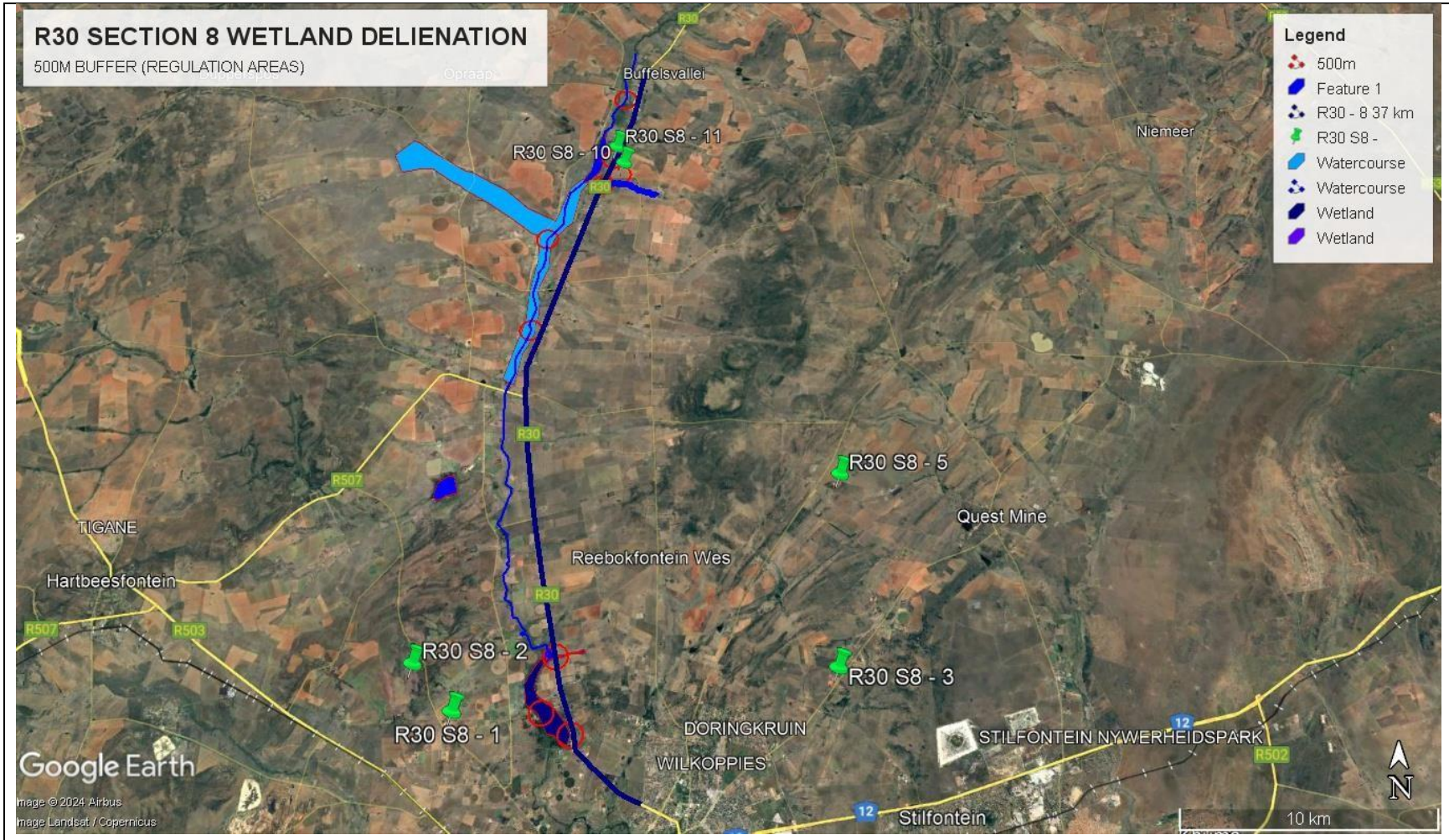

Figure 6: Delineated watercourses along the R30 National Road Section 8

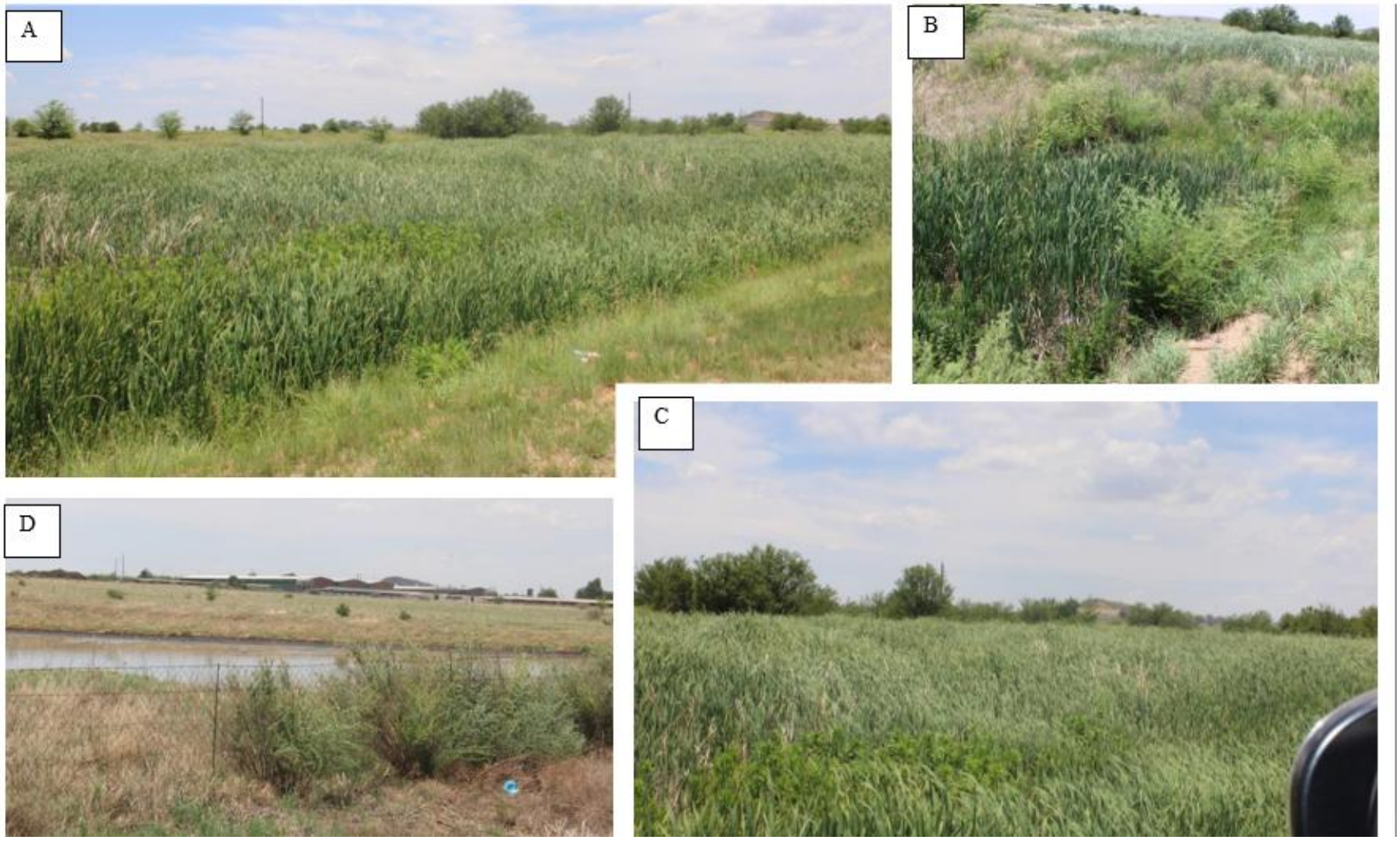

Figure 7: Watercourse and Wetland observed within 500m of the road (A-C Represents the watercourse and D represents the wetland (Dam)

7.4.2 Soil wetness and soil form indicator

The watercourses onsite have water and support a host of hydrophytes and terestrial plant species. Wetland areas were identified and mainly delineated according to the presence of hydric (wetland) soil types. Hydric soils are defined as those which show characteristics (redoximorphic features). The watercourses consist mainly of clay soils (Figure 8).

Figure 8: Soil Observed within one the watercourses.

7.4.3 Vegetation indicator

According to DWAF (2005), vegetation is regarded as a key component to be used in the delineation procedure for wetlands. Vegetation also forms a central part of the wetland definition in the National Water Act, Act 36 of 1998. However, using vegetation as a primary wetland indicator requires an undisturbed condition (DWAF, 2005). Major disturbances were however noted in the wetland systems making it difficult to rely solely on vegetation as a wetland indicator. Disturbances included the presence of agricultural activities, servitude of the road and powerlines along the R30 National Road. There was evidence of hydrophytes as reeds (Phragmites australis) (Figure 9).

Figure 9: Phragmite species observed onsite

7.4.4 Wetland Delineation.

Any wetlands identified on the site were categorised according to the National Wetland Classification System for South Africa (Ollis et al., 2013). The wetland area was classified as a hydrogeomorphic (HGM) unit. An HGM unit is a recognisable physiographic wetland-unit based on the geomorphic setting, water source of the wetland and the water flow patterns (MacFarlane et al., 2009). The proposed project is located within 500m of the Taalbosspruit and its tributaries, the Rietgatsspruit and two artificial wetlands (Figure 10).

