



Olifants Management Model Programme Bulk Raw Water Study Phase (OMMP-BRWSP)

OLIFANTS MANAGEMENT MODEL PROGRAMME BULK RAW WATER STUDY PHASE (OMMP-BRWSP); PROPOSED PHASE 2F PIPELINE RE-ALIGNMENT AND ASSOCIATED INFRASTRUCTURE, IN THE FETAKGOMO TUBATSE AND LEPELLE NKUMPI LOCAL MUNICIPALITIES, WITHIN THE CAPRICORN AND GREATER SEKHUKHUNE DISTRICT MUNICIPALITIES, IN THE LIMPOPO PROVINCE.

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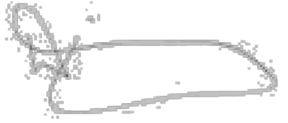
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Appendix 1	Content as required by NEMA	Section
3(a)	(i) details of the EAP who prepared the report; and	Control sheet, Section 1.2. Annexure A
	(ii) details of the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including -	Section 1.3 and Section 1.4.
	(i) the 21-digit Surveyor General code of each cadastral land parcel;	
	(ii) where available, the physical address and farm name;	N/A
(c)	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	
	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is -	Section 1 and Section 5.
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	N/A
(d)	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	NA
	a description of the scope of the proposed activity, including -	Section 5
	(i) all listed and specified activities triggered;	Section 2.2
(e)	(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Section 5
	a description of the policy and legislative context within which the development is proposed including -	Section 2
	i. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	
(f)	ii. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 5.9
	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	
(g)	a motivation for the preferred site, activity and technology alternative;	Section 6
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including -	Section 6
	(i) details of all the alternatives considered;	Section 4 and Annexure C
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 4.4, Annexure C
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
	(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 7
	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 3.2.2

	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 7
	(ix) the outcome of the site selection matrix;	Section 5 and Section 6
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 6
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 6 and Section 8
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including - (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 3.2
(j)	an assessment of each identified potentially significant impact and risk, including - (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Section 7
(k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 7
(l)	an environmental impact statement which contains - (i) a summary of the key findings of the environmental impact assessment;	Section 7.5 and Section 8
	(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	
	(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMP; and	Section 7
(n)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 8.1
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.8
(p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 8
(q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the	NA.

	activity will be concluded, and the post construction monitoring requirements finalized.	
(r)	an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Annexure A
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	any specific information required by the competent authority; and	Email correspondence from the DFFE form part of Annexure B.
(2)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

ABBREVIATIONS

AEL	Atmospheric Emissions License
AIP	Alien Invasive Plant
AMSL	Above Mean Sea Level
ATS	Air Traffic Service
BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CAA	Civil Aviation Authority
CARA	Conservation of Agricultural Resources Act, No. 43 of 1983
CBA	Critical Biodiversity Area
CB	Critical Biodiversity
CC	Corner Coordinate
CDM	Capricorn District Municipality
CH₄	Methane
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CoGHSTA	Cooperative Governance, Human Settlements and Traditional Affairs
COLTO	Committee of Land Transportation Officials
CR	Critically Endangered
CRR	Comments and Responses Report
CV	Curricula vitae
DFFE	National Department of Forestry, Fisheries and the Environment
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DMRE	Department of Mineral Resources and Energy
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners' Association of South Africa
EARES	Enviro Acoustic Research
ECA	Environmental Conservation Act, No. 73 of 1989
ECO	Environmental Compliance/Control Officer
EIA	Environmental Impact Assessment
EI	Ecological Importance
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EPL	Ecosystem Protection Level
ESA	Ecological Support Area
ES	Ecological Sensitivity
ESO	Environmental Safety Officer
ETA	Ecosystem Threat Status
FL	Flight Level
FTLM	Fetakgomo Tubatse Local Municipality
FPO	Fire Protection Officers
FPA	Fire Protection Association
GA	General Authorisation
GDP	Gross Domestic Product
GG	Government Gazette
GIS	Geographic Information Systems
GISSA	Geo-Information Society of South Africa
GLC	Ground Level Concentration
GN	Government Notice / General Notice
HIA	Heritage Impact Assessment
HGM	Hydrogeomorphic
HMP	Heritage Management Plan
I&APs	Interested and Affected Parties

IAIA	International Association for Impact Assessment South Africa
IDP	Integrated Development Plan
IECA	International Erosion Control Association
IEIM	Integrated Environmental Information Management
IEM	Integrated Environmental Management
IFC	International Finance Corporation
IPILRA	Interim Protection of Informal Land Rights Act, No. 31 of 1996
IS	Information Science
IUCN	International Union for Conservation of Nature
KOP	Key Observation Point
KZN	KwaZulu-Natal
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LEMA	Limpopo Environmental Management Act, No. 7 of 2003
LIHRA	Limpopo Provincial Heritage Resources Authority
LNLM	Lepelle Nkumpi Local Municipality
LOS	Level of Service
LT	Least Threatened
LVIA	Landscape and Visual Impact Assessment
LWUA	Lebalelo Water User Association
m.a.s.l	meters above sea level
MCA	Multi-Criteria Analysis
MDGs	Millennium Development Goals
MPRDA	Mineral and Petroleum Resources Development Act, No. 28 of 2002
MTPA	Mpumalanga Tourism and Parks Agency
NBA	National Biodiversity Assessment
NCR	Noise Control Regulations
NCW	Not Conservation Worthy
NDP	National Development Plan
NEC	New Engineering Contract
NEMA	National Environmental Management Act, No. 107 of 1998
NEM: AQA	National Environmental Management: Air Quality Act, No. 39 of 2004
NEM: BA	National Environmental Management: Biodiversity Act, No. 10 of 2004
NEM: PAA	National Environmental Management: Protected Areas Act, No. 57 of 2003
NEM: WA	National Environmental Management: Waste Act, No. 59 of 2008
NFA	National Forests Act, No. 84 of 1998
NFEPA	National Freshwater Ecosystems Priority Areas
NHRA	National Heritage Resources Act, No. 25 of 1999
NIP	National Infrastructure Plan
NMT	non-motorised transport
NNR	No Natural Remaining
NO_x	Oxides of Nitrogen
NPAES	National Protected Areas Expansion Strategy (2008)
NRTA	National Road Traffic Act, No. 93 of 1996
NSR	Noise-Sensitive Receptors
NT	Near Threatened
NWA	National Water Act, No. 36 of 1998
O₃	Ozone
OMM	Olifants Management Model
OMMP-BRWSP	Olifants Management Model Programme Bulk Raw Water Study Phase
ONA	Other Natural Areas
ORWRDP-2	Olifants River Water Resources Development Project
PA	Protected Areas
Pb	Lead
PDA	Palaeontological Desktop Assessment
PES	Present Ecological State
PLC	Programmable Logic Controllers
PM	Particulate Matter

PPP	Public Participation Process
PS	Performance Standard
PSDF	Provincial Spatial Development Framework
PTO	Permissions to Occupy
RAL	Roads Agency Limpopo
RAP	Resettlement Action Plan
RoD	Record of Decision
RQIS	Research Quality Information Services
RRoD	Revised Record of Decision
SAAQIS	South African Air Quality Information System
SAATCA	South African Auditor and Training Certification Authority
SAAQIS	South African Air Quality Information System
SACAA	South African Civil Aviation Authority
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SANRAL	South African National Road Agency
SANS	South African National Standards
SAPS	South African Police Service
SAS	Scientific Aquatic Services
SCADA	Supervisory control and data acquisition
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SDGs	Sustainable Development Goals
SDM	Sekhukhune District Municipality
SIA	Social Impact Assessments
SIP	Strategic integrated Projects
SKA	Square Kilometre Array
SMME	Small, Medium and Micro Enterprise
SO₂	Sulphur Dioxide
spp	Species
SPLUMA	Spatial Planning and Land Use Management Act, No. 16 of 2013
SQR	Sub quaternary catchment reach
SSV	Site Sensitivity Verification
STI	Sexually Transmitted Infection
SUDS	Sustainable Urban Drainage Systems
SWMP	Stormwater Management Plan
SWSA	Strategic Water Source Area
TCTA	Trans-Caledon Tunnel Authority
TIA	Traffic Impact Assessment
ToR	Terms of Reference
TSP	Total Suspended Particulate Matter
UN	United Nations
VAC	Visual absorption capacity
VIA	Visual Impact Assessment
VOC	Volatile Organic Compounds
VU	Vulnerable
WCMR	Waste Classification and Management Regulations
WMA	Water Management Area
WML	Waste Management License
WRC	Water Research Commission
WSA	Water Service Authority
WTW	Water Treatment Works
WUL	Water Use Licence
WULA	Water Use License Application
ZNJV	Zutari Ndodana Joint Venture
ZoR	Zones of Regulation
ZVI	Zone of Visual Influence

1 INTRODUCTION

The Lebalelo Water User Association (LWUA) appointed the Zutari Ndodana Joint Venture (ZNJV) for the provision of professional services for the Olifants Management Model Programme Bulk Raw Water Study Phase (OMMP-BRWSP).

1.1 PROJECT OVERVIEW

Phase 2 of the Olifants River Water Resources Development Project (ORWRDP-2) is a Department of Water and Sanitation (DWS) project, which underwent an environmental impact assessment (EIA) process and obtained a positive Record of Decision (RoD) from the Department of Environmental Affairs (DEA)¹ in 2006 in terms of the Environmental Conservation Act, No. 73 of 1989 (ECA). After many appeals by large organisations, including the Kruger National Park, the Minister decided to grant the Revised RoD (RRoD) (ref: **03/2/4** and **12/12/20/553**), dated 16 October 2006 (refer to **Annexure J**).

The approved ORWRDP-2 consists of various phases as defined below (refer to **Figure 1-1**). These were previously implemented by the Trans-Caledon Tunnel Authority (TCTA). The phases are designed and implemented in a phased manner, depending on need and availability of finances. For this reason, phase specific Environmental Management Programmes (EMPrs) are developed and submitted for approval to the Competent Authority (CA).

- ▶ **Phase 2A:** Construction of De Hoop Dam
- ▶ **Phase 2B:** Pipeline from Flag Boshielo Dam to Pruissen near Mokopane (72 km)
- ▶ **Phase 2B+:** Consists of a raw water pipeline from Pruissen Reservoir to the proposed Sekuruwe Water Treatment Works (WTW), including offtakes to the proposed Mokopane WTW and two commercial user offtakes.
- ▶ **Phase 2C:** Pipeline from De Hoop Dam to Mooihoek
- ▶ **Phase 2D:** Pipeline from Steelpoort to Mooihoek (24 km)
- ▶ **Phase 2E:** Pipeline from Mooihoek to Havercroft Junction (14 km)
- ▶ **Phase 2F:** Pipeline from Havercroft Junction to Olifantspoort (44 km)
- ▶ **Phase 2G:** Possible second pipeline parallel to Phase 2B
- ▶ **Phase 2H:** Changes and additions to the current Phase 2H (Lebalelo Network); and
- ▶ **Phase 2I:** Pipeline from the De Hoop Dam to the proposed Eskom Tubatse Pump-storage Hydro-electric Scheme.

The ORWRDP-2 has since been reconstituted to become the OMMP-BRWSP in recent years, with the LWUA acting as the implementing agent for the following portions of the project, with the focus of this Basic Assessment Report (BAR) being on Phase 2F:

- ▶ Phase 2B
- ▶ Phase 2B+
- ▶ Phase 2D²; and
- ▶ Phase 2F

Furthermore, since inception, the project has acquired the status of strategic importance, and recently on 05 March 2023 the project was classified as a Strategic Integrated Project (SIP) under the SIP 19 (i.e., Water and Sanitation Infrastructure Portfolio). As such, it is critical that the project must be expedited in terms of Schedule 2 (Section 17(2)) of the Infrastructure Development Act, No. 23 of 2014. The purpose of this piece of legislation is to provide facilitation and coordination of public infrastructure development which is of economic significance or social importance in South Africa and to ensure that infrastructure development in the country is given priority in planning, approval, and implementation.

¹ Now referred to as the Department of Forestry, Fisheries and the Environment (DFFE).

² Changes in this phase will be administratively implemented as Phase 2H.

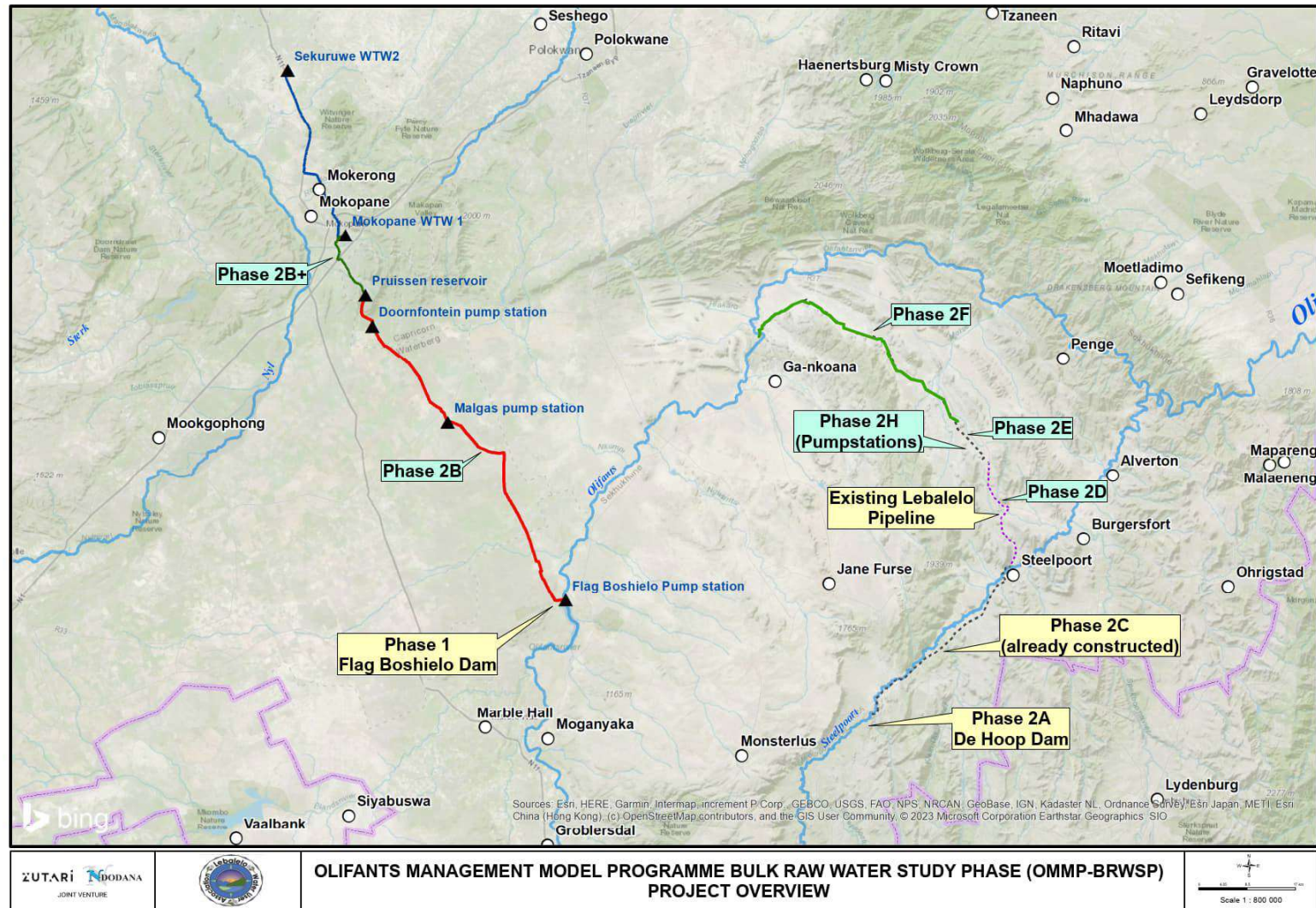


Figure 1-1: Map indicating the alignment of the different pipelines for the various Phases. The Northern Limb includes Phases 2B and 2B+ while the Eastern Limb consists of the phases in the east section of the project (i.e., Phases 2H, 2F, 2E and 2D).

1.2 DESCRIPTION OF PHASE 2F

Phase 2F comprises approximately 44 km of pipeline intended to convey water to the Olifantspoort Water Treatment Works (WTW), thereby augmenting the water supply to Polokwane and surrounding rural areas. The alignment of Phase 2F starts near Havercroft Junction, deviating from the R37 to take a more direct route to the Olifantspoort WTW, following existing gravel roads along part of the way. The pipeline starts as a 1,200 mm diameter over 18.5 km, reducing to a 1,000 mm diameter over 25.6 km, originating at the Klipfontein Balancing Dam (or Break Pressure Dam) with a projected capacity of 21 ML.

An Environmental Authorisation (EA) (ref: **14/12/16/3/3/1/1626**) was obtained for Phases 2E & 2F in May 2017, for the alignment illustrated in **Figure 1-3**, from the National Department of Forestry, Fisheries and the Environment (DFFE). This authorisation was valid for five (5) years and lapsed in June 2022. Following an interactive public participation process (PPP) in April 2022, facilitated by the DWS and the ZNJV, Condition 7 of the EA was amended on 2 May 2017 (ref: **14/12/16/3/3/1/1626/AM1**). The revised condition stipulates that the activity must commence within ten years of the authorisation issue date (i.e., by 2 May 2027), after which the authorisation will lapse, necessitating a new application for EA to proceed with the activity.