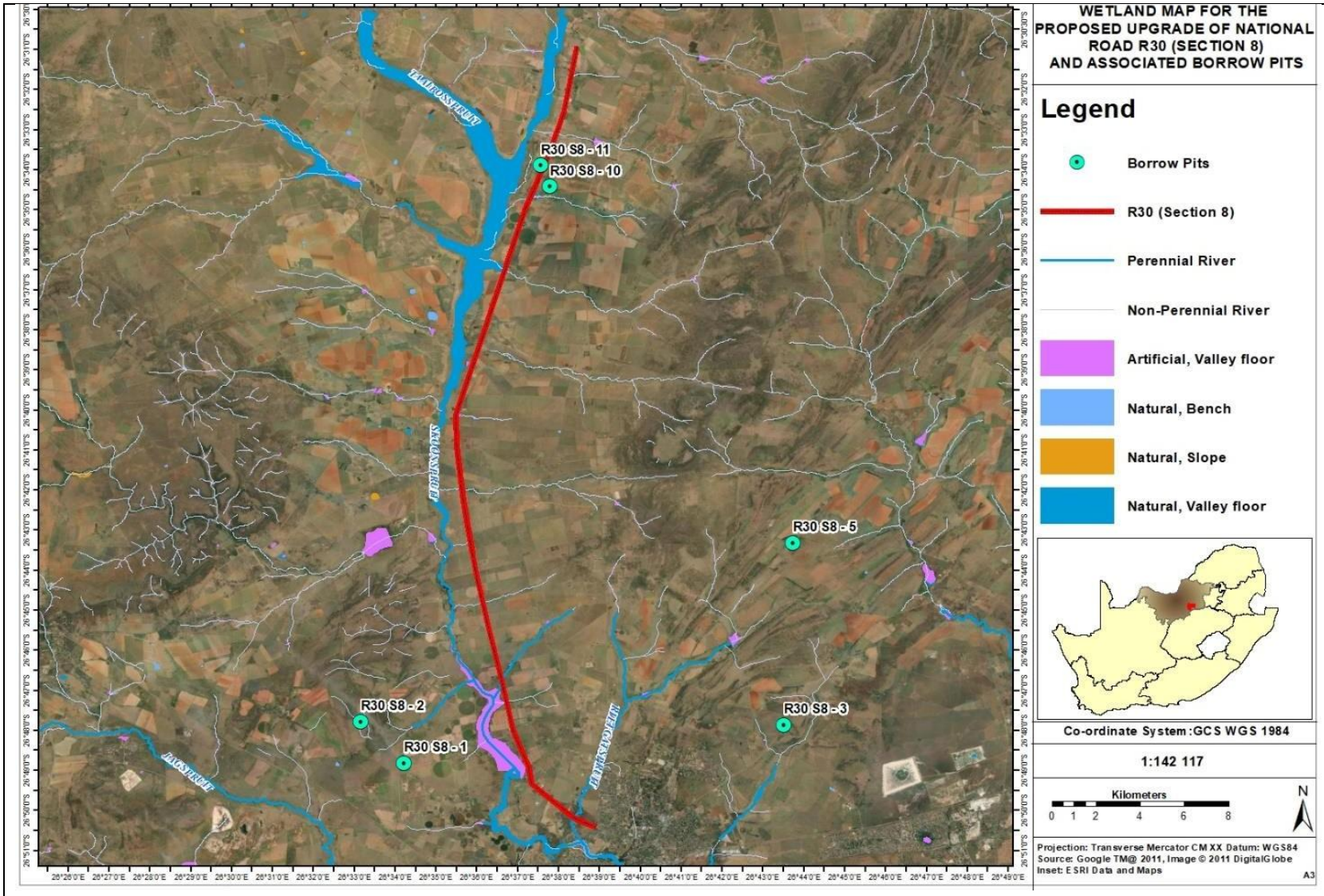

Figure 10: Wetland delineation Map

7.4.5 Freshwater Aquatic Specialists

The freshwater habitats (water courses) onsite consist mainly of terrestrial plant species (Figure 19). It is important to note that plants such as algae, water lilies, and willow trees help keep the water clean by using their root systems to filter pollution and excess nutrients from the water. The watercourses are dry, and thus unable to accommodate fish. During the site inspection there was evidence of avifaunal species within the watercourses (Figure 11).

Figure 11: Typical Freshwater Habitat onsite

7.5 Terrestrial Biodiversity (Floral and Faunal)

The road R30-S8 is located within the Vaal-Vet Sandy Grassland (Gh 10) vegetation unit (Figure 12). This vegetation unit is found in plain-dominated landscapes with some scattered, slightly irregular undulating plains and hills. The vegetation unit consist of low-tussock grasslands with an abundant karroid element. The vegetation unit is dominated by *Themeda triandra* which is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.

The Vaal-Vet Sandy Grassland (Gh 10) is distributed in the North-West and Free State Provinces, South of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. This vegetation unit is found in altitudes ranging between 1 220 and 1 560 m, it is generally found in 1 260– 1 360 m.

The taxa associated with the dominant vegetation units are summarized on **Table 6** below.

Table 6: Important Taxa within the Vaal-Vet Sandy Grassland (Mucina and Rutherford 2006).

PLANT FORM	SPECIES
Gh 10 Vaal-Vet Sandy Grassland	
Graminoids:	*Anthephora pubescens (d), Aristida congesta (d), Chloris virgata (d), Cymbopogon caesius (d), Cynodon dactylon (d), Digitaria argyrograpta (d), Elionurus muticus (d), Eragrostis chloromelas (d), E. lehmanniana (d), E. plana (d), E. trichophora (d), Heteropogon contortus (d), Panicum gilvum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus berteronianus (d), Brachiaria serrata, Cymbopogon pospischilii, Digitaria eriantha, Eragrostis curvula, E. obtusa, E. superba, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides.*
Herbs	*Stachys spathulata (d), Barleria macrostegia, Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Geigeria aspera var. aspera, Helichrysum caespititium, Hermannia depressa, Hibiscus pusillus, Monsonia burkeana, Rhynchosia adenodes, Selago densiflora, Vernonia oligocephala.*
Geophytic Herbs	*Bulbine narcissifolia, Ledebouria marginata*

Table 6: Important Taxa within the Vaal-Vet Sandy Grassland (Mucina and Rutherford 2006).

PLANT FORM	SPECIES
Succulent Herb	*Tripteris aghillana var. integrifolia*
Low Shrubs	*Felicia muricata (d), Pentzia globosa (d), Anthospermum rigidum subsp. pumilum, Helichrysum dregeanum, H. paronychioides, Ziziphus zeyheriana.*

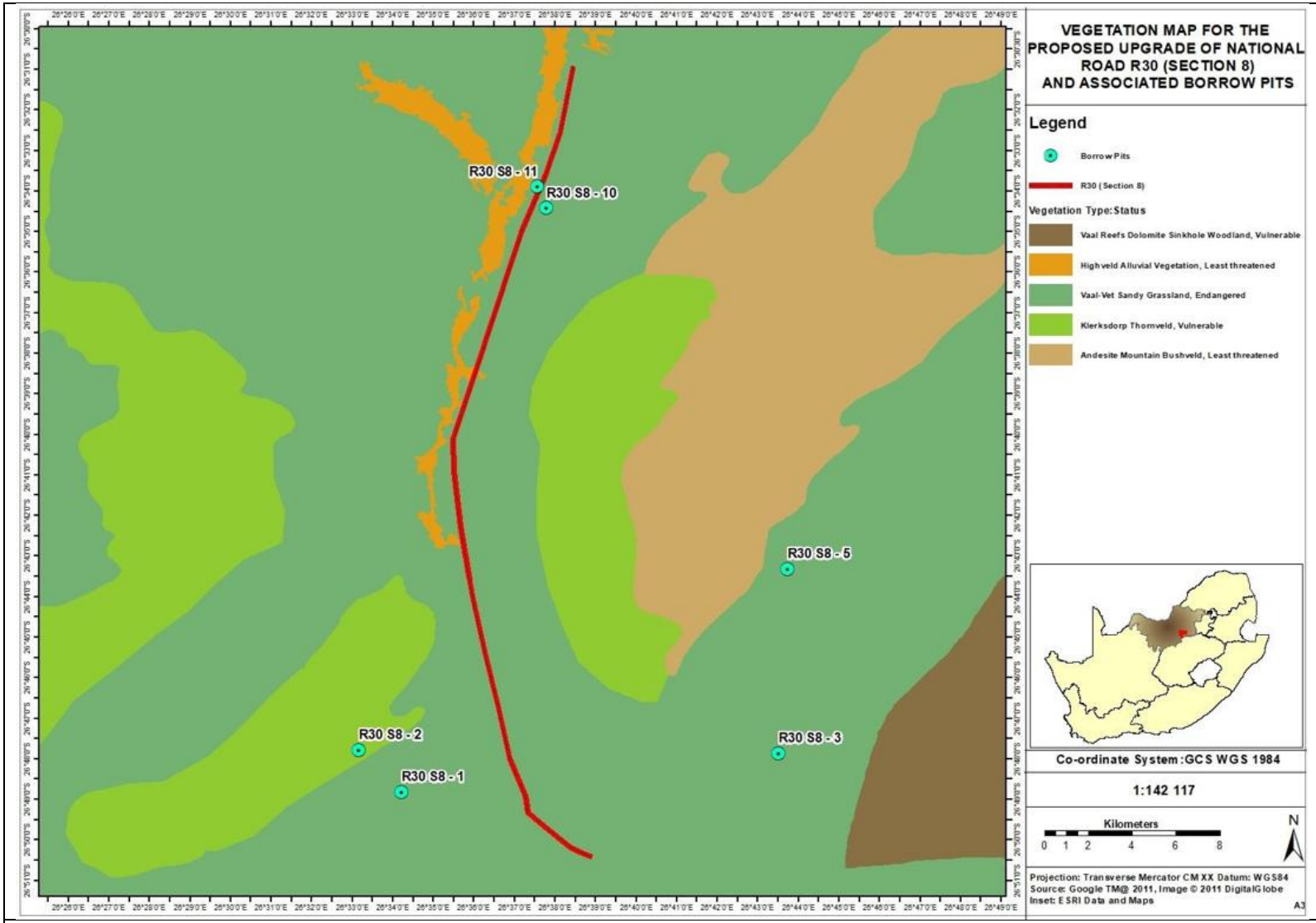

Figure 12: Vegetation Map-Road R30 Section 8

7.5.1 Gh 10 Vaal-Vet Sandy Grassland's Conservation Status

The Gh 10 Vaal-Vet Sandy Grassland is classified as **Endangered**. A conservation target of 24% has been set. Only 0.3% is statutorily conserved in the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves. More than 63% transformed for cultivation (ploughed for commercial crops) and the rest under strong grazing pressure from cattle and sheep. Erosion is very low (85.3%) and low (11%).

7.5.2 2015 North West Biodiversity Sector Plan

According to the 2015 North West Biodiversity Sector Plan, the proposed Upgrade of section 8 of the road R30 are located within the following:

- Critical Biodiversity Area 1 and 2
- Ecological Support Area 1.

Refer to Figure 13 below for the Sensitivity map.

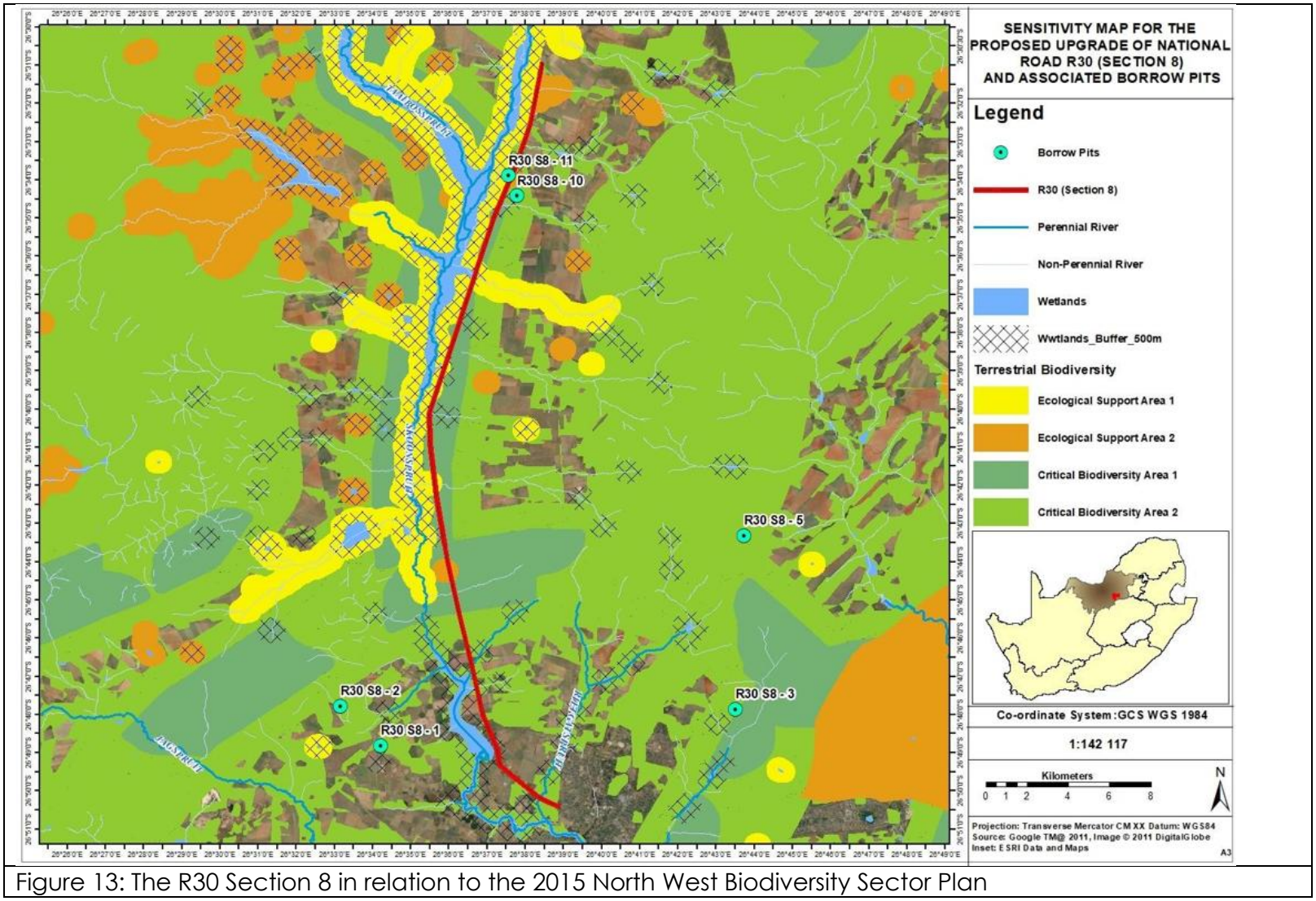

Figure 13: The R30 Section 8 in relation to the 2015 North West Biodiversity Sector Plan

7.5.3 Flora Species of Special Concern

During the field investigation no floral SCCs were found and the chances that the species above re-establish themselves on the site is medium to low. Should any floral SCC be encountered during any phase of the proposed development, these species should be rescued and relocated by a suitably qualified specialist and either relocated to suitable habitat within the study area outside of the development footprint, utilised within the landscaping plan of the project, or moved to registered nurseries such as the Agricultural Research Council (ARC) or the South African National Biodiversity Institute (SANBI).

7.5.3.1 Ethnobotanical plant species

Ethnobotany/ Ethnoecology is a branch of botany that focuses on the use of plants for medicines, cultural and recreational purposes. The overexploitation of indigenous plants for ethnobotanical purposes can be detrimental to populations of those particular plant species, and the other species that depend on its existence for their survival.

During the site inspection, no medical plants were encountered along the road servitude.

7.5.3.2 Alien Invasive Species Present on Site

The Invasive Species that were observed onsite are listed below:

- Eucalyptus camaldulensis (Commonly known as Gumtree)

The genus Eucalyptus, with about 800 species, belongs to the myrtle family, Myrtaceae, and is almost entirely native to Australia. The Eucalypts are best known for their commercial use as timber trees and windbreaks. They are also cultivated for ornament, shade, firewood and honey production.

Eucalyptus species are invasive and pose a threat to the natural resources of the country. Most invasion occurs along watercourses but also on forest margins, in gaps within native forest and plantations as well as into Fynbos and grassland. Eucalypts are well known for their ability to use large volumes of water, and this increases with increasing availability of water such as along watercourses.

Figure 14: Eucalyptus tree observed onsite

7.5.4 Faunal Diversity

7.5.4.1 Mammals

None of the sensitive mammals which were expected were spotted on site. According to the desktop study conducted, the species listed in Table 11-1 of the terrestrial biodiversity compliance statement attached under Appendix 3.1, were identified as being possible to occur within the study area or the immediate vicinity of the proposed construction area. It must be noted that some of these species are very sensitive to habitat and in some instances the likeliness for them to occur is minimal. There are six (6) sensitive mammal species that have a HIGH chance of occurring in the study area.

7.5.4.2 Reptile

None of the expected reptiles were observed on site during the site visit. Reptile lists require intensive surveys conducted for several years. Reptiles are extremely secretive and difficult to observe even during intensive field surveys conducted over several seasons. The majority reptile species are sensitive to severe habitat alteration and fragmentation. Large areas surrounding the site have resulted in increased habitat modification and transformation as well as increased human presence and associated disturbances (illegal reptile collecting, indiscriminate killing of all snake species, fires) surrounding the site coupled with increased habitat destruction and disturbances on the neighbouring properties are all causal factors in the alteration and disappearance of reptile diversity in the area. A list of the reptile species that can be expected onsite are listed on table 11-2 of the terrestrial biodiversity compliance statement attached under Appendix 3.1.

7.5.4.3 Avifauna

A few avifaunal species were spotted onsite during the site visit, most notably Ostriches were observed on borrow pit. R30 S8-10, which is located next to the road servitude (Figure 15) near the watercourse (Figure 16 to Figure 17).

Figure 15: Ostriches observed outside of the borrow pit R30 S8-10, which is located next to the road servitude.