A general layout of all the project phases and pipeline alignments is illustrated in **Figure 1-1** above. Phase 2F, is the easterly pipeline alignment indicated by the green line. For this application, LWUA, on behalf of the DWS, seeks authorisation for the approximately 3.35 km (~3,350 m) pipeline realignment (refer to **Figure 1-4**), as well as the required access and internal roads necessary for the construction and operation of the entire Phase 2F alignment.

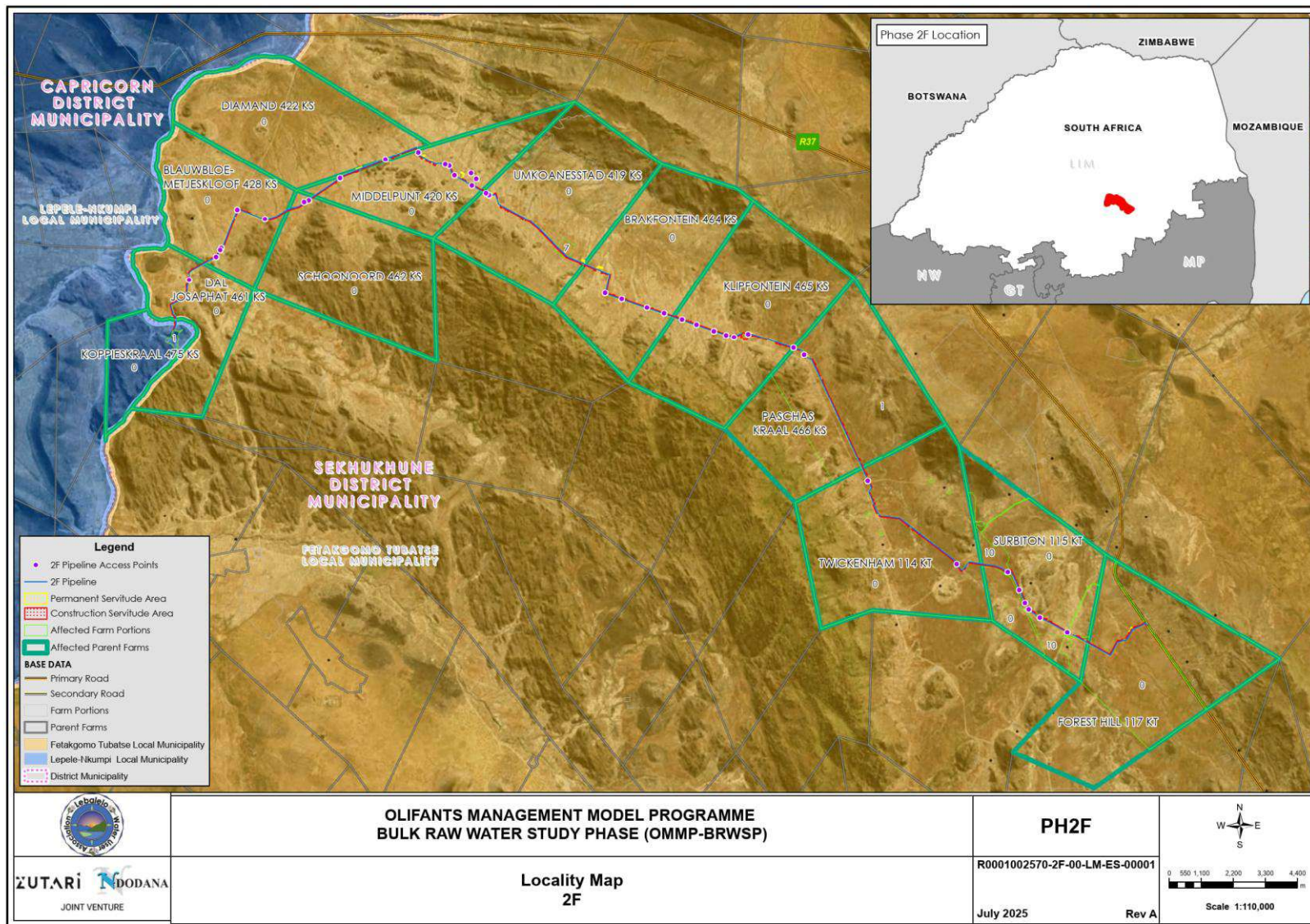


Figure 1-2: Locality Map of the current Phase 2F pipeline alignment.

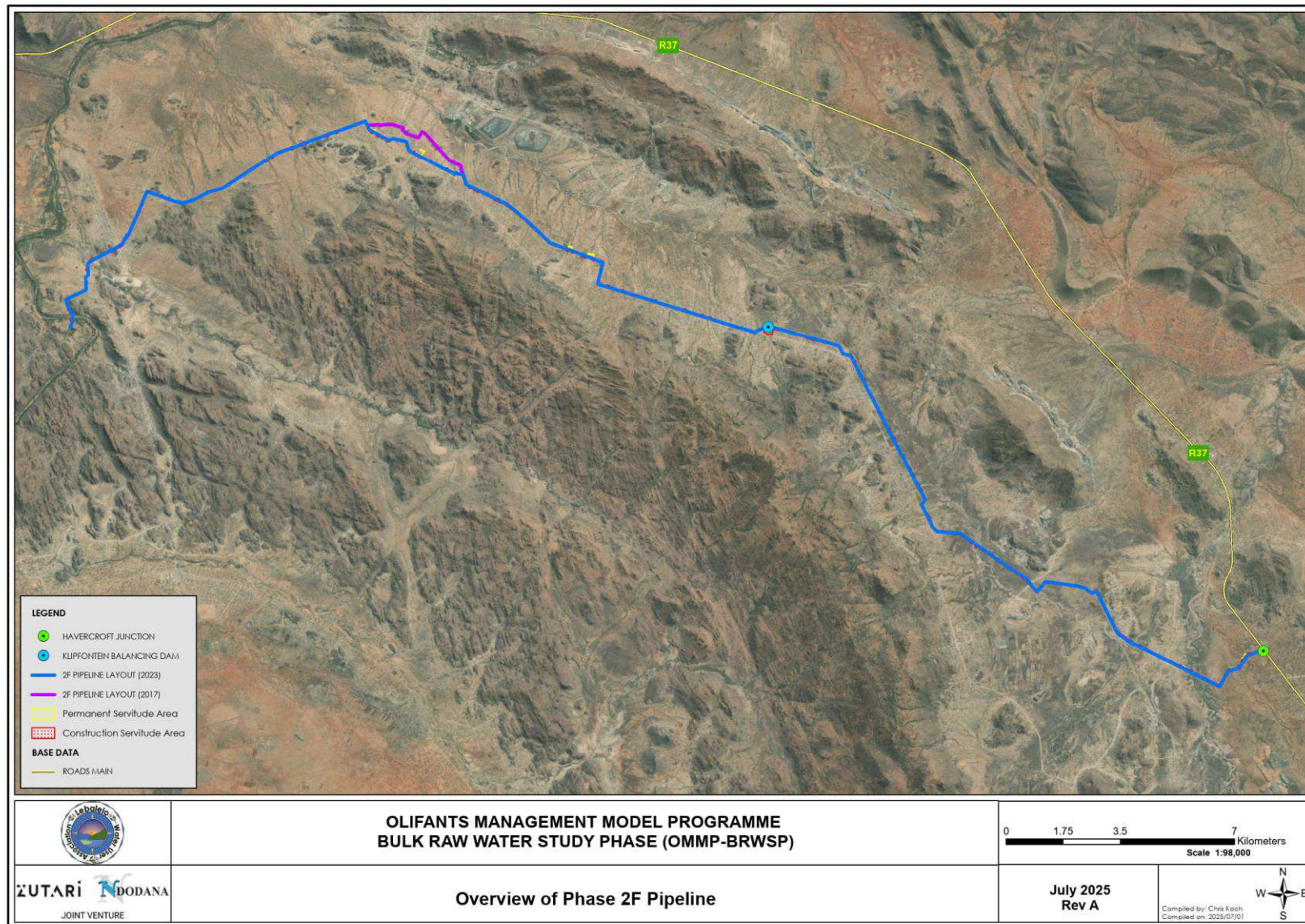


Figure 1-3: Map indicating the location and alignment of the previously authorised Phase 2F (2017) vs the new proposed alignment.

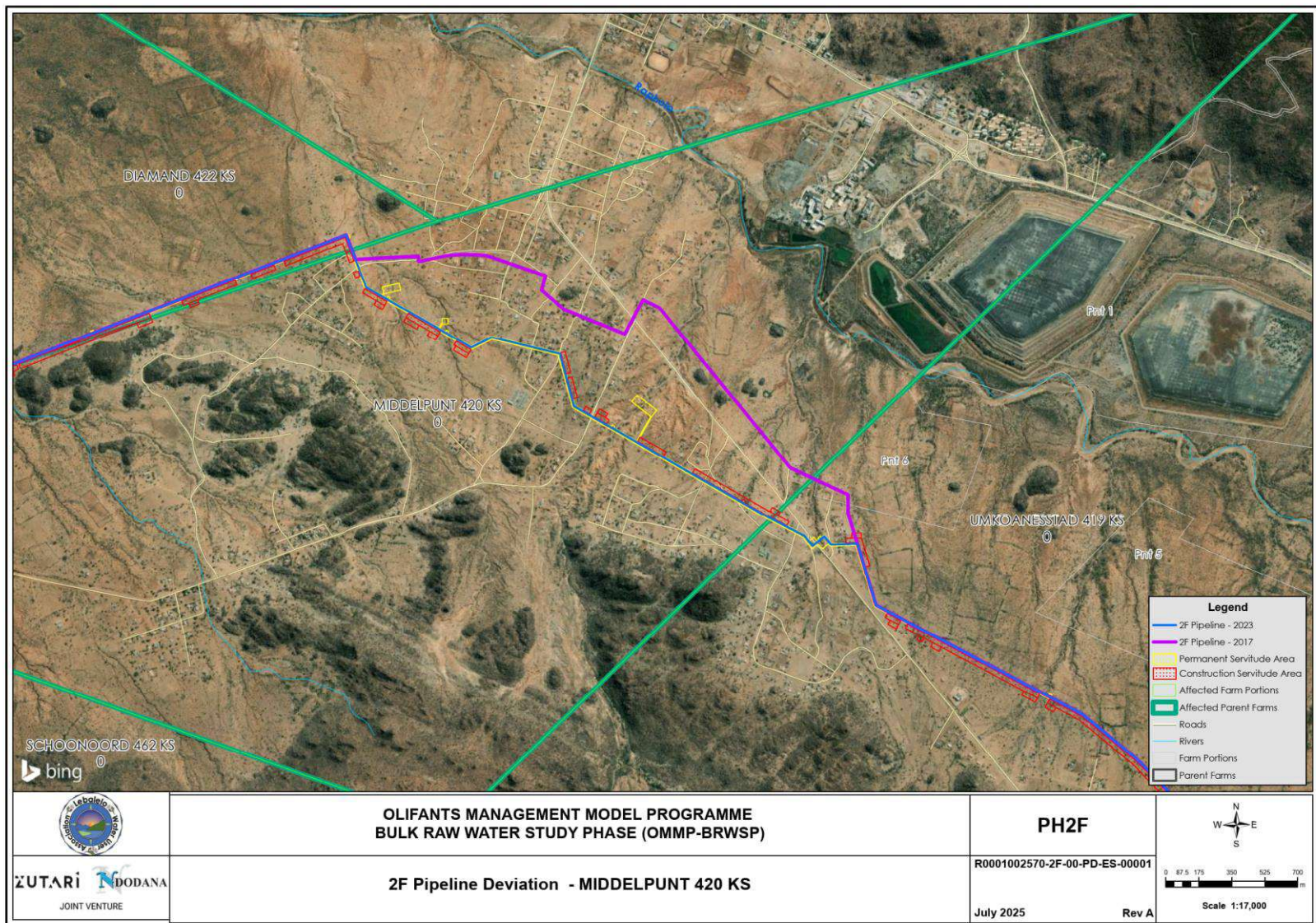


Figure 1-4: Pipeline realignment.

1.3 REQUIREMENTS OF AN ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Section 24 of South Africa's National Environmental Management Act, No. 107 of 1998 (NEMA) pertains to Environmental Authorisation (EA), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the CA. The EIA Regulations of 2014 [General Notice (GN) R982 of 2014] published under NEMA prescribe the process to be followed when applying for EA, while the Listing Notices [Listing Notice 1 (GN R983 of 2014), Listing Notice 2 (GN R984 of 2014), and Listing Notice 3 (GN R985 of 2014)] contain those activities that may not commence without an EA.

Several listed activities outlined in the NEMA Listing Notice 1 and Listing Notice 3 are expected to be triggered by the construction of the newly proposed infrastructure (i.e., pipeline realignment) of Phase 2F, along with the associated access and internal roads. Consequently, these activities require authorisation by means of a Basic Assessment (BA) process as outlined in Regulations 19 - 20 of the EIA Regulations of 2014 (GN R982 of 2014).

The CA is the DFFE, while the Applicant, the DWS, is a government department. The implementing agent, LWUA, was established in terms of Section 92(1)(a) of the NWA, as per the notice published in Government Gazette (GG) No. 89/23053. The Limpopo Department of Economic Development, Environment and Tourism (LEDET) will be the commenting authority.

1.4 LEGAL REQUIREMENTS AS PER THE EIA REGULATIONS, 2014 FOR THE UNDERTAKING OF AN IMPACT ASSESSMENT REPORT

This BAR has been prepared in accordance with the requirements of the EIA Regulations of 2014 (GN R982 of 2014). This chapter of the BAR includes the following information required in terms of Appendix 1: Content of the BAR of these regulations.

Requirement	Relevant Section
(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out the BA procedures; including a curriculum vitae	See Section 1.8 The Curricula vitae (CVs) of the ZNJV Environmental team have been included as Annexure A .
(b) the location of the activity, including (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the properties.	Section 1.5 . The details of the affected properties, property names and numbers, and SG-codes are included in Table 1-4 .
(c) a plan which locates the proposed activity or activities for at an appropriate scale, or, if it is (i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	See the locality in Figure 1-2 and Error! Reference source not found., and Section 1.5 .

The BA process entails several phases, which are discussed in **Section 3.1**. The purpose of this BAR³ is to set out and assess the environmental outcomes, impacts and residual risks of the proposed activity. Accordingly, the BAR includes the following chapters:

- ▶ **Section 1** – Introduction, context and overview.
- ▶ **Section 2** – Legal framework.
- ▶ **Section 3** – EIA methodology and description of the BA process.

³ Appendix 1 of the EIA Regulations (GN R982 of 2014) lists the content required in a Basic Assessment Report. This has been listed for cross checking purposes on the page preceding the table of contents.

- ▶ **Section 4** – PPP indicating the methodologies used in notifying the potential interested and affected parties (I&APs) and the PPP stages, with estimated dates.
- ▶ **Section 5** – Detailed project description and provisional layout with additional details on the project components and requirements.
- ▶ **Section 6** – Alternatives. Motivation and description for the approach to alternatives.
- ▶ **Section 7** – Baseline description of the environment i.e. the current state of the environment, and an assessment of the project's potential environmental impacts.
- ▶ **Section 8** – Conclusion and recommendations. This section provides the Environmental Assessment Practitioner's (EAP) concluding remarks, a recommended way forward in terms of the application for EA and proposed conditions of the EA.

1.5 PROJECT LOCATION

The Phase 2F project area spans two local municipalities—Fetakgomo Tubatse and Lepelle Nkumpi—and two district municipalities—Capricorn and Sekhukhune—within the Limpopo Province (see **Figure 1-2**). However, the pipeline realignment and the proposed access roads are located within the Fetakgomo Tubatse Local Municipality (FTLM), which is part of the Sekhukhune District Municipality (SDM). The project area is recognised as part of the Critical Biodiversity Area (CBA) and situated within the Sekhukhuneland Centre of Floristic Endemism, known for its diverse plant life and habitat suitable for endemic species. The pipeline route begins in Ward 15 of the FTLM, passing through Wards 10, 33, 34, 35, and terminating in Ward 25 of the Lepelle Nkumpi Local Municipality (LNLM).

Key settlements along the route, within a 2 km radius of the pipeline include Ditobeleng, Ga-Kgoete, Makgake, Makoba-Koba, Morapaneng, Sealane, Motlamotshe, Ga-Selepe, Malogeng, Maropeng and Malomanye. The entire Phase 2F pipeline route also crosses the jurisdiction of ten Traditional Authorities: Nareng Thokwane Traditional Authority, Magadimane Traditional Authority, Roka Mashabela (Ga Mongatane) Traditional Authority, Roka Phashaskraal Traditional Authority, Baroka ba Nkoana Traditional Authority, Maisela Manotoane Traditional Authority, Baroka ba Selepe Traditional Authority, Nareng Thokwane Traditional Authority, Magadimane Traditional Authority and Ngwanamohube Traditional Authority (Bakgaga ba Mphahlele).

The realignment for which we are applying affects the jurisdiction of the Baroka ba Nkoana Traditional Authority (Middelpunt 420 KS, Umkoanesstad 419 KS and Blauwbloemetjieskloof 428 KS) and Magadimane Traditional Authority (Surbiton 115 KT). Additionally, several mines are located along the pipeline route, including RPM Twickenham, Cromex Mining Mecklenburg, Sefateng Chrome Mines, and ARM Bokoni Platinum Mine (Atok), previously owned by Anglo Platinum.

The primary access routes for Phase 2F will be the D4131, D4182, D4180, D4197, and R37. The R37 is a national road under the jurisdiction of the South African National Roads Agency (SANRAL), while the other roads are provincial roads maintained by the Roads Agency Limpopo (RAL).

The project description was disseminated to 13 project specialists and informed the impact assessment in **Section** Error! Reference source not found.. For this BA process, only one location project alternative (the preferred alternative), including the access roads for the authorised Phase 2F alignment, was assessed. However, other alternatives that were considered during the prefeasibility assessment, such as the pipeline route, are discussed in **Section 6**. The no-go alternative is also assessed.

The tables below provide general site information, including the coordinates of the proposed infrastructure and the affected farm portions.

Table 1-1: General Site information.

Province	Limpopo Province
District Municipality	Capricorn District Municipality and Sekhukhune District Municipality
Local Municipality	Fetakgomo Tubatse Local Municipality and Lepelle Nkumpi Local Municipality

Ward Number	15, 10, 33, 34, 35, 25
Closest towns	Polokwane
Current zoning	Common Zoning: Agricultural and Industrial zones Land-use: Mining, Industries, Rural residential, and/or communal land mostly under traditional authority.

Table 1-2: Coordinates of Project related infrastructure (corner points or start, middle, end).

Feature	Latitude (S)			Longitude (E)		
	Deg	Min	Sec	Deg	Min	Sec
Phase 2F Authorised Alignment (ref:14/12/16/3/3/1/1626)						
Start Point	24°	21'	07.63"	29°	45'	37.29"
Middle Point	24°	21'	08.93"	29°	57'	07.30"
End Point	24°	26'	29.34"	30°	05'	21.87"
Pipeline Realignment⁴						
Start Point	24°	17'	46.35"	29°	50'	32.39"
Middle Point	24°	18'	11.47"	29°	51'	13.64"
End Point	24°	18'	34.82"	29°	52'	07.06"
Proposed Access Roads⁵						
Access 2F1-01	24°	26'	37.76"	30°	03'	45.61"
Access 2F1-02	24°	26'	21.75"	30°	03'	12.30"
Access 2F1-03	24°	26'	12.90"	30°	02'	58.63"
Access 2F1-04	24°	26'	05.73"	30°	02'	54.05"
Access 2F1-05	24°	25'	51.36"	30°	02'	46.86"
Access 2F1-07	24°	25'	31.08"	30°	02'	32.86"
Access 2F1-08	24°	25'	22.67"	30°	01'	30.46"
Access 2F1-11	24°	23'	50.68"	29°	59'	41.91"
Access 2F1-14	24°	21'	30.88"	29°	58'	23.22"
Access 2F1-15	24°	21'	22.98"	29°	58'	10.48"
Access 2F1-17	24°	21'	08.31"	29°	57'	15.07"
Access 2F2-01	24°	21'	11.59"	29°	56'	58.12"
Access 2F2-02	24°	21'	09.54"	29°	56'	48.47"
Access 2F2-03	24°	21'	05.03"	29°	56'	33.33"
Access 2F2-04	24°	20'	58.03"	29°	56'	12.32"
Access 2F2-05	24°	20'	52.43"	29°	55'	54.56"
Access 2F2-06	24°	20'	45.57"	29°	55'	32.85"
Access 2F2-07	24°	20'	39.31"	29°	55'	12.17"
Access 2F2-08	24°	20'	29.80"	29°	54'	41.35"
Access 2F2-09	24°	20'	23.33"	29°	54'	21.03"
Access 2F2-13	24°	18'	34.99"	29°	51'	59.24"
Access 2F2-14	24°	18'	32.91"	29°	51'	55.51"
Access 2F2-15	24°	18'	24.28"	29°	51'	38.22"
Access 2F2-16	24°	18'	13.17"	29°	51'	16.95"
Access 2F2-17	24°	18'	02.63"	29°	51'	10.83"
Access 2F2-18	24°	18'	01.36"	29°	51'	05.70"
Access 2F2-20	24°	17'	47.75"	29°	50'	32.86"
Access 2F2-21	24°	17'	55.84"	29°	49'	52.98"
Access 2F2-22	24°	18'	16.90"	29°	48'	58.18"
Access 2F2-23	24°	18'	42.20"	29°	48'	20.31"
Access 2F2-24	24°	18'	44.06"	29°	48'	14.71"
Access 2F2-25a (New)	24°	19'	03.19"	29°	47'	27.13"
Access 2F2-25	24°	18'	53.09"	29°	46'	53.48"
Access 2F2-27	24°	19'	35.58"	29°	46'	34.30"
Access 2F2-26	24°	19'	38.07"	29°	46'	33.04"
Access 2F2-28 (A leg to Spoil Site)	24°	19'	46"	29°	46'	27.93"
Access 2F2-29	24°	20'	11.61"	29°	45'	55.34"
Access 2F2-33 (To spoil site)	24°	18'	10.68"	29°	51'	37.21"
Access 2F2-34 (To site establishment)	24°	18'	17.15"	29°	51'	43.63"

The table below includes the length and width details of the proposed access roads.

Table 1-3: Access roads details.

⁴ Re-alignment that triggers listed activities.

⁵ These are the coordinates for the points where the proposed access road intersects with the proposed pipeline.

Access Road No.	Main Road Name – Branching off	Access Rd Width (m)	Access Rd Length (m)
Access 2F1-01	D4180	7	37.947
Access 2F1-02	-	7	32.658
Access 2F1-03	no name	7	41.357
Access 2F1-04	D4180	7	32.151
Access 2F1-05	D4180	7	33.677
Access 2F1-07	D4169	7	44.506
Access 2F1-08	D4180	7	31.854
Access 2F1-11	D4180	7	23.37
Access 2F1-14	D4180	7	36.218
Access 2F1-15	D4180	7	31.887
Access 2F1-17	D4180	7	16.392
Access 2F2-01	D4180	7	41.402
Access 2F2-02	D4180	7	27.907
Access 2F2-03	D4180	7	43.186
Access 2F2-04	D4180	7	11.967
Access 2F2-05	D4180	7	13.555
Access 2F2-06	D4181	7	15.25
Access 2F2-07	D4182	7	10.888
Access 2F2-08	D4183	7	28.138
Access 2F2-09	D4184	7	49.732
Access 2F2-13	D4185	7	42
Access 2F2-14	-	7	37.345
Access 2F2-15	No Name	7	35.074
Access 2F2-16	D4197	7	40.662
Access 2F2-17	-	7	23.843
Access 2F2-18	-	7	37.014
Access 2F2-20	No name	7	31.05
Access 2F2-21	-	7	25.9
Access 2F2-22	-	7	26.788
Access 2F2-23	D4197	7	17.78
Access 2F2-24	2F2-24	7	13.934
Access 2F2-25a (New)	No Name	7	38.445
Access 2F2-25	D4190	7	39.463
Access 2F2-27	D4190	7	44.808
Access 2F2-26	-	7	12.212
Access 2F2-28 (A leg to Spoil Site)	-	7	24.625
Access 2F2-29	-	7	51.738
Access 2F2-33 (To spoil site)	-	7	74.815
Access 2F2-34 (To site establishment)	-	7	73.9

Table 1-4: Description of affected farm portions/properties

2F Affected Properties					
ID	Parent Farm Name	Parcel No	Portion No	Pipeline & Servitudes	Access Route
TOKS00000000042800000	BLAUWBLOEMETJESKLOOF 428 KS	428	0	Yes	Yes
TOKS00000000046200000	SCHOONOORD 462 KS	462	0	Yes	Yes
TOKS00000000047500001	KOPPIESKRAAL 475 KS	475	1	Yes	
TOKS00000000046600001	PASCHAS KRAAL 466 KS	466	1	Yes	Yes
TOKT00000000011700002	FOREST HILL 117 KT	117	2	Yes	
TOKT00000000011700000	FOREST HILL 117 KT	117	0	Yes	
TOKS00000000046100000	DAL JOSAPHAT 461 KS	461	0	Yes	Yes
TOKS00000000041900000	UMKOANESSTAD 419 KS	419	0	Yes	Yes
TOKS00000000042200000	DIAMAND 422 KS	422	0	Yes	Yes
TOKS00000000041900007	UMKOANESSTAD 419 KS	419	7	Yes	
TOKS00000000046500000	KLIPFONTEIN 465 KS	465	0	Yes	Yes
TOKS00000000046400000	BRAKFONTEIN 464 KS	464	0	Yes	Yes
TOKS00000000047500000	KOPPIESKRAAL 475 KS	475	0	Yes	
TOKT00000000011400000	TWICKENHAM 114 KT	114	0	Yes	Yes
TOKT00000000011500010	SURBITON 115 KT	115	10	Yes	Yes
TOKT00000000011500000	SURBITON 115 KT	115	0	Yes	Yes
TOKS00000000042000000	MIDDELPUNT 420 KS	420	0	Yes	Yes
TOKT00000000011500000	SURBITON 115 KT	115	0	Yes	
TOKT00000000011500000	SURBITON 115 KT	115	0	Yes	

Note: The grey rows represent the affected properties associated with the pipeline realignments.

1.6 ENVIRONMENTAL IMPACT ASSESSMENT PROJECT TEAM

ZNJV has selected a team of experienced specialists and multi-disciplinary practitioners to execute this project (see **Table 1-5**). Full Curricula Vitae (CVs) of the EAP and project team are available in **Annexure A**. Specialist CVs are included in the respective specialist reports in **Annexure D**.

Table 1-5: BA Project Team

Role	Consultant	Company
EIA and Project Management		
Project Leader & Lead EAP	Deon Esterhuizen	ZNJV
Project Staff (EAP)	Natanya Whitehorn	ZNJV
Project Staff (EAP)	Zinzi Portia Xakayi	ZNJV
Sub-consulting Specialists		
Agricultural Compliance Statement	Johann Lanz	Soilsza
Heritage and Archaeology	Polke Birkholtz	PSG Heritage
Palaeontology	Elize Butler	Banzai Environmental
Freshwater Biodiversity Assessment	Paul Da Cruz	Scientific Aquatic Services
Terrestrial Biodiversity Assessment	Willem de Frey and Lukas Niemand	EkoInfo CC Environmental Consultancy
Social Impact Assessment	Valentina Kruger	Zutari (Pty) Ltd
Visual and Landscape Assessment	Elmie Weideman	Create Landscape
Civil Aviation Compliance Statement	Hein Reid	Parivision
Defence Compliance Statement		
Air Quality Impact Assessment	Uno Neveling	EHRCON
Traffic Impact Assessment	Vera Mpofu	Zutari (Pty) Ltd
Noise Impact Screening	Morné de Jager	Enviro Acoustic Research
Hydrology Impact Assessment	Ivan Jenkins	Zutari (Pty) Ltd

1.7 INDEPENDENCE

The NEMA EIA Regulations of 2014 (GN R982 of 2014) provide general requirements for EAPs and specialists to reduce the potential for bias in the environmental process. The first requirement is that the EAP should be independent [Regulation 13(1)(a) of GN R982 of 2014].

Neither ZNJV nor any of its sub-consultants are subsidiaries or affiliated to the OMMP-BRWSP nor is the OMMP-BRWSP a subsidiary of ZNJV. Furthermore, ZNJV does not have any interests in secondary developments that may arise out of the authorisation of the proposed development. The EAP and specialists' declarations of independence are appended respectively in **Annexures I and D**.

1.8 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER, THE EIA PROJECT TEAM AND THEIR EXPERTISE TO CONDUCT THE BA PROCESS

Annexure A includes the CVs for the environmental team from ZNJV. The ZNJV environmental team for this project includes Deon Esterhuizen, Natanya Whitehorn and Zinzi Portia Xakayi. Their experience and capabilities are summarised below.

DEON ESTERHUIZEN has 30 years' experience in water related projects, which include water resource management, water quality management, water use registration and licensing of water users, including project management of multi-disciplinary studies. He also has extensive experience in a wide-range of environmentally related projects, processes and applications for private, commercial and industrial clients, in addition to local, provincial and national government departments.

He is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP **registration no. 400154/09**) and is registered as a professional EAP with the Environmental Assessment Practitioners' Association of South Africa (EAPASA **registration no. 2022/5762**).

NATANYA WHITEHORN is as an EAP at Zutari. She specialises in environmental auditing and her expertise consists of risk assessment, environmental monitoring and social impact assessments (SIAs), including the study of human interaction with one another and the natural environment. She has experience in fieldwork for impact assessments, environmental monitoring as well as the PPP, where, she has facilitated and translated at various landowner, stakeholder and public meetings and also gained experience in environmental compliance monitoring by working on a large construction project. Further significant experience includes her role as Project Manager (Environmental Lead) on various integrated environmental management (IEM) processes such as environmental impact assessments (EIAs), BARs and the development of environmental management plans (EMPs).

She has previous working experience in geo-informatics and geographic information systems (GIS). She has more than a decade of experience working with GIS, which she has gained whilst working on projects for the government, local authorities as well as the private sector. She has also gained skills in spatial representation and interpretation through her involvement in the engineering environment. Natanya has specialised in spatial analysis, data processing and mapping while her technical responsibilities include inter alia the evaluation of data, digitising, editing and converting spatial data and non-spatial data from various formats and manipulating data in Esri ArcMap with extension (XTools, ET Geowizards, ET Geotools), ArcView 3.2 and Planet GIS. She has research experience on biodiversity, natural resources management, and human developmental issues and tutoring experience at a tertiary institution in the field of Information Science (IS).

Natanya obtained a Bachelor's degree (Honours) in Geography, majoring in Geo-Informatics and Strategic Environmental Planning, from the University of Johannesburg, South Africa, in 2002. She has also completed a South African Auditor and Training Certification Authority (SAATCA) Certified ISO 14001 Lead Auditors Course. She is a member of the International Association for Impact Assessment South Africa (IAIASa) as well as the Geo-Information Society of South Africa (GISSA).

She is registered with EAPASA (**registration no. 2019/1526**).

ZINZI PORTIA XAKAYI is a proficient EAP at Zutari with extensive experience in diverse environmental projects. Her responsibilities include the compilation of EMPs, BARs, EIA Reports, Environmental Screening Reports, Part 1 and Part 2 EA amendment applications and conducting Water Use Licence (WUL) applications. With a background in geo-informatics and GIS, Zinzi brings two years of invaluable experience gained in the private sector. Her specialization in spatial analysis, data processing, and mapping is complemented by technical skills such as data evaluation, digitizing, editing, and converting spatial and non-spatial data using tools like Esri ArcMap, GeoMedia, and QGIS.

Since joining Zutari, Zinzi has played a role in renewable energy projects, contributing to the compilation of BARs, EIAs, EMPs, and conducting PPP. Her expertise extends to feasibility screenings for photovoltaic (solar PV) projects in Limpopo, and she serves as an environmental compliance officer (ECO) for green building projects in Gauteng, where she conducts monthly audits and compiles ECO audit reports.

Furthermore, Zinzi has experience in managing projects, which includes conducting client meetings, meeting with various departments and competent authorities, sourcing information, collaborating with project teams, compiling technical and financial proposals, and preparing reports. She takes an active role in coordinating PPP and engaging with stakeholders.

She is registered as a candidate with the SACNASP (**registration no. 155265**) and is registered as a professional EAP with EAPASA (**registration no. 2022/6136**).

1.9 ASSUMPTIONS, LIMITATIONS AND GAPS IN KNOWLEDGE

In undertaking the investigation and compiling the BAR, the following has been assumed:

- ▶ The information provided by LWUA, on behalf of DWS, is accurate and no information that could change the outcome of the BA process has been withheld.
- ▶ All information provided by the appointed specialists is complete, accurate and true.
- ▶ The scope of this investigation is limited to assessing the environmental impacts associated with the proposed construction of Phase 2F (i.e., the pipeline realignment) and its associated infrastructure.
- ▶ The BA process is based on best practice guidelines which were available at the time of writing this report.
- ▶ Additional permits or authorisations required for the development in terms of other legislation will be dealt with by the developer outside this process.

Any gaps that have been encountered by the specialists are identified in their respective assessments (**Annexure D**).

2 LEGAL AND PLANNING CONTEXT

There are a host of legal and policy documents and guidelines to consider when undertaking such a project. These have been detailed in the sections that follow.

2.1 RELEVANT LEGISLATION

An overview of the relevant legislation is provided in **Table 2-1** and further detail is provided in subsections to follow.