Figure 16: Example of the Long-tailed widowbird.

Figure 17: Yellow tailed oriole observed on the watercourse along the road servitude.

7.5.4.4 Invertebrates

A list of butterflies that are likely to be observed on the study site and the surrounding areas are summarised in Table 11-3 of the terrestrial biodiversity compliance statement attached under Appendix 3.1.

7.6 Socio Economic

7.6.1 Regional Context

The Dr. Kenneth Kaunda District Municipality comprises four local municipalities:

- City of Matlosana (including Klerksdorp)
- Maquassi Hills
- JB Marks
- Ventersdorp

The district is a hub for economic activities such as mining, agriculture, and manufacturing. Klerksdorp, a major urban center in the district, is known for its mining and retail sectors, providing employment and services to surrounding communities. The rural areas along the proposed upgrade route are predominantly agricultural, with farming as a key livelihood activity.

7.6.2 Population Demographics

- Population Size and Density: The district is home to approximately 742,000 people, with a population density of about 36 people per km². Urban areas like Klerksdorp are more densely populated compared to the rural stretches along the proposed route.
- Age Distribution: The majority of the population is under 35 years old, reflecting a youthful demographic with potential employment needs.
- Education Levels: Educational attainment varies, with a significant portion of the rural population lacking post-secondary qualifications. Urban areas demonstrate higher literacy and skill levels

7.6.3 Economic Profile

The district's economy is diversified, with key sectors including:

- Mining: Gold and uranium mining are prominent in Klerksdorp, contributing significantly to employment and regional GDP.
- Agriculture: The rural parts of the route are characterized by crop farming (maize and sunflower) and livestock production, which are vital for subsistence and commercial purposes.
- Retail and Services: Urban centers like Klerksdorp act as commercial hubs for the surrounding rural population, with retail and service industries playing a crucial role in employment.

7.6.4 Employment and Income

- Employment Levels: Unemployment rates in the district are above the national average, particularly in rural areas. The road upgrade may create temporary job opportunities for local communities.

- Income Levels: The district exhibits income disparities, with urban residents generally earning higher wages than their rural counterparts. Many rural households rely on grants or informal sector income.

7.6.5 Infrastructure and Services

- Road Infrastructure: The current condition of National Road R30 is a key factor affecting regional connectivity. The upgrade is expected to improve access to markets, health facilities, and educational institutions.
- Health and Education Services: While urban centers have relatively well-equipped facilities, rural areas often lack adequate health and educational services. Improved road infrastructure can facilitate better service delivery.

7.6.6 Social Dynamics

- Community Characteristics: The region is home to a mix of cultures and languages, with Setswana being the predominant language.
- Land Use: The route passes through a combination of urban, peri-urban, and rural landscapes, impacting agricultural lands, residential areas, and undeveloped spaces.
- Social Challenges: The area faces challenges such as poverty, inequality, and limited access to basic services, particularly in rural communities.

7.7 Heritage

7.7.1 Social And/or Religious Intangible Heritage

The section of the R30 traverses predominately active farmlands before entering the town of Klerksdorp. No active social or religious areas were recorded along the route.

7.7.2 Historical Period and Built Environment

Historical maps from UCT digital collections were perused for information pertaining to the R30. A map from 1900, clearly shows that what is now the R30 existed at that time. Cognisance should be taken of this fact, as the road in various forms has connected Klerksdorp and Rustenburg for well over a century. However, as population increase occurred the road would have undergone many upgrades over more than 120 years.

7.7.3 Graves

The area contains several memorial sites and graveyards of cultural and historical significance. Four graves and two roadside markers are present, typically memorializing loved ones lost in motor vehicle accidents. One marker, located at GPS coordinates S26° 45' 11.3" E26° 36' 13.2", signifies such a loss. Another roadside marker at GPS coordinates S26° 37' 54.9" E26° 36' 14.6" bears the inscription (translated): "*My whole world came to*

a standstill on 18-11-2010 when you took your last breath in my arms. Nothing will ever be the same without you. I love you with my whole life, Boeta."

Additionally, there are two graveyards in the vicinity. The first, a well-maintained and formalized cemetery, contains over 70 graves marked with heaped soil, headstones, or crosses and is listed as a historical cemetery on eGGSA. This cemetery is located at GPS coordinates S26° 32' 56.1" E26° 38' 00.1" and lies approximately 16 meters from the northbound side of the road. The second, an informal graveyard with over 50 graves marked with heaped soils, headstones, or crosses, is located at GPS coordinates S26° 40' 40.1" E26° 35' 30.6". The first graves in this cemetery are approximately 15 meters from the road and as such mitigation measures must be put in place to avoid disturbance. Refer to Figure 18 to Figure 23 for the coordinates and graves.

Figure 18: View of graveyard_ GPS: S26° 40' 40.1" E26° 35' 30.6"

Figure 19: View of graveyard_ GPS: S26° 36' 26.3" E26° 36' 45.1"

Figure 20: View of graveyard_ S26° 33' 58.9" E26° 37' 34.4"

Figure 21: View of graveyard_ **GPS:** *S26° 32' 56.1" E26° 38' 00.1"*

Figure 22: View of marker_ GPS: S26° 45' 11.3" E26° 36' 13.2"

Figure 23: View of marker_ GPS: S26° 37' 54.9" E26° 36' 14.6"

7.7.4 Iron Age

According to the most recent archaeological cultural distribution sequences by Huffman (2007), this area falls within the distribution area of various cultural groupings originating out of the Urewe Tradition. The facies that may be present are:

Urewe Tradition: Blackburn branch- Ntsuanatsatsi facies AD 1450 - 1650

Uitkomst facies AD 1650- 1820

Olifantspoort facies AD 1500- 1700

Buispoort facies AD 1700- 1840

No remains from the Iron Age were recorded.

7.7.5 Stone Age

No remains from the Iron Age were recorded.

7.8 Palaeontology

The R30 route lies mostly on the non-fossiliferous Klipriviersberg Group volcanic rocks. Part of the route and the three southern borrow pits lie on low to moderately sensitive rocks. The eastern and two northern pits lie on non-fossiliferous rocks. There is a very small chance that trace fossils may occur in the Rietgat and Kameeldoorns Formation quartzites and stromatolitic limestones, but they have not been recorded from this area.

From the SAHRIS map for the R30 section 8 (Figure 24) part of the area is indicated as moderately sensitive (green) for the Rietgat and Kameeldoorns Formations, of low sensitivity (blue) for the Goedenoeg Formation and Witwatersrand Supergroup, and of insignificant to zero for the basement granites.

Figure 24: SAHRIS palaeosensitivity map for the site for the proposed R30 Section 8 road upgrade

8 ENVIRONEMNTAL SENSITIVITY

8.1 DFFE Screening Tool Site Sensitivity

The National Department of Forestry, Fisheries and the Environment (DFFE) has developed a national screening tool that identifies potentially environmentally sensitive areas in and around the proposed site. It is now a requirement that any application for environmental authorisation is accompanied by such a screening report.

The screening tool identified specialist studies that may be applicable to the proposed development based on the site's classification, and the identified environmental sensitivities of the proposed development footprint.

The full screening reports and site verification reports can be found as appendix 4 to this report. The environmental sensitives identified by the screening tool for the proposed infrastructures are shown in **Table 7** below.

Table 7: Site Sensitivity as per DFFE Screening Report

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity	Confirmation of the specialist and site sensitivity by EAP	Site sensitivity after Site Verification
Agriculture Theme	**X**				Agricultural Compliance – **See Appendix 5.5**	Low
Animal Species Theme		**X**			Terrestrial Biodiversity Compliance- **See Appendix 5.1**	Low
Aquatic Biodiversity Theme	**X**				Aquatic Biodiversity Compliance – **See Appendix 5.2**	Low
Archaeological and Cultural Heritage Theme				**X**	Heritage Impact Assessment - **See Appendix 5.3**	Low
Civil Aviation Theme		**X**			No assessment to be undertaken (Refer to site verification report attached under Appendix 6)	Very Low
Defence Theme				**X**	No assessment to be undertaken (Refer to site verification report attached under Appendix 6)	Very Low
Palaeontology Theme			**X**		Paleontological Assessment – **See Appendix 5.4**	Low
Plant Species Theme			**X**		Terrestrial Biodiversity Compliance- **See Appendix 5.1**	Low
Terrestrial Biodiversity Theme (including Animal and Plant Specialist Theme)	**X**				Terrestrial Biodiversity Compliance - **Appendix 5.1**	Low

9 IMPACT ASSESSMENT METHODOLOGY

Impacts – whether anticipated– were scored on the following basis:

- **Status:**
  - *Positive* – the proposed project will have a positive impact in terms of the particular parameter;
  - *Negative* – the proposed project will have a negative impact in terms of the particular parameter;
  - *Neutral* – the proposed project will have neither a positive nor a negative impact in terms of the particular parameter.

- **Extent:**
  - *Site-bound* – the impact will be felt only on the site itself;
  - *Local* – the impact is to be felt on the site and in its immediate surroundings, up to a radius of 50km from the site);
  - *Sub-regional* – the impact is to be felt at a distance of up to 100km from the site;
  - *Regional* – the impact is to be felt in the KwaZulu Natal Province; - *National* – the impact is to be felt across provincial boundaries.

- **Duration:**

Refers to the period of time over which impacts can be expected to be experienced.

  - *Short term* – 0 to 5 years;
  - *Medium term* – more than 5 years, up to 15 years;
  - *Long term* – more than 15 years;
  - *Permanent* – the impact is irreversible.

- **Magnitude:**

Refers to the intensity of the potential impact, if it is experienced.

  - *Negligible* – the impact will barely be felt, if at all. No mitigation required;
  - *Low* – the parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
  - *Medium* – the parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and

monitoring required;

- *High* – functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

- **Likelihood:**
  - *Improbable* – it is unlikely that the impact will be experienced;
  - *Possible* – the impact may be experienced. Monitoring required; mitigation may also be required based on the type of impact and its significance;
  - *Highly probable* – the impact will most likely be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact;
  - *Definite* – the impact will be experienced or has already been experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact.

- **Significance:**

Significance is based on a consolidation of the anticipated extent, duration, magnitude and likelihood of the potential impact.

- *Negligible* – The impact will barely be felt, if at all. No mitigation required;
- *Low* – The parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
- *Medium* – The parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
- *High* – Functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

10 ENVIRONEMNTAL IMPACT ASSESSMENT

10.1 Construction Phase

10.1.1 Topography

Topography and soils

Potential impacts that may be associated with alteration of the local topography is the increased erosion because of site clearing and earth works (Construction phase) and increased proportion of hard surfaces leading to concentrated peak storm water flow (operational phase).

Geology and Geo-hydrology

The project is not anticipated to impact on the geology or geo-hydrology of the area.

Potential impacts that may be associated with topography, soils, geology are summarised in **Table 8** below.

Table 8: Potential impacts in terms of topography, soils, geology and hydrology

Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Increased soil erosion and concomitant sedimentation of watercourses	Negative	Local	Short term	Medium	Possible	Medium	Low
Soil compaction / trampling of vegetation within watercourses or riparian areas	Negative	Local	Short term	Low-Medium	Possible	Medium	Low

10.1.2 Terrestrial Biodiversity

A terrestrial biodiversity compliance statement was undertaken by the Ntumbuluko Consulting to assess the associated impacts. The full report is attached as Appendix 5.1

10.1.2.1 Potential Impacts

The majority of the project area has historically been modified to accommodate agricultural practices and as such remain in a transformed state. The project area does, however, contain unique habitat features such as the wetland systems. The negative expected environmental impacts that will stem from the development activities include:

- The loss and fragmentation of vegetation communities.
- The unsafe movement of faunal species; and
- The direct and indirect loss and disturbance of floral and faunal species and communities.

Completion of the terrestrial biodiversity assessment led to disputing of classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The majority of the project area has instead been assigned a Very Low to Low sensitivity, because of the high levels of environmental disturbance that have taken place along the road servitude and the fact that no SCC were observed - or are very likely to occur. It is noted that one area have been assigned higher sensitivity, mainly the wetland system which have been allocated a 'Medium' sensitivity. The wetland areas remain in a moderately natural condition as it has been predominantly excluded from direct historic anthropogenic activities and as such still provides habitat to support indigenous vegetation and common faunal species.

10.1.2.2 Mitigation measures

The R30 S8 road servitude is classified as having a sensitivity rating of 'Very low', is likely to face minimal further impacts from any development activities, and as such the proposed activities may proceed within these areas.

10.1.3 Aquatic

A wetland delineation and impact assessment were undertaken by the Ntumbuluko Consulting (Pty) Ltd to assess the associated impacts as per the DFFE screening tool specialist protocols. The full report is attached as Appendix 5.2.

10.1.3.1 Potential Impacts

The following impact assessment is supplied, the assessment was conducted only for existing degradation of the study site by the existing R30 National Road section 8 site with the focus on wetland habitats. From the assessments it is clear that impacts can be expected from the proposed activities (**Table 9**).

Table 9: Impact 1: Degradation and / or destruction of Freshwater habitats (Watercourses and the wetland).

Impact Name	**Degradation and/or destruction of wetland habitats.**				
Alternative	**Proposal**				
Phase	**All phases**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	2	1
Duration of Impact	2	1	Probability	3	2
Environmental Risk (Pre-mitigation)					-4.50
Mitigation Measures					

Impact Name	Degradation and/or destruction of wetland habitats.

In terms of section 19 of the NWA (1998), owners / managers / people occupying land on which any activity orprocess

undertaken which causes or is likely to cause pollution or degradation of a water resource must take all reasonable measures to prevent any such disturbance from occurring, continuing or recurring. These measures may include measures to (inter alia):

- Cease, modify, or control any act or process causing the pollution/degradation.
- Comply with any prescribed waste standard or management practice.
- Contain or prevent the movement of pollutants or the source of degradation.
- Remedy the effects of pollution/degradation.
- Remedy the effects of any disturbance to the bed and banks of a watercourse/wetland.

According to the NWA (1998) part of the definition of pollution of water resources states that any physical alterations to a water resource, for example the excavation of a wetland / stream or changes to the morphology of such a water resource may be considered to be pollution. Activities which cause an alteration to the biological properties of a wetland, i.e. the fauna and flora contained within and supported by that water resource are therefore also considered to be a form of pollution.

Any construction activities in or within a delineated buffer zone of a water resource may only take place after the necessary water use license has been obtained.

Where wetlands may be encroached upon by proposed activities, the edge of the wetland must be clearly demarcated in the field with pegs or poles that will last for the duration of the construction phase, color-coded as follows:

- RED – Indicating the edge of the wetland (Note: This includes the permanent, seasonal and temporal zones of wetlands, or parts thereof; and no vehicles or building materials are allowed in this zone). These should be put along the entire length of the site.
- ORANGE – Indicating the edge of the buffer zone

Construction machinery and associated vehicles may not be allowed to enter wetlands. Strictly no re-fueling of vehicles or machinery should be allowed to take place in any area close to a wetland.

During and after construction areas of exposed soil can easily erode and subsequently end up in the wetlands. A well-designed storm water system must be put in place to avoid erosion into wetlands. Natural runoff from the natural terrestrial habitat surrounding the wetlands should, however, not be restricted unnecessarily.

Impact Name	Degradation and/or destruction of wetland habitats.
The use of potential pollutants (painting, chemicals, etc.) during construction and operational phases must be strictly controlled and a high quality of management and supervision concerning such materials must be enforced, especially close to wetland buffer zone areas. Sanitary facilities must be made available to construction workers to prevent urine and human waste entering the wetlands. If at any point construction activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regarding wetland habitats.	
Environmental Risk (Post-mitigation)	-2.00
Degree of confidence in impact prediction:	High
Impact Prioritization	
Public Response	1
Low: Issue not raised in public responses	
Cumulative Impacts	2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	1
The impact is unlikely to result in irreplaceable loss of resources.	
Prioritisation Factor	1.17
Final Significance	-2.33

Table 10: Impact 2: Loss of indigenous fauna and flora diversity associated with watercourses.

Impact Name	Loss of indigenous fauna and flora diversity associated with wetlands.				
Alternative	**Proposal**				
Phase	**All phases**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	2	1
Extent of Impact	2	1	Reversibility of Impact	4	2

Duration of Impact	2	2	Probability	2	1
Environmental Risk (Pre-mitigation)					-5.00
Mitigation Measures					
Destruction of natural wetland vegetation must be avoided at all costs. Special attention should be paid to alien and invasive control within the whole study area. Alien and invasive vegetation control should take place throughout all development phases to prevent loss of habitat of indigenous fauna and flora. Movement of vehicles and construction workers in wetlands and buffer zones should be strictly prohibited. No harvesting of plants or animals should be allowed. Any specimens of protected plant species known to occur in the wetlands and the delineated buffer zone and may potentially be impacted by the construction activities, are to be fenced off for the duration of the activity. Conservation of these species and their natural habitat must be a high priority. Red Data listed and protected species as well as sensitive habitats related to wetlands should be strictly monitored.					
Environmental Risk (Post-mitigation)					-1.50
Degree of confidence in impact prediction:					High
Impact Prioritization					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result *in spatial and temporal cumulative change.*					
Degree of potential irreplaceable loss of resources					2
The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value(services and/or functions) of these *resources is limited.*					
Prioritization Factor					1.33
Final Significance					-2.00

10.1.4 Visual

10.1.4.1 Potential Impacts

The following visual impacts are anticipated during the construction phase of the project:

- Site Preparation and Vegetation Clearance: Removing vegetation exposes bare soil, altering the natural landscape and diminishing the scenic quality of the area.
- Excavation and Earthworks: Large-scale earthmoving operations create mounds of soil and debris, which can be unsightly and visually intrusive.
- Temporary Bypass Roads: Construction of bypass roads introduces artificial elements into the landscape, disrupting its natural character.
- Storage of Materials and Machinery: Construction sites can appear cluttered and untidy due to the storage of materials, machinery, and equipment.
- Construction of Structures (Bridges, Culvert: erection of structures like bridges and culverts introduces temporary scaffolding, machinery, and construction materials, creating visual intrusions.
- Dust and Airborne Particles: Dust from construction activities reduces air clarity, making the surrounding landscape appear hazy and less visually appealing.

10.1.4.2 Impacts significance

The table below summarizes the significance of impacts both with and without mitigation. With the implementation of mitigation measures, these impacts are of low significance.