Table 2-1: Relevant legislation

Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
The Republic of South Africa Constitution Act, No. 108 of 1996 ("the Constitution")	The Constitutional Court	The environmental right contained in Section 24 of the Constitution provides that everyone is entitled to an environment that is not harmful to his or her well-being.
National Development Plan: A Vision for 2030	National Government	The South African Government through the Presidency has published a National Development Plan (NDP). The Plan aims to eliminate poverty and reduce inequality by 2030. The Plan has the target of developing people's capabilities to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety. It proposes the following strategies to address the above goals: 1. Creating jobs and improving livelihoods; 2. Expanding infrastructure; 3. Transition to a low-carbon economy; 4. Transforming urban and rural spaces; 5. Improving education and training;

		6. Providing quality health care; 7. Fighting corruption and enhancing accountability; and 8. Transforming society and uniting the nation. Important, one of the enabling milestones was to ensure that all South Africans have access to <u>clean running water in their homes</u> by 2023. One of the proposed critical actions is public infrastructure investment at 10% of gross domestic product (GDP), financed through tariffs, public-private partnerships, taxes and loans focus on transport, energy and water.
Fetakgomo Local Municipality: Integrated Development Plan (IDP), Final 2024/2025	FTLM	The IDP outlines the strategies and goals for future development within the FTLM. The Municipality's IDP emphasises the urgent need for proper water treatment, particularly through the active monitoring of water sources, due to the high levels of contaminants present in the water used by rural communities. This is especially concerning as approximately 39% of households rely on rivers and other natural sources for water. Additionally, around 22.2% of households depend on piped water within their yards, while 21.5% rely on piped water at community standpipes.
Lepelle-Nkumpi Local Municipality: Integrated Development Plan (IDP), Draft 2024/2025	LNLM	The IDP references the Olifantspoort supply scheme and the intervention by the Minister of DWS, who established the Olifants Management Model to address the challenges associated with the Olifantspoort project. The objective of the project is to ensure the sustainable provision of water to approximately 534,000 households within the Lepelle Nkumpi and Polokwane Local Municipalities.
Aviation Act, No. 74 of 1962 Civil Aviation Act, No. 13 of 2009 (CAA)	South African Civil Aviation Authority (SACAA)	The DFFE Screening Tool report identifies the project area as a high-sensitivity site from a Civil Aviation perspective and, per the "Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations" (GN 320 of 20 March 2020) only a specialist compliance statement is required. The report further states that the project footprint falls within a dangerous and restricted airspace area, as demarcated, and is within 8 km of other civil aviation aerodromes. As these new changes involve an approximately 3.35 km pipeline realignment, along with other deviations along the pipeline alignment that do not trigger listed activities on their own, as well as access roads for the <u>entire</u> Phase 2F alignment, the EAP does not consider any further assessment necessary. No tall structures that could pose constraints to flight are planned. The proposed changes will not restrict flight operations, particularly with regard to restricted airspace or nearby civil aviation aerodromes. Furthermore, there are no concerns regarding height restrictions, as the proposed structures will not exceed 10 m, remaining below the minimum altitudes of any obstacle limitation surfaces. The CAA will, however, still be consulted as a stakeholder.
Conservation of Agricultural Resources Act, No. 43 of 1983 (CARA)	Department of Agriculture, Land Reform and Rural Development (DALRRD)	The purpose of this Act is to ensure that the natural agricultural resources of South Africa are conserved through maintaining the production potential of land, combating, and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants. As such, as part of the BA process, recommendations

		will be made to ensure that measures are implemented to maintain the agricultural production of land, prevent soil erosion, and protect any water bodies and natural vegetation on site. The DFFE Screening Tool report identified the proposed project footprint as having very high sensitivity from an agricultural perspective. Although the majority of the servitudes have been encroached upon by settlements, the Applicant must, as a precautionary measure, ensure the control of undesirable invasive alien plants listed in the regulations.
Environmental Conservation Act, No. 73 of 1989 (ECA)	DFFE	Noise impacts associated with the construction of the pipeline, the BPR and associated infrastructure are generally confined to the construction phase. In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in GG No. 13717 dated 10 January 1992) (NCR) were promulgated. The NCRs were revised under GN Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations, unless provincial noise control regulations exist. No approval is required under the national NCRs. Furthermore, noise mitigation measures are to be included in the EMP. Refer to Annexure D12 for a detailed assessment of noise impacts. NB: The ORWRDP-2 received a positive RoD in 2006 in terms of ECA. A RRoD (ref no.: 03/2/4 and 12/12/20/553) was granted on 16 October 2006 (refer to Annexure J).
Mineral and Petroleum Resources Development Act, No. 28 of 2002 (MPRDA)	Department of Mineral Resources and Energy (DMRE)	Section 53 of the MPRDA, states that any person who intends to use the surface of any land in a manner which may be contrary to the objectives of the MPRDA or is likely to impede such objects must apply to the Minister for approval in the prescribed manner. As per the requirements of the MPRDA, all mining activities, including the extraction of material from borrow pits and quarries also require authorisation from DMRE. <u>No mining permits for borrow pits</u> have been included in this application. Several mines are located along the pipeline route, including RPM Twickenham, Cromex Mining Mecklenburg, Sefateng Chrome Mines, and ARM Bokoni Platinum Mine (Atok), previously owned by Anglo Platinum. Only one planned access road falls within a property where Twickenham Mine holds mineral rights, specifically Twickenham No. 114 KT. However, no mining activities are planned for this site that would marginalise or impact the proposed project. Note: A Section 53 approval from the DMRE is currently underway, separate from this application. This process serves to confirm that the proposed activities will not result in the sterilisation of any mineral resources within the proposed project area.
National Environmental Management Act, No. 107 of 1998 (NEMA)	► DFFE – CA ► LEDET – Commenting Authority	NEMA establishes the principles for decision-making on matters affecting the environment. Section 2 of the Act sets out the National Environmental Management principles, which apply to the actions of organs of state that may significantly affect the environment. Section 28(1) states that “every person who causes or may cause significant pollution or degradation of the

		<i>environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such pollution or degradation cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution or degradation.</i> Chapter 6 (IEM) includes sections that provide for making regulations to deal with EA of specified types of activities through EIA processes. Several listed activities in terms of NEMA Listing Notice 1 (GN R983 of 2014) and Listing Notice 3 (GN R985 of 2014), are anticipated to be triggered for the proposed activities of Phase 2F, and these need to be authorised. Based on the listed activities triggered, the application for EA will have to follow a BA process as set out in Regulations 19 - 20 of the EIA Regulations of 2014 (GN R982 of 2014).
National Environmental Management: Air Quality Act, No. 39 of 2004 (NEM:AQA)	Local Municipality (FTLM) or National Air control officer when affected ambient air is trans-boundary (trans-provincial).	The Act aims to regulate and protect the environment by providing reasonable measures for the prevention of air pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management, and control by all spheres of government; for specific air quality measures; and for matters incidental thereto. No activities that would require an Atmospheric Emissions License (AEL) are envisaged. Specific to the project are the regulations about the control of fugitive noise and dust emissions that may arise from the project activities.
National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEM:BA)	DFFE	The act calls for the management of all biodiversity within South Africa. Phase 2F is situated in Sekhukhune land Centre of Floristic Endemism and it also forms part of an Ecological Support Area (ESA) and Terrestrial CBAs. These areas are considered to be sensitive, and it is possible Red Data Species may occur in these areas. Permit applications must be made to the relevant authority for the removal of any Red Data or Protected Species found in the proposed alignment and construction areas. These permit applications must be made in conjunction with requirements of the Limpopo Environmental Management Act, No. 7 of 2003 (LEMA) as well as the National Forests Act, No. 84 of 1998 (NFA). In this context, the DFFE screening tool report lists 12 plant species of conservation concern (SCC) whose presence or suitable habitat had to be verified during the site visit. The identity of four of the 12 species cannot be disclosed due to potential threat to them. The one species is an herbaceous climber with a rootstock, two are succulent shrubs and the fourth is a herbaceous perennial (geophyte). The other eight species are <i>Asparagus furei</i>, <i>Asparagus hirsutus</i>, <i>Asparagus sekukuniensis</i>, <i>Combretum petrophilum</i>, <i>Plectranthus venter</i>, <i>Polygala sekhukhuniensis</i>, <i>Raphionacme villicorona</i> and <i>Seersia batophylla</i>. Only one of the twelve species listed is not endemic to Sekhukhuneland, while 11 of the species are classified as being threatened Red Data plants, specifically Vulnerable (VU) (10) and Critically Endangered (CR) (1).

		During the site visit, only one of the twelve species was verified, namely the shrub <i>Seersia batophylla</i>. It was recorded within three of the plots surveyed, but not specifically along the 2F proposed servitude. Removal and control of all alien invasive plant species needs to be done in accordance with the Invasive Species Regulations, GN R1020 of 2020: Alien and Invasive Species Regulations, 2020.
Limpopo Environmental Management Act, No. 7 of 2023 (LEMA)	LEDET	Flora rescue and relocation permits are required as discussed under NEM:BA. Plant permits for protected species under the LEMA must be obtained accordingly prior to removal or relocation.
National Environmental Management: Waste Act, No. 59 of 2008 (NEM:WA)	▶ LEDET – General Waste ▶ DFFE - Hazardous Waste	The NEM:WA provides for the regulation of waste and its responsible management and disposal. The List of Waste Management Activities specifies activities that require a Waste Management License (WML). These activities, together with the listed activities in terms of the NEMA EIA Regulations of 2014, may be authorised through an integrated EIA process. Due to the nature of the proposed activities, it is anticipated that a WML will not be required. The following notices should be considered: ▶ GN R634 of 2013: Waste classification and Management Regulations (WCMR) ▶ GN R635 and GN R636 of 2013: National Norms and Standards for Disposal of Waste to Landfill
National Forests Act, No. 84 of 1998, as amended (NFA)	DFFE	The NFA provides protection to tree species that may not be cut, destroyed, damaged or removed unless a permit has been granted by the DFFE. In this context, the following national protected trees were observed within the proposed temporary disturbance servitude and surrounding landscape: 1. <i>Sclerocarya birrea</i> subsp. <i>caffra</i> (Marula tree). 2. <i>Balanites maughamii</i> subsp. <i>maughamii</i> (Torchwood). 3. <i>Boscia albitrunca</i> (Shepard's Tree). 4. <i>Combretum imberbe</i> (Leadwood). Tree permit applications will be compiled for removing and/or relocating any protected trees.
National Heritage Resources Act, No. 25 of 1999 (NHRA)	▶ South African Heritage Resources Agency (SAHRA) ▶ Limpopo Provincial Heritage Resources Authority (LIHRA) – provincial heritage authority	In terms of the NHRA, any person who intends to undertake “any development which will change the character of a site exceeding 5,000 m² in extent, or involving three or more existing erven or subdivisions thereof”, “the construction of a road, powerline, pipeline exceeding 300 m in length” or “the rezoning of site larger than 10,000m² in extent...” must at the very earliest stages of initiating the development notify the responsible heritage resources authority, namely SAHRA or the relevant provincial heritage agency (LIHRA in this case). These agencies would, in turn, indicate whether or not a full Heritage Impact Assessment (HIA) would need to be undertaken. Section 38(8) of the NHRA specifically excludes the need for a separate HIA where the evaluation of the impact of a development on heritage resources is required in terms of an EIA process. Since the pipeline realignment segment is expected to span over 300 m in length (approximately 3,350 m), a HIA will be required.

		There are significant heritage resources along the pipeline alignment as a result of the rich ethnology and history of the area. The features resulting from this activity are displayed as stone and Iron Age tools, remnants of old buildings and structures and a number of graves.
National Protected Areas Expansion Strategy (2008) (NPAES) & National Environmental Management: Protected Areas Act, No. 57 of 2003 (NEM:PAA)	DFFE	The NPAES for South Africa sets out targets for protected area expansion, identifies possible expansion areas and recommends a mechanism for protected area expansion. Protected areas in terms of the NEM:PAA are considered 'formal' protected areas in terms of the NPAES. The NPAES further identifies 'National Parks', 'informal protected areas' and 'focus areas'. Some proposed access roads are located within Terrestrial CBAs and the endangered Sekhukhune Plains Bushveld. Additionally, the proposed pipeline realignment is within ± 5 km of a protected area, the Potlake Nature Reserve.
National Road Traffic Act, No. 93 of 1996 (NRTA)	▶ SANRAL – national roads ▶ RAL ▶ Limpopo Department of Transport and Community Safety	Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed in the Regulations of the NRTA. SANRAL, RAL and the Limpopo Department of Transport and Community Safety should be provided with an opportunity to review and comment on the EIA process.
National Veld and Forest Fire Act, No. 101 of 1998	DFFE	The purpose of the Act is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. Fire protection has been considered in the EMPr. The Act sets out the responsibilities of landowners or persons in control of the land which includes: 1. Prepare firebreaks on their side of the boundary if there is a reasonable risk of wildfire. 2. Have such equipment, protective clothing and trained personnel for extinguishing fires as are: • prescribed (in the regulations) • if there are no regulations, reasonably required in the circumstances 3. Take all reasonable steps to notify the Fire Protection Officers (FPO) of the local Fire Protection Association (FPA) (if there is one) when a fire breaks out. 4. Do everything in their power to stop the spread of the fire.
National Water Act, No. 36 of 1998 (NWA)	DWS	The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. Section 21 of the NWA specifies the water uses which require authorisation from the DWS in terms of the NWA before they may commence. Particular forms of development within a watercourse or wetland or within a specified distance of a wetland must be authorised through a General Authorisation (GA) or a WUL.

		LWUA is currently applying for a WUL to authorise the triggered water uses resulting from the construction of Phase 2F and the associated infrastructure, as required under Section 21 of the NWA.
Traditional Leadership and Governance Framework Amendment Act, No. 23 of 2009	▶ Limpopo Department of Cooperative Governance, Human Settlements and Traditional Affairs (CoGHSTA) ▶ SDM	The Act provides for the establishment and recognition of Traditional Councils, defines the roles and powers of traditional leaders, and provides for dispute resolution and the establishment of a Commission on Traditional Leadership Disputes and Claims. The authority of the Tribal Authorities in the project area, in terms of acting on behalf of communities in their area of jurisdiction during land acquisition negotiations and granting access for construction work, therefore derives from the provisions of this Act. The authorised pipeline route also crosses the jurisdiction of ten Traditional Authorities: Nareng Thokwane Traditional Authority, <u>Magadimane Traditional Authority</u>, Roka Mashabela (Ga Mongatane) Traditional Authority, Roka Phashaskraal Traditional Authority, <u>Baroka ba Nkoana Traditional Authority</u>⁶, Maisela Manotoane Traditional Authority, Baroka ba Selepe Traditional Authority, Nareng Thokwane Traditional Authority, Magadimane Traditional Authority and Ngwanamohube Traditional Authority (Bakgaga ba Mphahlele). Therefore, these Tribal Authorities will have to be consulted during the PPP and when construction commences.
Restitution of Land Rights Act, No. 22 of 1994	Commission on Restitution of Land Rights.	The Act provides a legal framework for the restitution of land to people who were forcibly removed from their land or dispossessed of it under previous discriminatory laws or practices. The Act allows for claims to be made by individuals, communities, or families who were dispossessed of their land after 19 June 1913. It establishes a Commission on Restitution of Land Rights to investigate and assess claims, and to recommend the restoration of land or alternative forms of compensation. The Act was amended in 2014 to extend the deadline for lodging claims to 30 June 2019 and to provide for the appointment of a Chief Land Claims Commissioner to oversee the process of restitution. The amendment also provides for the reopening of the lodgement period for certain claims that were previously rejected, as well as the introduction of a special dispensation for farm dwellers and labour tenants. There are parcels of land claimed by individuals on the footprint of the proposed Phase 2F infrastructure.
Prevention of Illegal Eviction from and Unlawful Occupation of Land Act, No. 19 of 1998	Department of Rural Development and Land Reform	As we are developing in peri urban areas and rural and informal settlements, we are to ensure we do not encourage illegal occupation on the projects land and also, we do not develop on the land until a formal agreement has been implemented. Additionally, caution must be taken to ensure that no person is evicted illegally from occupying the project servitudes.

⁶ The pipeline realignments affect the Farm Middelpunt 420 KS, Farm Umkoanesstad 419 KS, Farm Surbiton 115 KT, and Farm Blauwbloemetjieskloof 428 KS, which fall under the Baroka ba Nkoana Traditional Authority and the Magadimane Traditional Authority.

2.2 LISTED ACTIVITIES IN TERMS OF NEMA

The proposed project considered in this application triggers activities listed in the 2014 EIA Regulations (GN R982 of 2014) as indicated in **Table 2-2**.

Table 2-2: Listed activities triggered by the preferred alternative for the proposed project

Activity No(s):	Listed Activity	Description of how the proposed project applies to the listed activity relates
BA Activity(ies) as set out in Listing Notice 1 (GN983 of 2014) of the EIA Regulations, 2014		
LN 1 Act 9 (i)(ii)	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— <u>(i) with an internal diameter of 0,36 metres or more; or</u> <u>(ii) with a peak throughput of 120 litres per second or more.</u>	The pipeline realignments are estimated to exceed 1,000 m (approximately 3,359 m) in length, with an internal diameter of 1.2 m. The daily water transfer through the pipeline will be 1.563 m ³ /s (equivalent to 1,563 l/s). This is all raw water under gravity flow.
LN 1 Act 12 (ii)(a)(c)	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or <u>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</u> where such development occurs— <u>(a) within a watercourse;</u> (b) in front of a development setback; or <u>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</u>	Access roads 1-08, 1-10, and 1-13 in the Motse River catchment, as well as access roads 1-17, 2-6, 2-8, and 2-9 in the Rapholo River catchment - located in the central part of the 2F alignment - are situated within 32 m of a watercourse, delineated as non-perennial by the freshwater biodiversity specialist. Similarly, drainage lines in the Rapholo River catchment, located in the north-western central part of the 2F alignment and associated with the proposed pipeline deviation and access roads 2-13 and 2-22, also fall within 32 m of a watercourse classified as non-perennial. Collectively, these access roads are expected to exceed a physical footprint of 100 m ² . Furthermore, as highlighted in the Hydrology Impact Assessment report, certain sections of the alignment, including the access roads, intersect the floodlines and, in some instances, are located within 32 m of these floodlines. The combined physical footprint of these deviations is expected to exceed 100 m ² .
LN1 Act 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 development, including associated infrastructure such as the pipeline and the access proposed access roads, will be located within a watercourse or within 32 m of a watercourse. This may require infilling or excavation, and as such, the relevant listed activity may be triggered.
LN 1 Act 24 (ii)	The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or <u>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</u>	The proposed development will require the development of new roads for construction and operation. The current access roads layout is conceptual. Detailed road networks will be designed later. However, roads are likely to have dimensions that fall within the ambit of the activity. The details of these roads, including their lengths and widths, are provided in a tabular format in Table 1-3 . NB: The proposed access road alternatives, individually, do not exceed 8 m in width. However, collectively - when considering all

		access roads associated with this project - the combined width exceeds this threshold, thereby triggering the relevant listed activity. Each access road is proposed to have an individual width of 7 m.
LN1 Act 56 (ii)	The <u>widening of a road by more than 6 metres</u>, or the lengthening of a road by more than 1 kilometre — (i) where the existing reserve is wider than 13,5 meters; or (ii) <u>where no reserve exists, where the existing road is wider than 8 metres;</u> excluding where widening or lengthening occur inside urban areas.	The project area is located within farms with existing farm roads. The Applicant may need to widen the identified access roads that are existing farm roads by more than 6 m. The details of these roads, including their lengths and widths, are provided in a tabular format in Table 1-3. Each access road is proposed to have an individual width of 7 m.
BA Activity(ies) as set out in Listing Notice 3 (GN985 of 2014) of the EIA Regulations, 2014		
LN3 Act 4(e)(i)(ee)(gg)	The development of a road wider than 4 metres with a reserve less than 13,5 metres. e. Limpopo i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an international convention; (ee) <u>Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</u> (ff) Core areas in biosphere reserves; or (gg) <u>Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas.</u>	The proposed development will require the development of new roads (construction and operational phase) that are wider than 4 m (the access road widths are anticipated to be 7 m wide). These roads will be located within Terrestrial CBAs, and will require vegetation clearance or disturbance within these areas. The northern section of the focus area, including access points 2F2-29, 2F2-28, 2F2-27, 2F2-26, 2F2-25, 2F2-25a, 2F2-24, and 2F2-23, falls within areas classified as CBA 1. Similarly, the central section of the alignment, along with access points 2F2-09, 2F2-08, 2F2-03, 2F2-02, and 2F1-17, is also designated as CBA 1. The southern section of the alignment, including access points 2F1-02, 2F1-03, and 2F1-04, is classified as CBA 2. Additionally, several of the proposed access roads along the pipeline realignment section are located within approximately 5 km of the Potlake Nature Reserve, a protected area.
LN3 Act 12 (e)(i)(ii)	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. e. Limpopo i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	The proposed development <i>may</i> require vegetation clearance of indigenous vegetation within the Sekhukhune Plains Bushveld, which is classified as “Endangered” in the Revised National List of Ecosystems that are Threatened and in need of Protection (GN R2747 of 2022) under the NEM:BA. The development of the proposed access roads may require the clearing of indigenous vegetation, which will take place in areas classified as Terrestrial CBAs. The anticipated vegetation clearance is expected to exceed 300 m². The northern section of the focus area, including access points 2F2-29, 2F2-28, 2F2-27, 2F2-26, 2F2-25, 2F2-25a, 2F2-24, and 2F2-23, falls within areas classified as CBA 1. Similarly, the central section of the alignment, along with access points 2F2-09, 2F2-08, 2F2-03, 2F2-02, and 2F1-17, is also designated as CBA 1. The southern section of the alignment,

		including access points 2F1-02, 2F1-03, and 2F1-04, is classified as CBA 2.
LN 3 Act 14 (ii)(a)(c)(e)(i)(ff)(hh)	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or <u>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</u> where such development occurs— <u>(a) within a watercourse;</u> <u>(b) in front of a development setback; or</u> <u>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u> excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. e. Limpopo i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas identified in terms of an international convention; <u>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</u> (gg) Core areas in biosphere reserves; or <u>(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.</u>	Access roads 1-08, 1-10, and 1-13 in the Motse River catchment, as well as access roads 1-17, 2-6, 2-8, and 2-9 in the Rapholo River catchment - located in the central part of the 2F alignment - are situated within 32 m of a watercourse, delineated as non-perennial by the freshwater biodiversity specialist. Similarly, drainage lines in the Rapholo River catchment, located in the north-western central part of the 2F alignment and associated with the proposed pipeline deviation and access roads 2-13 and 2-22, also fall within 32 m of a watercourse classified as non-perennial. Collectively, these access roads are expected to exceed a physical footprint of 10 m². Furthermore, as highlighted in the Hydrology Impact Assessment report, certain sections of the alignment, including the access roads, intersect the floodlines and, in some instances, are located within 32 m of these floodlines. The combined physical footprint of these deviations is expected to exceed 100 m². The pipeline and associated infrastructure is located outside urban areas, with areas of the development site identified as Terrestrial CBAs. Additionally, some of the proposed access roads along the pipeline realignment section are located within approximately 5 km of the Potlake Nature Reserve, a protected area.
LN3 Act 18(e)(i)(ee)(gg)(hh)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. e. Limpopo i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;	There are existing roads along the proposed footprint of the proposed pipeline. These roads will be incorporated into the design as far as possible. Upgrades to these roads will be required. The roads may need to be widened by more than 4 m. The pipeline is located outside urban areas, with areas of the development site identified as Terrestrial CBAs. Additionally, some of the proposed access roads along the pipeline realignment section are located within approximately 5 km of the Potlake Nature Reserve, a protected area.

	(dd) Sites or areas identified in terms of an international convention; <u>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</u> (ff) Core areas in biosphere reserves; (gg) <u>Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or</u> (hh) <u>Areas within a watercourse; or within 100 metres from the edge of a watercourse.</u>	Furthermore, access roads 1-08, 1-10, and 1-13 in the Motse River catchment, as well as access roads 1-17, 2-6, 2-8, and 2-9 in the Rapholo River catchment - located in the central part of the 2F alignment - are situated within 32 m of a watercourse, delineated as non-perennial by the freshwater biodiversity specialist. Similarly, drainage lines in the Rapholo River catchment, located in the north-western central part of the 2F alignment and associated with the proposed pipeline deviation and access roads 2-13 and 2-22, also fall within 32 m of a watercourse classified as non-perennial.
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2.3 NATIONAL WATER ACT (NO. 36 OF 1998) (NWA)

The NWA requires all water uses to be licensed with the CA, the DWS in this case. Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

In accordance with GN 509 of 2016, a regulated area of a watercourse in terms of water uses as listed in Section 21 (c) and 21(i) is defined as:

- the outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or
- a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.

The ZNJV is currently undertaking a Water Use License Application (WULA) for the entire Phase 2F infrastructure, which includes the already authorised pipeline. The following water uses, as outlined in Section 21 of the Act, are triggered by the proposed project activities:

Table 2-3: Triggered water uses in terms of Section 21 of the NWA

Notice No.	Activity No.	Description of Water Use
NWA, No. 36 of 1998	Section 21 (b)	Storage of water • Storing of water from Klipfontein Break Pressure Dam.
NWA, No. 36 of 1998	Section 21 (c)	Impeding or diverting the flow of water in a watercourse • Pipeline crossings of rivers, streams, and dongas.
NWA, No. 36 of 1998	Section 21 (i)	Altering the bed, banks, course, or characteristics of a watercourse. • Energy Dissipaters for storm water control. • Reno Mattresses for storm water control.
NWA, No. 36 of 1998	Section 21 (f)	Discharging of water containing waste into a surface water resource. • Discharge of pipe pressure testing water through scours as well as for intermittent maintenance purposes. • Discharging wastewater from the Olifantspoort WTW. • Septic tank at Klipfontein Pump Station.

2.4 NATIONAL HERITAGE RESOURCES ACT, NO. 25 OF 1998 (NHRA)

The NHRA provides an integrated system for the management of national heritage resources, and empowers civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities that require the undertaking of a HIA.

Section 38: Heritage Resources Management

1. *"Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development categorised as –*
 - a. *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 30m in length.*
 - b. *the construction of a bridge or similar structure exceeding 50m in length.*
 - c. *any development or other activity which will change the character of a site –*
 - i) *exceeding 5,000m² in extent; or*
 - ii) *involving three or more existing erven or subdivisions thereof; or*
 - iii) *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - iv) *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provisional heritage resource authority.*
 - d. *the re-zoning of a site exceeding 10 000 m² in extent; or*
 - e. *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.*

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development."

Section 38(8) does not require approval from the heritage authority if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38 (3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and SAHRA Permit Regulations (GN R668).

Section 38(8) of the NHRA specifically excludes the need for a separate HIA where the evaluation of the impact of a development on heritage resources is required in terms of an EIA process. Since the pipeline realignment segment is expected to span over 300 m in length (approximately 3,350 m), a HIA will be required.

There are significant heritage resources along the pipeline alignment as a result of the rich ethnology and history of the area. The features resulting from this activity are displayed as stone and Iron Age tools, remnants of old buildings and structures and a number of graves.

During this BA process, consultations will be conducted with SAHRA and the LIHRA.

2.5 DFFE SCREENING TOOL

The proposed alignment and infrastructure changes have been subjected to a screening according to the national web-based environmental screening tool of the DFFE (<https://screening.environment.gov.za/screeningtool/#/pages/welcome>). This screening tool must

be used prior to any EA application and contains high-level information on environmental sensitivities. One of the primary purposes of this screening tool is to determine specialist studies required during either a BA or Scoping and EIR process in order to obtain EA (refer to **Table 2-4**). This tool identified the potential restrictions and sensitivities on Phase 2F as discussed in more detail in **Section 7**.

Assessment protocols that set out the “procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) of NEMA, when applying for environmental authorisation” were gazetted in GN 320 of 2020. These protocols in terms of reporting of the identified environmental themes should be met in terms of NEMA.

According to the DFFE Screening Tool report, the Phase 2F alignment footprint includes areas identified as Terrestrial CBAs (CBA 1 and 2), ESAs (ESA 1 and ESA 2), and the endangered Sekhukhune Plains Bushveld. Furthermore, the proposed infrastructure is found within the Olifants Environmental Management Framework (EMF) and requirements listed in this EMF must be incorporated and considered during the authorisation process. The EMF is meant as a guideline to assist the decision-making process by the CA and integrates frameworks, policies, and different government mandates.

Table 2-4: Site sensitivity verification table for Phase 2F

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVITY	IDENTIFIED SPECIALIST ASSESSMENTS	IMPACT ASSESSMENT VS COMPLIANCE STATEMENT
Agriculture Theme	X				Agricultural Compliance Statement	Compliance Statement The DFFE screening tool identifies the area as a high-sensitivity site from an agricultural perspective and, per the “Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources” (GN 320 of 20 March 2020), an Agricultural Agro-Ecosystem Specialists Assessment is required or necessary. Despite the above, a <u>compliance statement</u> is compiled for this theme. This is because the project involves linear infrastructure with minimal agricultural impact, and the level of agricultural assessment required by the agricultural protocol is an Agricultural Compliance Statement. Additionally, there are settlements along the proposed development footprint, and no undeveloped land is being used for agricultural purposes.
Animal Species Theme		X			Terrestrial Biodiversity Assessment	Impact Assessment Included as part of the Terrestrial Biodiversity Assessment.
Aquatic Biodiversity Theme	X				Aquatic Biodiversity Assessment	Impact Assessment The DFFE screening tool identifies the area as a very high-sensitivity site from an aquatic biodiversity perspective and, per the “Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity” (GN 320 of 20 March 2020), an Aquatic Biodiversity Assessment is required or necessary.
Archaeological and Cultural Heritage Theme		X			Heritage Impact Assessment	Impact Assessment It is anticipated that the pipeline realignment segment will span over 300 m in length (approximately 3,350 m). In addition, there are significant heritage resources along the pipeline alignment as a result of the rich ethnology and history of the area. The features resulting from this activity are displayed as stone and Iron Age tools, remnants of old buildings and structures and a number of graves.
Civil Aviation Theme		X			Civil Aviation Assessment	Compliance Statement

						The DFFE screening tool identifies the area as a high-sensitivity site from a Civil Aviation perspective and, per the “Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations” (GN 320 of 20 March 2020) only a compliance statement is necessary.
Defence Theme			X		Defence Assessment	Compliance Statement The DFFE screening tool identifies the area as a medium-sensitivity site from a Defence perspective and, per the “Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Defence Installations” (GN 320 of 20 March 2020), a compliance statement is necessary.
Palaeontology Theme			X		Palaeontological Assessment	Impact Assessment The DFFE screening tool identifies the area as a medium-sensitivity site from a palaeontological perspective. An impact assessment is necessary.
Plant Species Theme			X		Terrestrial Biodiversity Assessment	Impact Assessment Included as part of the Terrestrial Biodiversity Assessment.
Terrestrial Biodiversity Theme	X				Terrestrial Biodiversity Assessment	Impact Assessment The DFFE screening tool identifies the area as a very high-sensitivity site from a Terrestrial Biodiversity perspective and, per the “Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity” (GN 320 of 20 March 2020), a Terrestrial Biodiversity Specialist Assessment is necessary. This assessment will consider the Plant and Animal Species theme, as well as the International Finance Corporation (IFC) Performance Standard (PS) 6 and the delineation and assessment of critical habitats.

2.6 RELEVANT GUIDELINES

This BA process is informed by the series of national Environmental Guidelines where applicable and relevant:

- ▶ Integrated Environmental Information Management (IEIM), Information Series 5: Companion to the NEMA EIA Regulations of 2010 (DEA, 2010).
- ▶ IEIM, Information Series 2: Scoping (Department of Environmental Affairs and Tourism (DEAT), 2002).
- ▶ IEIM, Information Series 3: Stakeholder Engagement (DEAT, 2002).
- ▶ IEIM, Information Series 4: Specialist Studies (DEAT, 2002).
- ▶ IEIM, Information Series 11: Criteria for determining Alternatives in EIA (DEAT, 2004).
- ▶ IEIM, Information Series 12: Environmental Management Plans (DEAT, 2004).
- ▶ IEM Guideline Series 7: Public Participation in the EIA Process (DEA, 2012).
- ▶ DEA (2017), Public Participation guideline in terms of NEMA.
- ▶ Guideline for involving biodiversity specialists in EIA process (Brownlie. 2005).
- ▶ Guideline for involving heritage specialists in the Environmental Impact Report (EIR) process (June Winter & Baumann, 2005).
- ▶ Guideline for involving visual and aesthetic specialists in the EIR process (Oberholzer.2005).
- ▶ Guideline for Environmental Management Plans (Lochner, 2005).
- ▶ Guideline on Alternatives, EIA Guideline and Information Document Seriesn(DEA&DP, 2011).
- ▶ Guideline on Need and Desirability, EIA Guideline and Information Document Series. (DEA, 2012).
- ▶ Guideline on Public Participation, EIA Guideline and Information Document Series. (DEA&DP, 2011).

3 EIA PROCESS AND METHODOLOGY

The formal BA process is outlined in **Figure 3-1** with the stipulated timeframes. The formal BA process commences with the submission of the Application form and is immediately followed by the 30-day comment period on the draft BAR. A description of the activities which have been, and will be, undertaken during each phase is provided in the following sections.

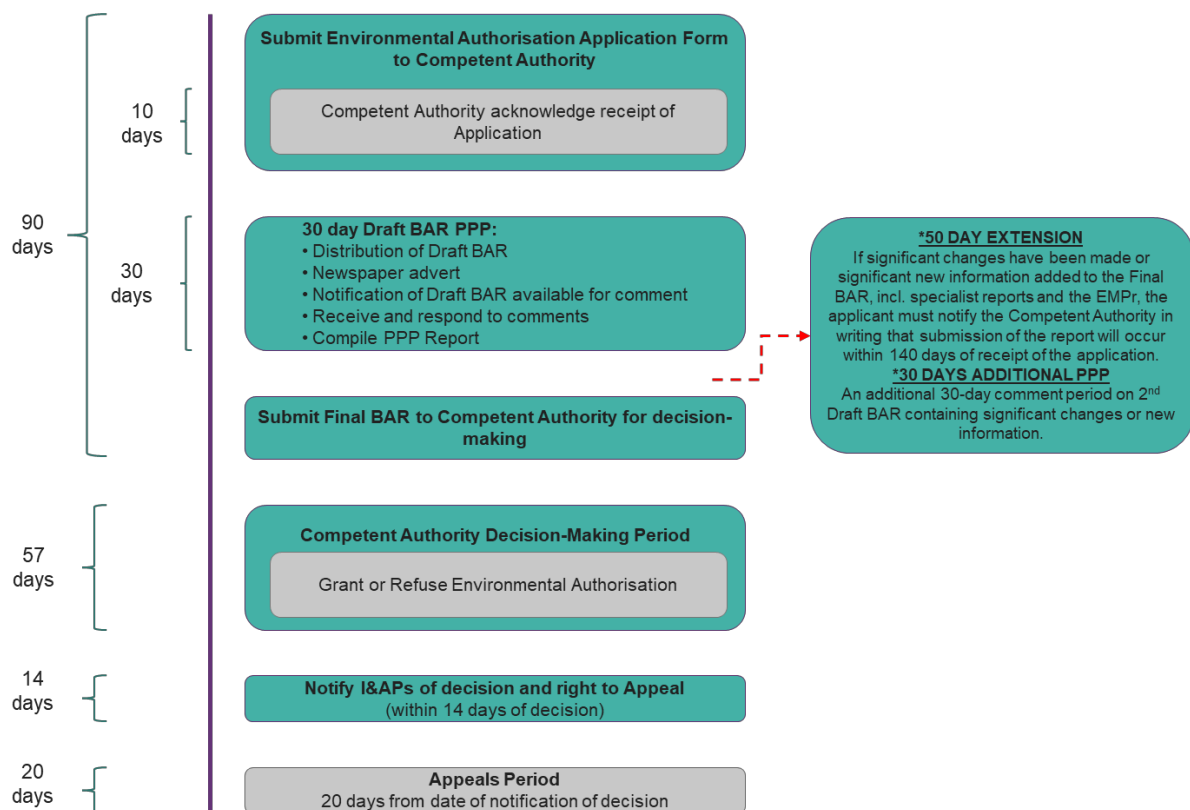


Figure 3-1: The BA process in terms of NEMA

As illustrated in **Figure 3-1**, one stage of public participation is included in a formal BA process, i.e., the comment period on the Draft BAR. More information on the PPP is included in **Section Error! Reference source not found.**

3.1 PHASES OF THE BA PROCESS

3.1.1 PRE-APPLICATION MEETING WITH DFFE

A combined pre-application meeting for Phases 2B (2024-07-0001), 2D (2024-07-0026) and 2F (2024-07-0027) was held between the DFFE and ZNVJ (EAP team) on 24 July 2024. The meeting was held to discuss the appropriate requisite regulatory processes to follow in order to authorise the proposed scope changes in Phases 2B, 2D and 2F of the OMMP-BRWSP (refer to **Annexure B** for the pre-application meeting minutes). Discussions during the pre-application meeting informed the EAP's decision to undertake a BA process to authorise the proposed scope changes in Phase 2F.