Table 11: Visual Impacts significance rating

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Site Preparation and Vegetation Clearance	Negative	Local	Short term	Medium	Definite	Medium	Low
Excavation and Earthworks	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Temporary Bypass Roads	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Storage of Materials and Machinery	Negative	Site-bound	Short term	Medium	Definite	Medium	Low

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Construction of Structures (Bridges, Culverts)	Negative	Local	Short term	Medium	Definite	Medium	Low
Dust and Airborne Particles	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Night-time Construction Lighting	Negative	Local	Short term	Medium	Possible	Medium	Low

10.1.4.3 Mitigation Measures

By implementing these mitigation measures, the visual impacts of construction activities can be significantly reduced, maintaining the aesthetic integrity of the surrounding landscape.

- Site Preparation and Vegetation Clearance:
  - Clearly demarcate construction areas to avoid unnecessary vegetation clearance.
  - Rehabilitate cleared areas promptly after construction activities.
- Excavation and Earthworks:
  - Limit the size of exposed areas at any given time.
  - Use visually neutral or natural-colored tarps to cover stockpiles.
- Temporary Bypass Roads:
  - Design bypass roads to minimize disruption to scenic areas.
  - Rehabilitate temporary routes promptly after construction.
- Storage of Materials and Machinery:
  - Store materials in designated, screened areas away from public view.
  - Ensure regular organization and maintenance of storage areas.
- Construction of Structures (Bridges, Culverts):
  - Use temporary visual barriers (e.g., hoardings or screens) around construction zones.
  - Incorporate aesthetic design features into permanent structures.
- Dust and Airborne Particles:
  - Regularly water dusty areas to suppress dust emissions.
  - Cover vehicles and material loads during transportation.

10.1.5 Noise

10.1.5.1 Potential Impacts

The folloing noise impacts are expected during construction phase:

- Site Clearing and Preparation: Use of equipment like bulldozers and chainsaws generates intermittent and moderately loud noise.
- Excavation and Earthworks: Excavators, backhoes, and other heavy machinery produce sustained high noise levels.
- Material Transportation: Movement of construction materials via trucks increases traffic noise, particularly along access roads.

10.1.5.2 Impacts significance

The following noise impacts are expected to range from medium to low with mitigation measures.

Table 12: Noise Impacts Significance

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Site Clearing and Preparation	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Excavation and Earthworks	Negative	Local	Short term	High	Definite	High	Medium
Material Transportation	Negative	Local	Short term	Medium	Highly probable	Medium	Low

10.1.5.3 Mitigation meausres

- Site Clearing and Preparation:
    - Use modern, quieter equipment and limit operations to daytime hours.
    - Avoid simultaneous operation of multiple noisy machines.
- Excavation and Earthworks:
    - Install noise barriers or screens around high-noise activity zones.
    - Maintain machinery to reduce noise emissions.
- Material Transportation:
    - Schedule transportation during off-peak hours.

- Use designated haul routes away from sensitive receptors.

- General Construction Activities:
  - Conduct regular maintenance of equipment to reduce noise.
  - Educate construction crews on noise minimization practices

10.1.6 Social Aspect

10.1.6.1 Potential Impacts

The following socio impacts are anticipated:

- Job Creation: The construction phase provides temporary employment opportunities for local workers, improving household income and reducing unemployment.
- Increased Local Business Activity: Local businesses may experience increased demand for goods and services, such as food, accommodation, and equipment.
- Disruption to Daily Activities: Construction activities, such as noise, dust, and road closures, can disrupt the daily lives of nearby residents.
- Traffic Delays and Diversions: Construction work and temporary bypass roads may cause travel delays, reducing efficiency and accessibility.
- Noise and Dust Impacts on Communities: Noise and airborne dust from construction activities can affect the quality of life of nearby residents.
- Pressure on Local Infrastructure: Construction activities may increase the use of local roads and utilities, leading to wear and strain on existing infrastructure.
- Social Tensions: There may be disagreements or competition over employment opportunities, especially if local hiring is perceived as insufficient.
- Improved Road Safety (Long Term Benefit): The upgraded road infrastructure will lead to safer and more efficient travel for local communities and regional users.

10.1.6.2 Impacts Significance

Table 13: Potential Socio-Economic impacts

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Job Creation	Positive	Local	Short term	Medium	Definite	Medium	High
Increased Local Business Activity	Positive	Local	Short term	Medium	Highly probable	Medium	High

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Disruption to Daily Activities	Negative	Local	Short term	Medium	Definite	Medium	Low
Traffic Delays and Diversions	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Noise and Dust Impacts on Communities	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Pressure on Local Infrastructure	Negative	Local	Short term	Low	Possible	Low	Negligible
Social Tensions	Negative	Local	Short term	Medium	Possible	Medium	Low
Improved Road Safety (Long Term Benefit)	Positive	Local	Long term	High	Definite	High	High

10.1.6.3 Mitigation Measures

By implementing these measures, socio-economic impacts can be managed effectively, ensuring that the benefits of the project outweigh its temporary inconveniences.

- Job Creation:
  - Prioritize hiring locally where possible.
  - Offer skills development programs to increase employability for long-term opportunities.
- Increased Local Business Activity:
  - Encourage contractors to source goods and services locally.
  - Facilitate partnerships with local businesses to maximize benefits.
- Disruption to Daily Activities:
  - Schedule noisy or disruptive activities during less intrusive times of the day.
  - Provide advance communication to affected communities about construction timelines and impacts.
- Traffic Delays and Diversions:
  - Implement traffic management plans to minimize disruptions.
  - Use signage to provide clear directions and reduce commuter inconvenience.
- Noise and Dust Impacts on Communities:
  - Suppress dust with regular watering of construction areas.
  - Restrict noisy activities to daytime hours and provide noise barriers if necessary.
- Pressure on Local Infrastructure:
  - Plan for construction activities to minimize strain on existing infrastructure.

- Coordinate with local authorities to address potential issues proactively.

- Social Tensions:
  - Ensure transparent hiring practices and equitable distribution of benefits.
  - Engage with communities to address grievances and promote inclusivity.
- Improved Road Safety:
  - Incorporate community feedback into road design to address local safety concerns.
  - Enhance safety awareness through signage and education during the construction phase.

10.1.7 Heritage

Shasa Heritage consulting was appointed to undertake heritage assessment for the proposed project. The full report is attached under Appendix 5.3.

10.1.7.1 Impact Ratings

Table 14: Heritage impact Rating

Impact	**Rating**
Nature	Road upgrade- R30 S8
Topographical effect	1- limited to site
Reversibility	2
Permanent loss of heritage resources	1
Cumulative effect	1
Duration	3
Magnitude	1
Probability	2
Significance S= (E+D+M) P	1+3+1 x2 =10 The area is considered of low significance
Mitigation	Monitoring on site

10.1.7.2 Recommendation

- Monitoring is recommended.
- The contractor should be apprised of the procedures to follow should any heritage materials be unearthed during construction.
- Contractors to be apprised of working with care near the graveyards
- Contractors should be apprised of the protocol to follow for paleontological chance finds.
- The markers should be locally advertised to establish the family wishes regarding memorial markers, either moving the side of the road, once reestablished or moved to a local cemetery.

10.1.8 Palaeontology

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either the wrong kind (volcanic) and/or much too old to contain body fossils.

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary. There is a very small chance that trace fossils may occur in the Rietgat and Kameeldoorns Formation quartzites and stromatolitic limestones, but they have not been recorded from this area. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations or drilling have commenced then they should be rescued, and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

10.1.9 Soil/Agriculture

Agricultural Compliance Statement has been undertaken by AgroConsult (Pty) Ltd/ Full report attached under Appendix 5.4

The site proposed for this project is surrounded by the project is limited by shallow soils, low fertility, and semi-arid climate. According to the South African Land Capability Classification System, the area is classified as Class IV (suitable for grazing with moderate limitations) and Class V (suitable for grazing with severe limitations).

The following possible impacts are expected during the road upgrade:

- Soil degradation and Erosion Risk
  - Key Risks:
    - Soil compaction and topsoil depletion due to heavy machinery.
    - Increased vulnerability to wind and water erosion.
  - Mitigation Measures:
    - Stockpile and reuse topsoil for rehabilitation.
    - Install silt traps, grassed swales, and erosion blankets.
    - Apply organic amendments to restore soil fertility.
- Impacts on Agricultural Biodiversity
  - Key Risks:
    - Loss of native vegetation and pollinators.
    - Reduced grazing quality and soil stability.
  - Mitigation Measures:
    - Replant native forage species post-construction.
    - Establish buffer zones with indigenous plants to support biodiversity.
- Surface water contamination

Table 15: Risk Assessment

Impact	Severity (Pre-Mitigation)	Likelihood	Mitigation Measures	Severity (post-mitigation)
Soil erosion	High	Moderate	Erosion control measures, rehabilitation	Low
Surface water contamination	Moderate	Low	Water quality monitoring, stormwater management	Low
Loss of soil fertility	High	Moderate	Topsoil conservation, fertilization	Low
Disruption to grazing	Low	High	Phased construction, continued grazing access	Very Low

10.2 Operational Phase

10.2.1 Terrestrial biodiversity

Increased sedimentation may occur as a result from the runoff from the road upgrade. This has the potential to change habitat structure within the receiving environment and this will in turn result in changes in ecosystem function. Changes in habitat structure due to sedimentation would result in changes in the species composition.