3.1.2 SCREENING PHASE - SITE INVESTIGATION BY THE EAP AND THE SPECIALISTS

A screening exercise was undertaken by various project specialists, which entailed:

1. A site verification assessment was undertaken by the EAP to determine if the proposed expansion will trigger any listed activity in terms of the NEMA EIA Regulations of 2014 (GN R982 of 2014).
2. Specialists undertook desktop and site visits (where necessary) to ground truth the site DFFE sensitivity report and map the site features and areas.
3. Specialists identified and mapped all sensitive features and areas of the site and provided suitable buffers for these areas/features and all the sensitive areas (including buffers) were

categorised into one of the following sensitivity categories, Very High, High, Medium, Low or not sensitive (or uncategorised).

3.1.3 BASIC ASSESSMENT PHASE

The objectives of the basic assessment process are to, through a consultative process -

- a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- b) identify the possible feasible and reasonable alternatives, including the activity, location, and technology alternatives;
- c) describe the need and desirability of the proposed project and alternatives;
- d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of the impact of the proposed activity and technology alternatives on these aspects to determine –
 - i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and;
 - ii. the degree to which these impacts –
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be avoided, managed or mitigated;
- e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to identify and motivate a preferred site, activity and technology alternative;
 - i. identify suitable measures to avoid, manage or mitigate identified impacts; and
 - ii. identify residual risks that need to be managed and monitored.

Various methods and sources were utilised to identify the potential social and environmental aspects associated with the proposed project and to develop the Terms of References (ToRs) for the specialist studies. The sources of information for the preparation of this report include, inter alia, the following:

- ▶ Collection of information specific to the project, as provided by the Applicant;
- ▶ Project description;
- ▶ Basic methodology for the construction of the various project components;
- ▶ Basic methodology during operations and decommissioning;
- ▶ The expected timeframe for project development;
- ▶ Maps and figures, outlining the proposed facilities;
- ▶ Technical descriptions relating to the function and layout of project components;
- ▶ Other relevant BARs/ EIRs prepared for BAs/EIAs undertaken in the area;
- ▶ Environmental baseline literature and desktop spatial surveys for this site and surrounding areas;
- ▶ Environmental baseline surveys for this site and surrounding areas from site visits by specialists;
- ▶ Consultation with the project team (including specialists); and
- ▶ Consultation with I&APs, including authorities.

An application form for the project will be submitted to DFFE (to register the project on the Department's database). All comments received will be recorded and responded to in a Comments and Responses Report (CRR) (**Annexure C**), and the final BAR will be updated to address I&AP comments, where appropriate. This final BAR will be submitted to DFFE no later than 90 days from their receipt of the application form. The competent authority must then decide within 57⁷ days of receipt of the final BAR and EMP_r, and in writing –

⁷ On 5 March 2023 the project was classified as a SIP under the SIP 19 (i.e., Water and Sanitation Infrastructure Portfolio). As such, it is critical that the project must be expedited in terms of Schedule 2 (Section 17(2)) of the Infrastructure Development Act, No. 23 of 2014.

- a) Grant environmental authorisation in respect of all or part of the activity applied for; or
- b) Refuse environmental authorisation.

The key dates of the formal BAR process are summarised below:

- ▶ Submit Application form and Draft BAR to DFFE – **25 August 2025**
- ▶ Place hard copies of the Draft BAR at the **Nareng Thokwane Traditional Authority, Magadimane Traditional Authority, Roka Mashabela (Ga Mongatane) Traditional Authority, Roka Phashaskraal Traditional Authority, Baroka ba Nkoana Traditional Authority, Maisela Manotoane Traditional Authority, Baroka ba Selepe Traditional Authority, Nareng Thokwane Traditional Authority, Magadimane Traditional Authority and Ngwanamohube Traditional Authority (Bakgaga ba Mphahlele), LNLN and the FTLM** and make a digital copy available online via the following link: https://www.zutari.com/ommp-brwsp-2d_2f-public-participation/ – **25 August 2025**
- ▶ Notification of potential I&APs, affected landowners, neighbouring landowners and state departments of availability of the Draft BAR for review and comment – **25 August 2025**
- ▶ Last day for I&AP to submit comment on Draft BAR – **03 October 2025**
- ▶ Submit Final BAR to DFFE – **October 2025**
- ▶ DFFE to provide decision on application – 57-days from date of submission of final BAR to issue decision.
- ▶ Notification of registered I&APs of DFFE decision and appeal process – upon receipt of DFFE decision.

3.2 METHODOLOGY

3.2.1 SPECIALIST ASSESSMENTS

To provide a scientific assessment that is transparent and robust, a clear methodology is required. Although each specialist required a methodology that was specific to their investigation (detailed in their reports in **Annexure D**), they were each given the following ToR:

- ▶ Undertake a site investigation to determine the status quo and identify any sensitive features or no-go areas;
- ▶ Provide shapefiles of all sensitive features;
- ▶ Assess all impacts associated with the proposed project and the no go alternative;
- ▶ Make use of the ZNJV Impact Assessment Methodology (explained below in Section 3.2.2) when assessing the impacts of the proposed project, as well as cumulative impacts (detailed below in Section 3.2.3);
- ▶ Provide a detailed description of appropriate mitigation measures that can be adopted to reduce or avoid negative impacts and improve positive impacts for each phase of the project. Indicate the level of significance of impacts pre- and post-mitigation;
- ▶ Provide a summary of succinct and practical recommendations based on mitigation measures identified to form the basis of environmental authorisation requirements, should the development be authorised;
- ▶ Comply with the content requirements for specialist reports listed in Appendix 6 of the 2014 EIA Regulations (GN R982 of 2014). These have been updated where required to consider the amendments made to the Regulations on 7 April 2017; and
- ▶ Comply with procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, 1998, when applying for environmental authorisation (GN R320, of 20 March 2020).

3.2.2 IMPACT ASSESSMENT METHODOLOGY

This section outlines the proposed method for assessing the significance of the potential environmental impacts. For each predicted impact, criteria are ascribed, and these include the intensity (size or degree

scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale); and the extent (spatial scale), as well as the probability (likelihood). The methodology is quantitative, whereby professional judgement is used to identify a rating for each criterion based on a seven-point scale (refer to **Figure 3-2**); and the significance is auto-generated using a spreadsheet through the application of the calculations in **Table 3-1**. Specialists can comment where they disagree with the auto-calculated impact significance rating.

Figure 3-2: Calculation of Significance

Calculations

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **intensity** (size or degree scale), which also includes the **type** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

$$\text{Consequence} = \text{type} \times (\text{intensity} + \text{duration} + \text{extent})$$

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

$$\text{Significance} = \text{consequence} \times \text{probability}$$

Depending on the numerical result, the impact would fall into a significance category. Negligible, minor, moderate or major, and the type would be either positive or negative.

Table 3-1: Assessment criteria for the evaluation of impacts

Criteria	Numerical Rating	Category	Description
Duration	1	Immediate	Impact will self-remedy immediately
	2	Brief	Impact will not last longer than 1 year
	3	Short term	Impact will last between 1 and 5 years
	4	Medium term	Impact will last between 5 and 10 years
	5	Long term	Impact will last between 10 and 15 years
	6	On-going	Impact will last between 15 and 20 years
	7	Permanent	Impact may be permanent, or in excess of 20 years
Extent	1	Very limited	Limited to specific isolated parts of the site
	2	Limited	Limited to the site and its immediate surroundings
	3	Local	Extending across the site and to nearby settlements
	4	Municipal area	Impacts felt at a municipal level
	5	Regional	Impacts felt at a regional level
	6	National	Impacts felt at a national level
	7	International	Impacts felt at an international level
Intensity	1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
	2	Very low	Natural and/ or social functions and/ or processes are slightly altered
	3	Low	Natural and/ or social functions and/ or processes are somewhat altered
	4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
	5	High	Natural and/ or social functions and/ or processes are notably altered
	6	Very high	Natural and/ or social functions and/ or processes are majorly altered
	7	Extremely high	Natural and/ or social functions and/ or processes are severely altered

Criteria	Numerical Rating	Category	Description
Probability	1	Highly unlikely / None	Expected never to happen
	2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
	3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
	4	Probable	Has occurred here or elsewhere and could therefore occur
	5	Likely	The impact may occur
	6	Almost certain / Highly probable	It is most likely that the impact will occur
	7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

When assessing impacts, broader considerations are also taken into account. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in **Table 3-2**, **Table 3-3**, and **Table 3-4**, respectively.

Table 3-2: Definition of confidence ratings

Category	Description
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table 3-3: Definition of reversibility ratings

Category	Description
Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 3-4: Definition of irreplaceability ratings

Category	Description
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

3.2.3 ASSESSMENT OF CUMULATIVE EFFECTS

Cumulative effects are commonly understood to be impacts from different projects that combine to result in significant change, which could be larger than the sum of all the individual impacts. Impacts contributing to such cumulative impacts are found in **Section 7** of this BAR.

4 PUBLIC PARTICIPATION

PPP is a broad, inclusive and continuous process of communication between a Proponent of a project, and those potentially affected by the activities of the proposed development. This can include a wide range of activities that are relevant to the entire life of a project. During the BA process, the aim is to provide an opportunity for stakeholders to be (1) informed of projects occurring in their area which may affect them directly or indirectly and (2) provide an accessible and meaningful opportunity for people to ask questions, raise concerns or grievances and (3) to ensure that these are used to guide the new development, and planned operations, in a responsible manner that complements the local socio-economic environment, reduces environmental impact and enhances the benefits of the project.

South African legislation and guidelines (refer to **Section 2**) have formalised the PPP for BA. PPP forms an integral component of this process and enables I&APs to identify issues, and concerns, and make suggestions during the BA process. This PPP is structured to provide I&APs with the opportunity to learn about the proposed project, to provide input through the review of documents/ reports, and to voice any issues of concern at various stages throughout the BA process. These stages are described below.

Proof of Public Participation actions and documents will be included as **Annexure C** during the submission of the Final BAR. However, copies of Public Participation actions that have been employed have been included as **Annexure C** to the Report.

4.1 PUBLIC PARTICIPATION PROCESS

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations of 2014, the subsequent sections below summarise the key public participation activities implemented. Furthermore, an overview of the tools available to I&APs and stakeholders to access project information and interact with the public participation team for obtaining project information, resolving any queries, and meeting the requirements for public participation are also outlined below.

4.1.1 DRAFT BAR

- ▶ **Notifications:** the following methods of notification are used:
 - **Written notice** - Written notices will be sent to registered I&APs. This notification will inform the reader of the availability of the draft BAR, where and when to access it and where to send a comment.
- ▶ **Information for review:** the draft BAR will be made accessible during the comment period as follows:
 - **Hardcopy:** Will be placed at the **Nareng Thokwane Traditional Authority, Magadimane Traditional Authority, Roka Mashabela (Ga Mongatane) Traditional Authority, Roka Phashaskraal Traditional Authority, Baroka ba Nkoana Traditional Authority, Maisela Manotoane Traditional Authority, Baroka ba Selepe Traditional Authority, Nareng Thokwane Traditional Authority, Magadimane Traditional Authority and Ngwanamohube Traditional Authority (Bakgaga ba Mphahlele), LNLN and the FTLM.**
 - **Electronic copy:** the draft BAR will be accessible via the following link:
 - Zutari webpage: https://www.zutari.com/ommp-brwsp-2d_2f-public-participation/
- ▶ **Comment period:** The draft BAR will be made available for comment for 30-days from **25 August to 03 October 2025**.
- ▶ **Comments and responses report:** all comments will be captured and responded to in the CRR. The CRR will be appended to the final BAR and will be submitted to the DFFE as part of the final application.

4.1.2 DECISION PHASE

- ▶ Following submission of the final BAR, the DFFE have 57 calendar days to issue a decision.
- ▶ Registered I&APs will be notified in writing within 14-days of the decision. I&APs will be informed of the right to appeal and the procedure to follow.
- ▶ I&AP will have 20 calendar days from the date of the written notification to lodge an appeal.

4.2 IDENTIFICATION OF STAKEHOLDERS

An existing database of I&APs of the OMMP-BRWSP was used to develop a stakeholder database for the proposed Phase 2F component. This database includes the details of following affected parties:

- ▶ Landowners, adjacent landowners and occupiers;
- ▶ Kgoshis, and traditional councils;
- ▶ Relevant district and local municipal officials and ward councillor/s;
- ▶ Relevant national and provincial government departments; and
- ▶ Relevant environmental bodies or organisations.

Site notices, written notices and the newspaper advertisement will inform the reader of the opportunity and manner to register as an I&AP for the project. This I&AP database will be updated as new I&APs are identified throughout the project lifecycle. The list of I&APs is included in **Annexure C**.

4.3 AUTHORITY INVOLVEMENT

In terms of Section 24O (2) and (3) of the NEMA, the following state departments and/or parastatal bodies will be notified on the application and will be sent a copy of the draft BAR for comment.

- ▶ National, Provincial and local authorities, and parastatal organisations:
- ▶ Department of Forestry, Fisheries and the Environment (DFFE)
 - Biodiversity and Conservation directorate
 - Forest Resource Protection directorate
- ▶ Department of Water and Sanitation (DWS) [Limpopo Water Management Area (WMA)]
- ▶ Department of Mineral Resources and Energy (DMRE) (Limpopo Regional Office)
- ▶ South African National Road Agency (SANRAL)
- ▶ Roads Agency Limpopo (RAL)
- ▶ Limpopo Department of Transport and Community Safety
- ▶ Department of Agriculture, Land Reform and Rural Development (DALRRD)
- ▶ South African Heritage Resources Agency (SAHRA)
- ▶ Limpopo Provincial Heritage Resources Authority (LIHRA)
- ▶ Fetakgomo Tubatse Local Municipality (FTLM)
- ▶ Lepelle Nkumpi Local Municipality (LNLM)
- ▶ South African Civil Aviation Authority (SACAA)
- ▶ Limpopo Department of Cooperative Governance, Human Settlements and Traditional Affairs (CoGHSTA)
- ▶ Nareng Thokwane Traditional Authority, Magadimane Traditional Authority, Roka Mashabela (Ga Mongatane) Traditional Authority, Roka Phashaskraal Traditional Authority, Baroka ba Nkoana Traditional Authority, Maisela Manotoane Traditional Authority, Baroka ba Selepe Traditional Authority, Nareng Thokwane Traditional Authority, Magadimane Traditional Authority and Ngwanamohube Traditional Authority
- ▶ Sekhukhune District Municipality (SDM)
- ▶ Capricorn District Municipality (CDM)

4.4 SUMMARY OF COMMENTS AND RESPONSES

All comments received during the 30-day comment period will be responded to in a CRR and appended to the BAR. The CRR will be submitted with the final BAR to inform the decision-making.

The BAR, specialist reports and EMPr will be updated where appropriate to accommodate issues raised in the draft BAR phase.

5 DESCRIPTION OF THE PROPOSED PROJECT

5.1 DESCRIPTION AND COMPONENTS OF THE PREFERRED ALTERNATIVE

This application involves an approximately 3.35 km pipeline realignment from chainage 14-220, reconnecting with the originally approved 2017 route at chainage 10580, a section southwest of Bokoni Platinum mine, close to the rural settlement of Zeekoegat (refer to **Figure 5-1**). Other deviations along the pipeline alignment, which do not trigger listed activities on their own, are shown in **Figure 5-2** (a section along the D4190, close to the settlement of Malogeng) and **Figure 5-3** (a section southwest of the Ditobeleng settlement) below. The pipeline is anticipated to have a diameter of 1,200 mm and an estimated throughput of 1.563 m³/s (equivalent to 1,563 l/s). A 40 m servitude is proposed, consisting of a temporary construction servitude of 25 m and a permanent servitude of 15 m.