Water quality impairment has the potential to change ecosystem function, change community structure as species sensitive to water quality impairment are eliminated and tolerant species increase in number, this results in a loss of biodiversity of sensitive species.

Invasive alien plants have far-reaching detrimental effects on native biota and has been widely accepted as being a leading cause of biodiversity loss. They typically have rapid reproductive turnover and are able to outcompete native species for environmental resources, alter soil stability, and promote erosion, change litter accumulation and soil properties. In addition, certain alien plants exacerbate soil erosion whilst others contribute to a reduction in stream flow thereby potentially increasing sediment inputs and altering natural hydrology of receiving watercourses. These impacts negatively affect areas that are largely natural (with low

existing weed levels) greater than for areas already characterised by dense infestations of alien plants with low indigenous plant diversity (Macfarlane *et al.*, 2014).

10.2.1.1 Sedimentation and soil erosion

Soil erosion will result in the deposition of sediment into the freshwater system, posing a risk to the downstream catchment geomorphological/functional integrity. Subsequent impacts that are likely to result are:

- sedimentation of the watercourse that will be destructive to many faunal species affecting their habitat; breeding and feeding cycles.

Local site factors such as soil erodibility, vegetation cover, gradient of local slopes and regional rainfall/runoff intensity will affect the probability and intensity of erosion impacts (Macfarlane *et al.*, 2014). Typical results of erosion & sedimentation of water resources may include:

- Localised scouring at stormwater discharge points into watercourses
- Deposition of large masses of sediment downstream causing localised channel braiding, instability of the riverbanks and alterations in water distribution.

10.2.1.2 Pollution of water resources and soil

Changes to the water quality will result in changes to the ecosystem structure and function as well as a potential loss of biodiversity. Water quality pollution leads to modification of the species composition where sensitive species are lost and organisms tolerant to environmental changes dominate the community structure. Any substances entering and polluting watercourses will directly impact downstream ecology through surface runoff during rainfall events, or subsurface water movement, particularly during the wetter summer months.

Contaminants such as hydrocarbons, solids, pathogens and hazardous materials may enter watercourses (examples include petrol/diesel, oil/grease, paint, cement/concrete and other

hazardous substances). These contaminants negatively affect aquatic ecosystems including sensitive or intolerant species of flora and fauna. Where significant changes in water quality occur, this will ultimately result in a shift in aquatic species composition, favouring more tolerant species, and potentially resulting in the localised exclusion of sensitive species. Water quality monitoring must be implemented to ensure sustainable management of water sources within that area. Suddenly drastic changes in water quality can also have chronic effects on aquatic biota leading to localised extinctions. Deterioration in water quality will also affect its suitability for human domestic/agricultural use and have far reaching impacts for local communities who may rely on rivers as water supply (Macfarlane et al., 2014).

10.2.1.3 Alien Invasive Species

There are alien invasive plant species currently present along the Road. Any ground disturbance provides an opportunity for alien invasive plant species to spread and for new species to establish themselves in the areas. Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and "quality" of species), change nutrient cycling and productivity, and modify food webs (Zedler & Kercher, 2004). Such changes on the ecology of the riparian habitat have/will have a detrimental impact on its ability to maintain both floral and faunal biodiversity. Invasive alien plant species, particularly woody species, have much increased water usage compared with indigenous vegetation. Many alien invasive plant species are particularly found in riparian ecosystems and their invasion results in the destruction of indigenous species; increased inflammable biomass (high fire intensity); erosion; clogging of waterways such as small streams and drainage channels causing decreased river flows and incision of river beds and banks. This results in an overall impact on the hydrological functioning of the system.

10.2.1.4 Mitigation

The proposed upgrading of the road will have negative effects on the environment. The following mitigation measures may reduce the severity of impacts:

- Rehabilitation of the disturbed areas;
- Minimising pollutants entering the watercourse;
- Implement a programme for the clearing/eradication of alien species including long term control of such species;
- Wetland monitoring and biomonitoring must take place bi-annually.

10.2.1.4.1 Sedimentation and soil erosion

Mitigation Measures

- Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place.
- Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. Erosion control measures must be employed where required.
- Riparian vegetation bordering on drainage lines, wetlands and rivers will be considered environmentally sensitive and impacts on these habitats should be avoided.
- If erosion has taken place, rehabilitation will commence as soon as possible.

10.2.1.4.2 Pollution of water resources and soil

Mitigation Measures

- Demarcate wetland areas to avoid unauthorised access.
- No washing of any equipment in close proximity to a watercourse is permitted.
- No releases of any substances that could be toxic to fauna or faunal habitats within the channels or any watercourses is permitted.
- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed, and the affected area rehabilitated immediately.
- Education of workers is key to establishing good pollution prevention practices. Training programs must provide information on material handling and spill prevention and response, to better prepare employees in case of an emergency.
- Signs should also be placed at appropriate locations to remind workers of good housekeeping practices including litter and pollution control.
- The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be ensured. All employees handling fuels and other hazardous materials are to be properly trained. Storage containers must be regularly inspected so as to prevent leaks.
- All contractors and employees should undergo induction which is to include a component of environmental awareness.

10.2.1.4.3 Alien Invasive Species

Mitigation Measures

- Ongoing alien plant control must be undertaken, particularly in the disturbed areas as these areas will quickly be colonised by invasive alien species, especially in the riparian zone, which is particularly sensitive to AIP infestation.
- Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden.
- Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.
- After rehabilitation, re-vegetate any exposed surfaces and mulch re-vegetated areas.
- Select appropriate species for wetland and terrestrial areas and ensure species diversity is enhanced, with species commonly found in the natural wetland area.

10.2.2 Social Aspect

The following operational phase socio economic impacts are anticipated

- Improved Traffic Flow: Upgraded road geometry and surface quality reduce travel times and alleviate congestion.
- Road Safety Improvements: Enhanced road standards, including wider shoulders and better signage, significantly lower the risk of accidents.

- Economic Growth: Improved road connectivity promotes regional trade and supports local businesses.

Table 16: Socio-economic impacts_ Operational Phase

Activity/Impact	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Improved Traffic Flow	Positive	Local	Long term	High	Definite	High	High
Road Safety Improvements	Positive	Local	Long term	High	Definite	High	High
Economic Growth	Positive	Sub-regional	Long term	Medium	Highly probable	Medium	High

10.2.2.1 Mitigation Measures
No mitigation measures are required

10.2.3 Aquatic

Increased sedimentation may occur as a result from the runoff from the road upgrade. This has the potential to change habitat structure within the receiving environment and this will in turn result in changes in ecosystem function. Changes in habitat structure due to sedimentation would result in changes in the species composition.

Water quality impairment has the potential to change ecosystem function, change community structure as species sensitive to water quality impairment are eliminated and tolerant species increase in number, this results in a loss of biodiversity of sensitive species.

Invasive alien plants have far-reaching detrimental effects on native biota and has been widely accepted as being a leading cause of biodiversity loss. They typically have rapid reproductive turnover and are able to outcompete native species for environmental resources, alter soil stability, and promote erosion, change litter accumulation and soil properties. In addition, certain alien plants exacerbate soil erosion whilst others contribute to a reduction in stream flow thereby potentially increasing sediment inputs and altering natural hydrology of receiving watercourses. These impacts negatively affect areas that are largely natural (with low

existing weed levels) greater than for areas already characterised by dense infestations of alien plants with low indigenous plant diversity (Macfarlane *et al.*, 2014).

10.2.3.1 Sedimentation and soil erosion
Soil erosion will result in the deposition of sediment into the freshwater system, posing a risk to the downstream catchment geomorphological/functional integrity. Subsequent impacts that

are likely to result are:

- sedimentation of the watercourse that will be destructive to many faunal species affecting their habitat; breeding and feeding cycles.

Local site factors such as soil erodibility, vegetation cover, gradient of local slopes and regional rainfall/runoff intensity will affect the probability and intensity of erosion impacts (Macfarlane *et al.*, 2014). Typical results of erosion & sedimentation of water resources may include:

- Localised scouring at stormwater discharge points into watercourses
- Deposition of large masses of sediment downstream causing localised channel braiding, instability of the riverbanks and alterations in water distribution.

10.2.3.2 Pollution of water resources and soil

Changes to the water quality will result in changes to the ecosystem structure and function as well as a potential loss of biodiversity. Water quality pollution leads to modification of the species composition where sensitive species are lost and organisms tolerant to environmental changes dominate the community structure. Any substances entering and polluting watercourses will directly impact downstream ecology through surface runoff during rainfall events, or subsurface water movement, particularly during the wetter summer months.

Contaminants such as hydrocarbons, solids, pathogens and hazardous materials may enter watercourses (examples include petrol/diesel, oil/grease, paint, cement/concrete and other hazardous substances). These contaminants negatively affect aquatic ecosystems including sensitive or intolerant species of flora and fauna. Where significant changes in water quality occur, this will ultimately result in a shift in aquatic species composition, favouring more tolerant species, and potentially resulting in the localised exclusion of sensitive species. Water quality monitoring must be implemented to ensure sustainable management of water sources within that area. Suddenly drastic changes in water quality can also have chronic effects on aquatic biota leading to localised extinctions. Deterioration in water quality will also affect its suitability for human domestic/agricultural use and have far reaching impacts for local communities who may rely on rivers as water supply (Macfarlane et al., 2014).