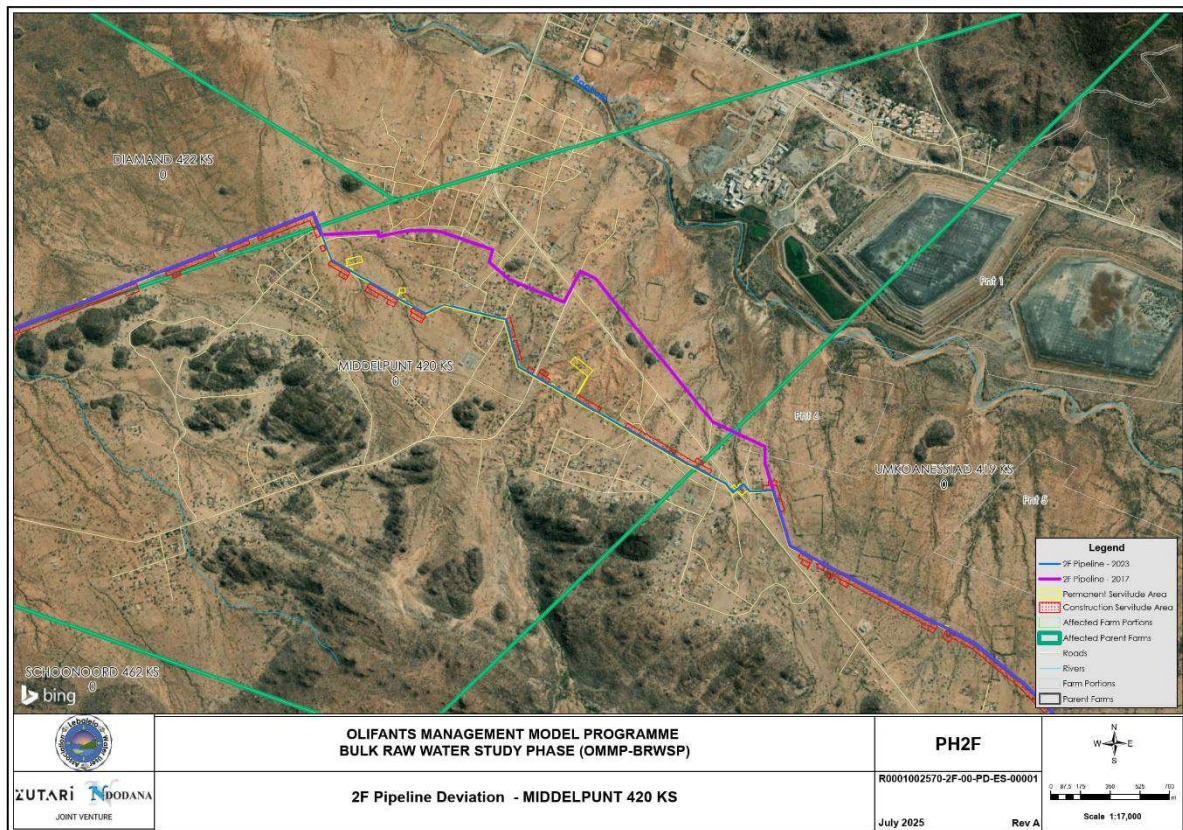


Figure 5-1: Proposed pipeline realignment

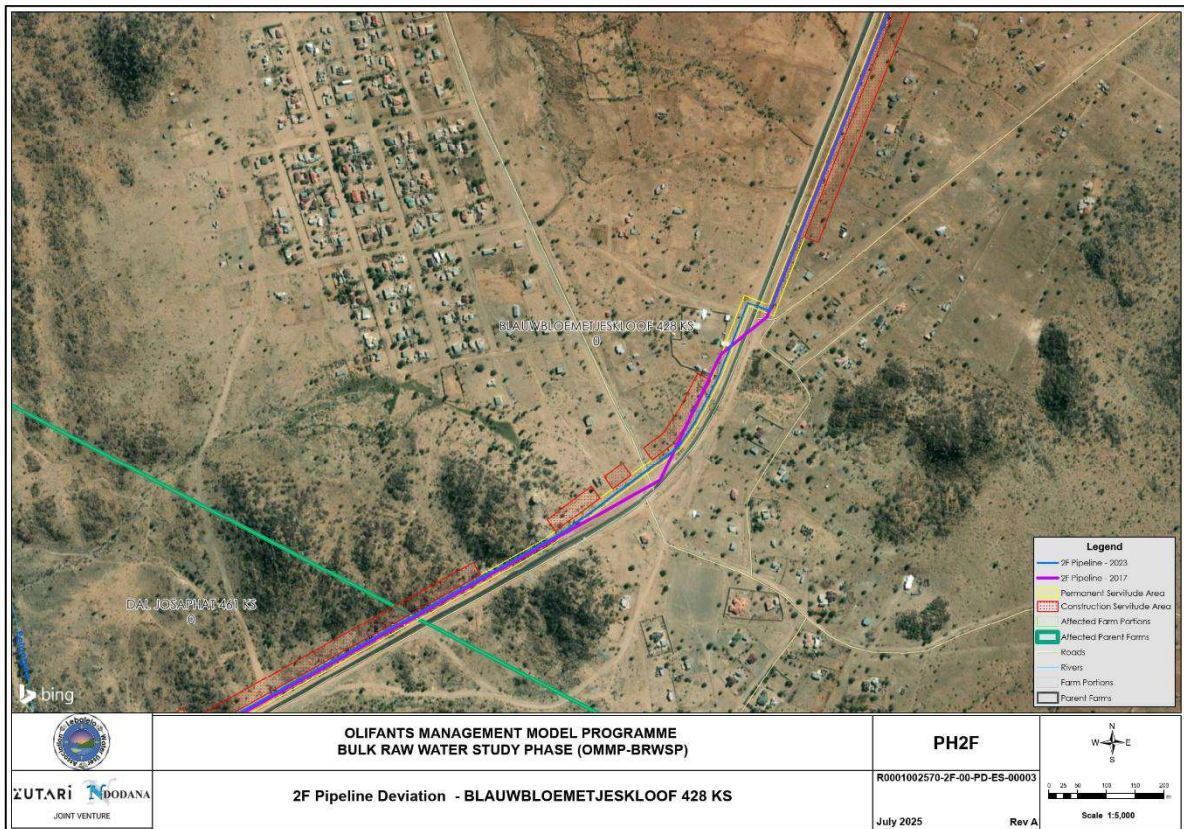


Figure 5-2: Proposed deviation along the D4190.

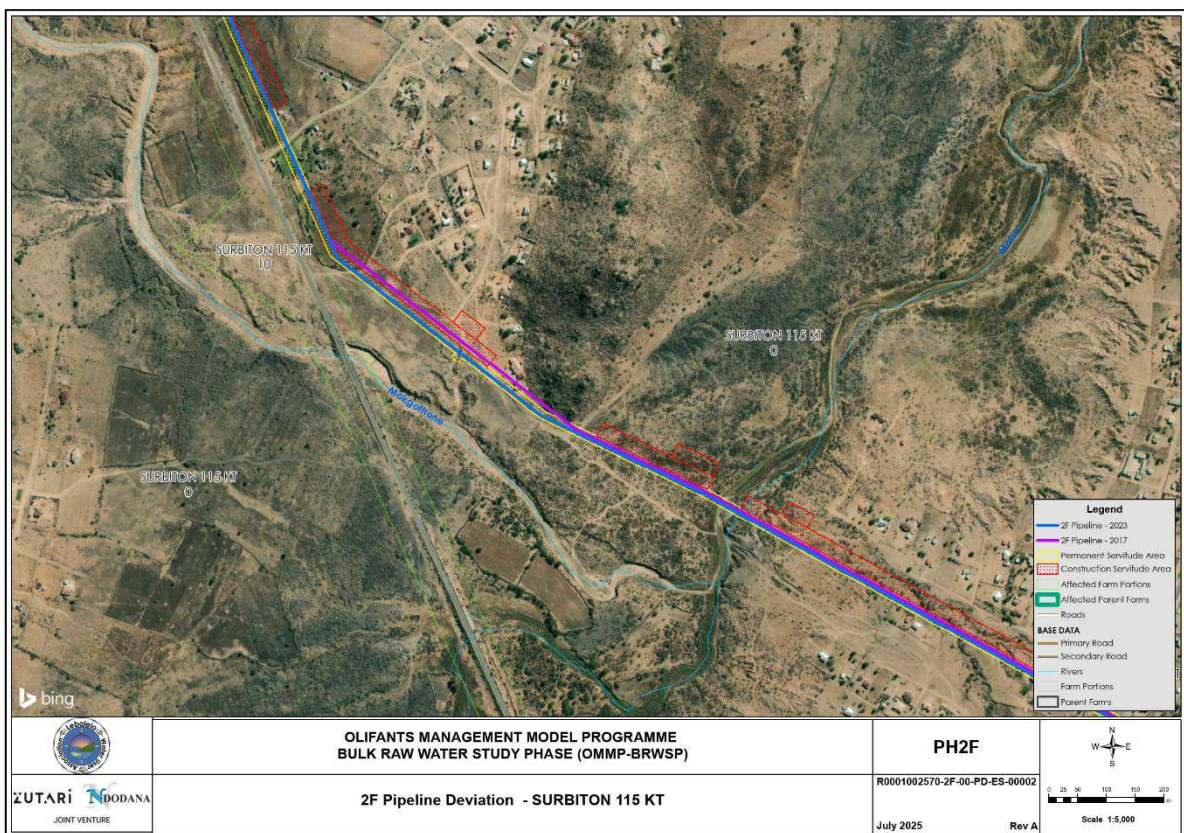


Figure 5-3: Proposed servitude deviation close to Ditobeleng settlement.

5.1.1 ACCESS ROADS

The primary access routes for Phase 2F will be the D4131, D4182, D4180, D4197, and R37. The R37 is a national road under the jurisdiction of the SANRAL, while the other roads are provincial roads maintained by the RAL. The proposed access roads, required specifically during construction and potentially for operation during maintenance, are listed in **Table 1-2** above and shown in **Figure 5-4** below.

The access roads are 7 m wide, with lengths varying depending on the specific road segment (refer to **Table 1-3**).

The current status quo of each access road (39 in total) and associated access number is given in the table below.

Existing status quo	Access number
Existing road/footpath	2F-01, 2F-02, 2F-03, 2F-04, 2F-05, 2F-07, 2F-08, 2F-11, 2F-14, 2F-15, 2F-17, 2F-2-1, 2F-2-2, 2F-2-3, 2F-2-4, 2F-2-5, 2F-2-6, 2F-2-7, 2F-2-8, 2F-2-9, 2F-2-13, 2F-2-14, 2F-2-15, 2F-2-16, 2F-2-17, 2F-2-18, 2F-2-20, 2F-2-21, 2F-2-23, 2F-2-24, 2F-2-25a, 2F-2-25, 2F-2-26, 2F-2-27, 2F-2-28, 2F-2-29, 2F-2-33, 2F-2-34.
New road/ Green fields/Unused Road	2F-2-22.

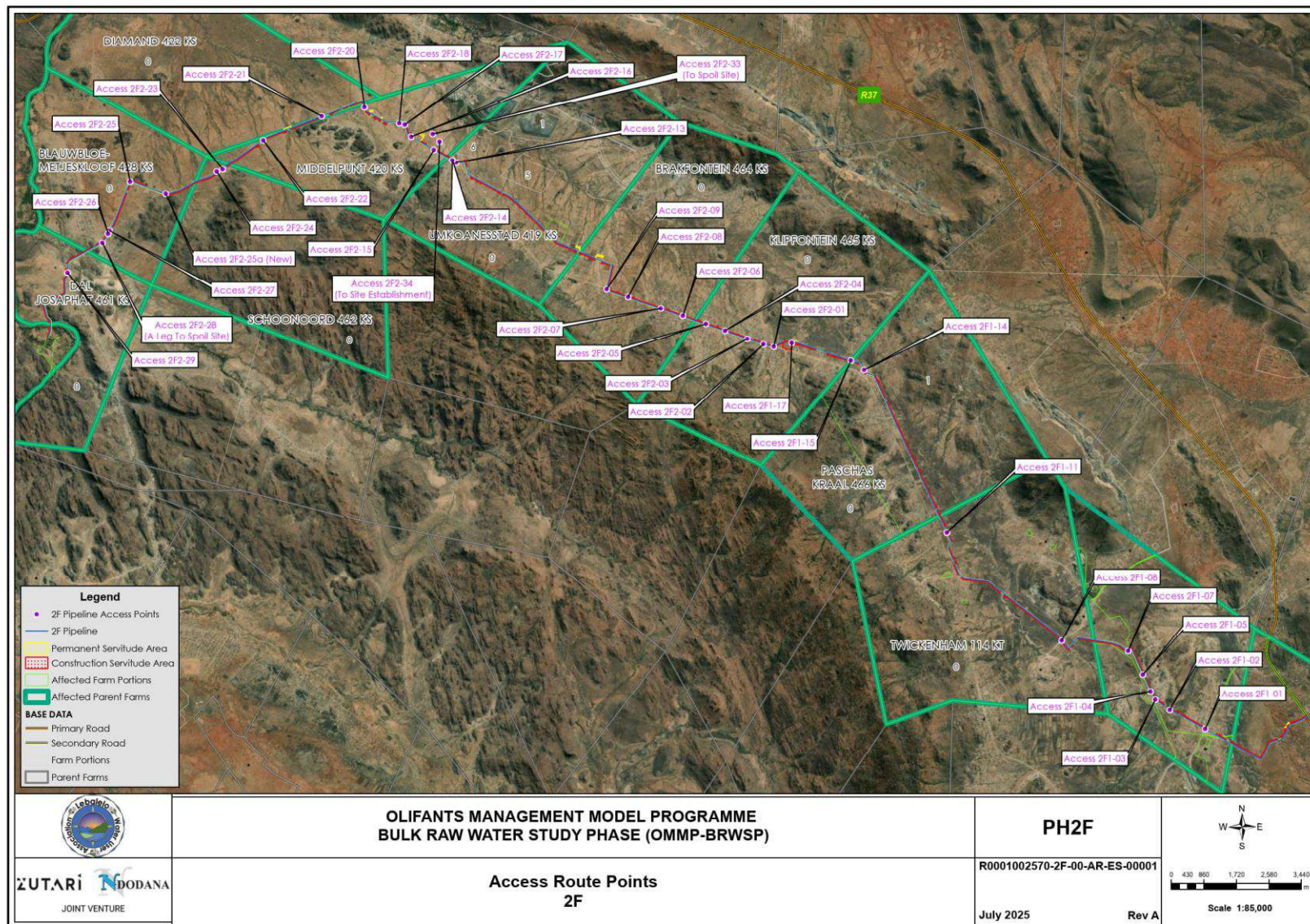


Figure 5-4: Access Route Points.

5.1.2 TEMPORARY CONSTRUCTION YARD

It has been proposed that the temporary construction servitudes be used as laydown areas during construction. Consequently, stockpiling and material handling are expected to occur in these areas.

5.2 SERVICES REQUIRED DURING CONSTRUCTION

5.2.1 EMPLOYMENT

The duration of the construction phase may vary depending on seasonal and environmental conditions at the time of construction. The project will employ semi-skilled and unskilled workers from within the FTLM and the LNLN. The Applicant is committed to optimising employment opportunities for local Black people, particularly Black women, and will preferentially hire local individuals through appropriate channels to minimise the potential influx of migrant job seekers.

5.2.2 WATER SUPPLY

Water will be required for construction activities, including wetting bedding material to achieve optimal compaction densities and for dust suppression along construction access roads. The only available water sources along the Phase 2F pipeline route are the Olifants River and groundwater. No other sources with sufficient capacity are available. As such, new water sources need to be identified, developed, and managed throughout the construction period.

These sources must be located in proximity to the construction sites and will generally be required at intervals of approximately 3.4 km along the pipeline route.

5.2.3 WASTE MANAGEMENT

► General waste

It is anticipated that some construction solid waste will be generated which would include (list is not exhaustive) building rubble, packaging material, scrap, overburden material and general litter from construction workers. Therefore, it is recommended that construction waste or rubble be collected and stored temporarily in designated containers for the different waste streams on site and disposed of at a licensed landfill site.

The EMP will make recommendations regarding the reduction, reuse and recycling of solid waste.

► Hazardous waste

Hazardous substances pose significant risks to health, safety, and the environment if not properly handled, stored, transported, or disposed of. On this project, hazardous substances are primarily limited to fuels and oils, although other materials may also be involved. It is crucial to ensure that hazardous substances are transported, stored, handled, and used in a way that minimises risks to human health and the environment. Hazardous waste generated from construction activities will be stored in clearly labelled, sealed, animal-proof, and waterproof containers until it is collected for disposal at an approved facility, where a certificate of disposal can be issued, or returned to the suppliers for proper disposal or reuse.

► Sewage

During construction the normal sewage will be handled via temporary ablution facilities (such as portable toilets) that will be serviced by a contractor on a regular interval (i.e., as, and when needed).

5.2.4 AIR AND NOISE EMISSIONS

Air emissions: Temporary air emissions are expected during the construction phase due to the operation of construction machinery and the clearing of vegetation, which may result in wind-blown and fugitive dust emissions. However, emissions during the operational phase are anticipated to be minimal, owing to measures such as vehicle speed limits, re-vegetation, and soil landscaping. Dust generated during construction activities will primarily arise from equipment such as excavators, TLBs, and heavy vehicles (e.g., trucks) moving in and out of the construction area.