10.2.3.3 Alien Invasive Species

There are alien invasive plant species currently present along the Road. Any ground disturbance provides an opportunity for alien invasive plant species to spread and for new species to establish themselves in the areas. Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and "quality" of species), change nutrient cycling and productivity, and modify food webs (Zedler & Kercher, 2004). Such changes on the ecology of the riparian habitat have/will have a detrimental impact on its ability to maintain both floral and faunal biodiversity. Invasive alien plant species, particularly woody species, have much increased water usage compared with indigenous vegetation. Many alien invasive plant species are particularly found in riparian ecosystems and their invasion results in the destruction of indigenous species; increased inflammable biomass (high fire intensity); erosion; clogging of waterways such as small streams and drainage channels causing decreased river flows and incision of riverbeds and banks. This results in an overall impact on the hydrological functioning of the system.

10.2.3.4 Mitigation

The proposed upgrading of the road will have negative effects on the environment. The following mitigation measures may reduce the severity of impacts:

- Rehabilitation of the disturbed areas;
- Minimising pollutants entering the watercourse;
- Implement a programme for the clearing/eradication of alien species including long term control of such species;
- Wetland monitoring and biomonitoring must take place bi-annually.

10.2.3.4.1 Sedimentation and soil erosion

Mitigation Measures

- Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place.
- Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. Erosion control measures must be employed where required.
- Riparian vegetation bordering on drainage lines, wetlands and rivers will be considered environmentally sensitive and impacts on these habitats should be avoided.
- If erosion has taken place, rehabilitation will commence as soon as possible.

10.2.3.4.2 Pollution of water resources and soil

Mitigation Measures

- Demarcate wetland areas to avoid unauthorised access.
- No washing of any equipment in close proximity to a watercourse is permitted.
- No releases of any substances that could be toxic to fauna or faunal habitats within the channels or any watercourses is permitted.
- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed, and the affected area rehabilitated immediately.
- Education of workers is key to establishing good pollution prevention practices. Training programs must provide information on material handling and spill prevention and response, to better prepare employees in case of an emergency.
- Signs should also be placed at appropriate locations to remind workers of good housekeeping practices including litter and pollution control.
- The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be ensured. All employees handling fuels and other hazardous materials are to be properly trained. Storage containers must be regularly inspected so as to prevent leaks.
- All contractors and employees should undergo induction which is to include a component of environmental awareness.

10.2.3.4.3 Alien Invasive Species

Mitigation Measures

- Ongoing alien plant control must be undertaken, particularly in the disturbed areas as these areas will quickly be colonised by invasive alien species, especially in the riparian zone, which is particularly sensitive to AIP infestation.
- Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden.
- Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.
- After rehabilitation, re-vegetate any exposed surfaces and mulch re-vegetated areas.
- Select appropriate species for wetland and terrestrial areas and ensure species diversity is enhanced, with species commonly found in the natural wetland area.

10.2.4 Hydrology

10.2.4.1 Potential Impacts

- Improved Drainage Systems: Upgraded drainage systems reduce water pooling and flood risks during heavy rainfall.
- Altered Surface Runoff Patterns: Changes to the landscape and increased impervious surfaces may lead to accelerated runoff, causing erosion or waterlogging in adjacent areas.
- Increased Water Pollution Risk: Road runoff carrying oils, fuel, and debris may contaminate nearby watercourses and affect water quality.
- Improved Culvert Capacity: Enhanced culverts and drainage structures reduce water flow obstructions, maintaining natural hydrological patterns.

10.2.4.2 Impacts Significance

Table 17: Hydrological Impacts Operational Phase

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Improved Drainage Systems	Positive	Local	Long term	Medium	Definite	Medium	High
Altered Surface Runoff Patterns	Negative	Local	Long term	Medium	Highly probable	Medium	Low

Activity	Status	Extent	Duration	Magnitude	Likelihood	Significance Without Mitigation	Significance With Mitigation
Increased Water Pollution Risk	Negative	Local	Long term	Medium	Highly probable	Medium	Low

10.2.4.3 Mitigation Measures

The following measures are recommended:

- Alteration of Natural Drainage Patterns:
  - Conduct hydrological assessments to design road alignments that preserve natural drainage paths.
  - Install culverts or channels to facilitate the natural flow of water.
- Increased Surface Runoff:
  - Introduce detention basins or swales to control runoff and reduce sedimentation.
  - Stabilize exposed soils with vegetation or erosion control mats.
- Contamination of Water Sources:
  - Implement spill response plans and use oil traps or separators in drainage systems.
  - Regularly maintain drainage infrastructure to prevent clogging and pollutant buildup.
- Improved Drainage Infrastructure:
  - Monitor drainage systems to ensure long-term functionality.

10.3 Decommissioning Phase

The R30 road is not anticipated to be decommissioned, as it is intended to remain in use for an indefinite operational lifespan, potentially serving the region for several decades or more. This long-term functionality aligns with its strategic importance for transportation and economic activities in the area.

However, in the unlikely event that the road is decommissioned, the impacts associated with such activities would likely mirror those experienced during the construction phase. This is because decommissioning would involve similar processes, such as the use of heavy machinery, the removal of infrastructure, and the rehabilitation of disturbed areas. Potential impacts could include:

- Soil Disturbance and Erosion: The removal of road materials and associated infrastructure could lead to soil exposure, increasing the risk of erosion and sedimentation in nearby watercourses.
- Dust and Air Pollution: Dust generation and emissions from machinery during decommissioning activities could temporarily affect air quality.

- Noise Pollution: The operation of equipment and the dismantling of structures would generate noise, potentially disturbing nearby communities and wildlife.
- Vegetation and Habitat Disturbance: If areas surrounding the road are disturbed during decommissioning, local flora and fauna may be temporarily affected.
- Waste Management Challenges: The disposal of materials, including asphalt, concrete, and debris, would need to be managed carefully to prevent environmental contamination.

Despite these potential impacts, the application of mitigation measures similar to those implemented during the construction phase would help minimize environmental and social disruptions. These measures would include erosion control, dust suppression, noise mitigation, and proper waste disposal practices.

10.4 Impact Statement

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial and National level.

The impact assessment and the specialist findings from the EIA studies undertaken have indicated that there are no identified fatal flaws associated with the upgrade of R30 road section 8 and associated infrastructure. The mitigation measures have been recommended by the specialist for any sensitivity that occurs within the project site. The impacts that are expected to remain after the avoidance of the sensitive areas have been reduced through the recommendation of specific mitigation measures by the specialists. The minimization of the significance of the impacts is in line with tier 2 of the mitigation hierarchy

Therefore, by putting the recommended mitigation or enhancement strategies into practice, impacts can be reduced to levels that are acceptable or increased. Both positive and negative effects are anticipated from a societal perspective.

It can be inferred from the development's assessment that upgrading road R30 Section 8 and the associated bridges and culverts won't have any detrimental impacts on the environment (subject to the implementation of the recommended mitigation measures).

10.5 Impact Mitigation and Monitoring

Please refer to the attached EMPR, which contains measures for the prevention, mitigation and/or monitoring of impacts related to the project.

11 CONCLUSION AND RECOMMENDATIONS

It is recommended that Environmental Authorisation be granted to the applicant, SANRAL, for the Proposed Upgrade of National Road R30 Section 8 From Klerksdorp (Km 0.0) To Buffelsvallei (KM 37.0) And Associated Borrow Pits Within Dr Kenneth Kaunda District Municipality in The North West Province, as described in this report.

It is recommended that the following conditions be included in the authorisation:

- Should any deviations from the current layout be contemplated, such changes must be communicated to DFFE, and it must be determined whether the changes are allowable in terms of the EA or if amendment of the EA must be applied for first;
- No additional activities triggering the listed activities contained in the EIA Regulations may take place, unless EA is obtained first.
- The impact mitigation measures contained in the EMPR accompanying this report must be implemented to minimize and/or mitigate environmental impacts henceforth.
- Conditions that may be set by DFFE in terms of the EA must be adhered to. If it is found that it will not be possible to adhere to certain conditions, this must be communicated to DFFE ahead of time to prevent a non-compliant situation.
- Should any additional activities listed in terms of the EIA Regulations be planned on the site, the appropriate application(s) for authorisation must be lodged with the relevant authority.

12 REFERENCES

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APPENDIX 1: PROJECT MAPS

APPENDIX 2: SITE PHOTOS

APPENDIX 3: PROOF OF PUBLIC PARTICIPATION

APPENDIX 4: SCREENING REPORT

APPENDIX 5.1: TERRESTRIAL COMPLIANCE STATEMENT

APPENDIX 5.2: WETLAND DELINEATION AND IMPACT ASSESSMENT REPORT

APPENDIX 5.3: HERITAGE IMPACT ASSESSMENT

APPENDIX 5.4: PALEONTOLOGICAL REPORT

APPENDIX 6: SITE SENSITIVITY VERIFICATION REPORT APPENDIX 7: ENVIRONEMNTAL MANAGEMENT PROGRAMME REPORT (EMPR)

APPENDIX 8 – SPECIALIST DECLARATION

APPENDIX 9 – EAP CV