The national dust control regulations under the NEM:AQA were published in GG 34307 under GN 309 on 27 May 2011. According to these regulations:

- No person may conduct an activity that generates dust in quantities or concentrations that:
 - Have a detrimental effect on the environment, including health, social, economic, ecological, or cultural conditions, or contribute to the degradation of ambient air quality beyond the premises where the dust originates;
 - Cause the dust to remain visible in the ambient air beyond the premises where it originates;
 - Exceed 600 mg/m²/day averaged over 30 days in residential and light commercial areas, as measured using the reference method ASTM D1739; or
 - Exceed 1,200 mg/m²/day averaged over 30 days in areas other than residential and light commercial areas, also measured using ASTM D1739.

For a detailed Air Quality Assessment, refer to **Section 7.3**.

Noise emissions: The key temporary noise sources during the construction phase will be from the mobile machinery, vehicles, workers, and plant construction activities including high-speed ramming using percussion hammers. Some after-hours construction activities may be needed. With that said, surrounding property owners and residents of the directly affected villages along the pipeline should be informed if any unusually noisy activities (e.g., blasting) are planned, or if construction activities are scheduled to extend beyond normal working hours (typically 7 am to 5 pm).

For a detailed Noise Impact Screening statement, refer to **Section 7.13**.

5.2.5 STORMWATER

To avoid soil erosion, stormwater management of runoff from the proposed project infrastructure need to be implemented. Erosion and sediment control measures must be implemented in accordance with South African published guidelines and best practices, such as the *Environmental Best Practice Specifications: Construction*, published by the Department of Water Affairs and Forestry (DWAF) in 2005 (refer to section 3.7). Stormwater management and mitigation measures are also included in the EMP.

5.2.6 ENERGY EFFICIENCY

In terms of energy efficiency, the proposed water supply pipeline and associated infrastructure construction should be carried out during normal working hours to minimise the need for artificial lighting in open trenching and excavation activities. Additionally, the contractor will be advised to transport all construction materials to the site simultaneously, where possible, and to collect waste materials concurrently with other construction activities. These measures aim to reduce fuel consumption associated with transportation.

5.3 PROJECT PHASES

From a practical perspective the project lifecycle will likely be phased as follows:

- ▶ Pre-Construction
- ▶ Construction
- ▶ Operation
- ▶ Decommissioning

5.3.1 PRE-CONSTRUCTION

Pre-construction activities involve tasks that establish the site, both in terms of the construction activities, as well as the social and environmental management systems. During this time, efforts should be made to ensure that the planning of the project is completed effectively to ensure that there are no delays, and that no unnecessary environmental degradation occurs. The detailed design must align with the recommendations outlined in the BAR, the EMP, and the EA, and should incorporate all design recommendations and mitigation measures arising from the BA process.

Before the mobilisation of the main contractor on site, the boundaries of the work areas and nearby no-go areas will be demarcated according to specialist recommendations, after which the Contractor may set up their construction yard, mobilise their staff and equipment on site.

Social risks must be addressed by implementing an appropriate grievance mechanism from the outset. Additionally, the relevant Traditional Authorities, as identified in the sections above, should be engaged from the outset to prevent any social issues when the contractor and workers are on site. Furthermore, all the Contractor's staff must undergo training to ensure they understand the environmental and social obligations.

5.3.2 CONSTRUCTION

The typical activities for the construction of the pipeline and associated infrastructure are as follows:

- ▶ Establishment of access roads: During the construction period, internal roads need to be established; however, these roads will only be temporary. There are a number of permanent roads that need to be established for operation and will be gravel based. Existing roads will be used, where possible.
- ▶ Site preparation: Vegetation would need to be cleared for the footprint of the pipeline as well as for the access roads to the site/internal roads and the laydown areas, etc. Topsoil stripped from the construction of access roads and the pipeline would need to be stockpiled and used to rehabilitate areas of the construction footprint.
- ▶ Transportation of equipment and components to the site: The main components of Phase 2F would be transported by road to the site. Excavators, graders, trucks and compacting equipment will need to be brought to the site.
- ▶ Establishment of workshops, temporary laydown areas and equipment camps: Once all the equipment has been brought to the site, dedicated laydown and equipment camps will be established within the temporary construction servitudes. Fuel will most likely be stored on site during construction; appropriate mitigation measures must be employed to ensure no pollution occurs as a result.
- ▶ Open trench excavations: Open trench excavations will be the primary method for installing the pipeline. The construction activities will involve the excavation of trenches along the designated pipeline route to accommodate the pipeline. This process will include site preparation, clearing, and excavation to the required depth and width for the pipeline. Additional activities will involve the installation of pipes, backfilling of trenches, and compaction to ensure stability. Environmental management practices will be implemented to minimise disruption to the surrounding area,

including dust control and proper waste disposal. These activities will be carried out in phases, with careful coordination to ensure minimal disruption to local communities and the environment. All excavation work will comply with safety and environmental regulations, with necessary mitigation measures in place.

- ▶ Site rehabilitation: Removal of all construction equipment from the site and rehabilitation of areas where reasonable and practical.

5.3.3 OPERATION

During operation of the bulk raw water pipeline, activities primarily focus on the monitoring, maintenance, and efficient management of water supply. Regular inspections will be conducted to ensure the pipeline is functioning as intended, with checks for any signs of leaks, blockages, or structural issues.

Routine maintenance activities may include cleaning of the pipeline, clearing of debris, and ensuring the functionality of associated valves and pumps. Additionally, water quality monitoring will be carried out to ensure compliance with regulatory standards. Maintenance of access roads and emergency preparedness will also be important operational tasks.

Overall, the operational phase focuses on ensuring the reliable and sustainable delivery of water, as well as minimising disruptions to service through regular upkeep and prompt response to any operational issues.

5.3.4 DECOMMISSIONING

The decommissioning phase for this project is not foreseeable in the near future, as access to clean potable water remains an ongoing necessity. However, should the facility undergo expansion or significant upgrading in the future, an EA may be required at that time, in accordance with the prevailing legislation.

5.4 PROJECT NEED AND DESIRABILITY

The OMMP-BRWSP (and previously the ORWRDP) was initiated to reduce the water demands on the Flag Boshielo Dam in the Limpopo province, which is the key water resource in the region. The project also aimed to meet the increasing water demand of the City of Polokwane, as well as allowing the respective Water Service Authorities (WSAs) to have surplus water to meet their water demands. The project bulk infrastructure plan allows for the construction of raw water pipeline systems to the identified target areas.

The revised scope of the project will prioritise the following key aspects (of the OMMP-BRWSP):

- ▶ Abstract the LWUA scheme water primarily from the De Hoop Dam instead of the Olifants River to relieve pressure on the already over-allocated Flag Boshielo Dam;
- ▶ Re-sequence the construction of OMMP-BRWSP bulk raw water infrastructure to meet revised water needs;
- ▶ Support existing potable WSAs and develop potable water infrastructure in defined areas in the Northern and Eastern Limb to address immediate and long-term social water needs of the WSAs.

Phase 2 of the project consists of four major components, namely, bulk water pipeline from De Hoop to Steelpoort; bulk distribution system comprising pipelines and pump stations from Steelpoort linking with the existing Olifants-Sand transfer scheme; bulk distribution system from the Flag Boshielo dam to Mokopane; and acquisition of the LWUA infrastructure for incorporation into the project. A bulk distribution system means that the Flag Boshielo and De Hoop dams will be able to function as a single system, thereby enabling a higher water supply level to the target areas.

Importantly, the WSAs have been unable to realise the ambitions (i.e. to reduce water demands on the Flag Boshielo Dam, meet the increasing water demands of the City of Polokwane, and allowing the respective WSAs to have surplus water to meet their water demands) of the project on their own and the DWS has since appointed the LWUA to implement the most critical aspects of the scheme on their behalf. The DWS along with other stakeholders are working together to meet the following objectives:

- ▶ Delivering raw water and potable water to the region;
- ▶ Meeting the required water demand in the region; and
- ▶ Realising the socio-economic development expectations in the region.

In addition, it is critical for the project to proceed urgently to stabilise the region. Moreover, the need for clean drinking water is well documented and reasons for access to potable water include, and not limited to:

- ▶ Safe drinking water that is not harmful to human health;
- ▶ Reduce the reliance of rural communities (generally low-income households) on raw surface or groundwater water (i.e., often unsafe for human consumption);
- ▶ Improved livelihood and quality of life;
- ▶ Prevent, combat, or reduce the risk of contracting waterborne diseases;
- ▶ Safe and readily available water is important to public health, whether it is used for drinking, domestic use, food production or recreational; and
- ▶ Provision of adequate (clean) water supply infrastructure means less expenditure on health, as people are less likely to fall ill and incur medical costs (as a result of contracting waterborne disease), and importantly are better able to remain economically productive.

5.4.1 REGIONAL CONTEXT

The responsibility for providing clean and safe drinking water to the LNLm rests with CDM as the WSA. Water and sanitation infrastructure in the local municipality is generally in poor condition, and the municipality is currently experiencing high water losses due to aging infrastructure (CDM IDP, 2024). The SDM is the water authority responsible for bulk water supply, reticulation, and sanitation management in the FTLM. The FTLM plays a role in identifying water backlogs and sanitation challenges within its jurisdiction, liaising with the district municipality, and facilitating service delivery (FTLM IDP, 2024). The majority of the Phase 2F components and infrastructure are concentrated within the FTLM.

The water infrastructure within the municipality is primarily concentrated along the R37 and R555 roads. Approximately one-third (36%) of the population lacks access to water, which is largely due to the limited reach of water infrastructure in rural areas, compounded by South Africa’s general water scarcity (FTLM IDP, 2024). Additionally, there has been a lack of operation and maintenance of existing water infrastructure, exacerbated by reduced fiscal and labour capacity. This has left infrastructure in relatively well-serviced areas unable to meet the demand created by an influx of people seeking employment and services. Specifically, 34.40% of the population in FTLM has no access to piped water, 24.20% have access to piped water inside their dwellings, 21.80% have access to piped water within their yards, and 19.60% have access to water at communal stands (FTLM IDP, 2024).

In its IDP, FTLM has emphasised the need to engage with the LWUA and SDM, in consultation with the Office of the OMM, to mitigate potential failures associated with attempts to export raw water through dry villages.

The table below highlights the water challenges across the wards that the pipeline traverses.

Table 5-1: Water related challenges across the wards that the pipeline traverses (source: FTLM IDP, 2024).

Ward No	Challenges
15	All villages do not have proper water infrastructure.

10	
33	
34	No water at Mafeane, Maruping, Bogalatladi.
35	New pipeline at Madithame new stand, Malogeng new stand, extension of water pipes from existing boreholes.

5.4.2 NEED AND DESIRABILITY CHECKLIST

Specific need and desirability questions raised by the national and Department of Environmental Affairs and Development Planning (DEA&DP) need and desirability guidelines are addressed in **Table 5-2** below

Table 5-2: Need and desirability checklist

Need and Desirability (Timing)	
Question	Response
1. Is the activity permitted in terms of the property's existing land use rights?	Yes, the activity will be permitted in terms of the property's existing land use rights. Note: Segments of the pipeline and associated servitudes still traverse private properties. In such cases, LWUA, on behalf of DWS, will expropriate the necessary land and compensate all landowners and occupiers in accordance with the Expropriation Act No. 63 of 1975. Upon completion of the construction, the permanent servitude will be incorporated into the title deed description of each property.
2. Will the activity be in line with the following? (a) Provincial Spatial Development Framework (PSDF)	Yes, this is a project of national importance. The objectives of this project align with the goals outlined in the Limpopo Spatial Development Framework (SDF) and are specifically referenced as an objective in the De Hoop Master Plan for the province.
(b) Urban edge / Edge of Built environment for the area	As this project is a linear activity, it bisects the urban edge and the boundary of the built environment. However, given that this is a ministerial project, and an item outlined in the IDP for the FTLM and the SDM, the positive impacts of the project outweigh the negative.
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	The FTLM IDP (2024) outlines the strategies and goals for future development within the Municipality. The IDP emphasises the urgent need for improved water treatment, particularly through the active monitoring of water sources, due to the high levels of contamination present in the water used by rural communities. The LNLN IDP (2024), on the hand, references the Olifantspoort supply scheme and the intervention by the Minister of DWS, who established the Olifants Management Model to address the challenges associated with the Olifantspoort project. The objective of the project is to ensure the sustainable provision of water to approximately 534,000 households within the Lepelle Nkumpi and Polokwane Local Municipalities. Both IDPs are aligned with the Provincial SDF. The relevant SIP for water supply, and for this project, is the De Hoop Master Plan. The FTLM IDP highlights the need to accelerate the implementation of the De-Hoop Master Plan, supported by the ORWRDP⁸, in order to address the urgent water supply demands in the area.

⁸ Now the OMMP-BRWSP

Need and Desirability (Timing)	
Question	Response
(d) Approved Structure Plan of the Municipality	The local municipalities included the ORWRDP in their documents as a construction objective, referring to the project as both the De Hoop Dam Water Scheme and the ORWRDP. As such, this constitutes an approved structure plan for the municipalities, which will support them in achieving the SIPs for the province and the region.
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	The project lies within the Olifants EMF. One of the specific objectives of the EMF is to encourage sustainable development. The EMF also highlights several key issues, including: 1. More than two million people in the area depend on groundwater resources for their basic water needs. 2. Surface water in rivers and streams is generally unusable. 3. Water resources in the EMF area are already over-allocated. 4. Inadequate services and infrastructure remain significant problems in certain areas. The EMF further recommends that <i>"one method of increasing the volume of available water is to import water from external source"</i> which is where the OMMP-BRWSP project plays a critical role. In summary, the area the pipeline will traverse is already degraded, and the OMMP-BRWSP project will help address basic human needs along this route by providing access to potable water.
(f) Any other Plans (e.g. Guide Plan)	No
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	Yes. As mentioned in 2c above, the FTLM IDP (2024) emphasises the urgent need for improved water treatment.
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level, e.g. development is a national priority, but within a specific local context it could be inappropriate.)	The community needs the project since it would benefit directly from the bulk water supply infrastructure. The project will provide potable water to the residents; and provide both raw and potable water to commercial users, thereby potentially enabling the provision of basic water-services and associated infrastructure. Furthermore, at least 50+ people will be employed during the construction phase of the OMMP-BRWSP project.
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	No services are needed; the project is adding additional services in the area by supplying potable water to the community and the surrounding areas.
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority	Yes, it is. As discussed above regarding the relevant IDPs and Provincial SDF, the local municipalities include the ORWRDP in their documents as a construction objective, referring to the project as both the De Hoop Dam Water Scheme and the ORWRDP.

Need and Desirability (Timing)	
Question	Response
and placement of services and opportunity costs)?	
7. Is this project part of a national programme to address an issue of national concern or importance?	Yes, the OMMP-BRWSP is a water scheme under the authority of the DWS with the objective of meeting the water resource demand within the Olifants catchment area. As such, it is part of the national program addressing a critical issue of national concern. The need for this project stems from the commitments made by the South African Government in Chapter 2 (Bill of Rights) of the Constitution, specifically sections 24 and 27. Additionally, it aligns with the Millennium Development Goals (MDGs) set by the United Nations (UN) in 2000, where South Africa committed to achieving universal access to basic water and, in particular, to ensuring that all schools and clinics had access to water by 2008.
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	Yes, the pipeline and related infrastructure have been positioned in areas that facilitate or support the activity, such as placing the pipeline upstream and alongside existing roads, powerlines, and other infrastructure.
9. Is the development the best practicable environmental option for this land/site?	Yes, the people in this area do not have access to potable water, making this project essential for meeting their water needs. Additionally, the project alignment is located near existing roads and is primarily situated in previously disturbed areas with minimal steep slopes.
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	Yes, people in this area currently lack access to potable water. This project will provide all residents in the Olifants Catchment area of the FTLM and the LNLN with access to basic water, meeting a critical human need. Therefore, the negative impacts of the proposed development, after mitigation measures are implemented, are negligible when compared to the significant benefits the project will bring.
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	The SDM and CDM will have to design and construct water treatment and reticulation infrastructure to access raw water from the OMMP-BRWSP (Phase 2F).
12. Will any person's rights be negatively affected by the proposed activity/ies?	Yes, the project will impact individuals' rights. There are parcels of land claimed by individuals within the footprint of the proposed Phase 2F infrastructure and alignment. These issues will be addressed through a formal legal process in accordance with the Expropriation Act No. 63 of 1975.
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	No, as this project will improve the resources available to people living on the urban edge.
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPs)?	Since inception, the project has acquired the status of strategic importance, and recently on 05 March 2023 the project was classified as a SIP under the SIP 19 (i.e., Water and Sanitation Infrastructure Portfolio).
15. What will the benefits be to society in general and to the local communities?	The project aims to develop much-needed bulk water infrastructure, which will then supply potable water to both residents and

Need and Desirability (Timing)	
Question	Response
	commercial users. The local community will gain access to potable water, addressing a fundamental human need. The expected benefits of providing a reliable potable water supply include: • A reduction in waterborne illnesses • Improved health and livelihoods for local communities • Enhanced sustainability efforts in the region On a broader scale, the project will contribute to addressing water and sanitation challenges in the area. Furthermore, the overall project holds international significance, as it supports South Africa's ability to meet its global obligations, particularly the Sustainable Development Goals (SDGs). These 17 SDGs, part of the 2030 Agenda for Sustainable Development, were adopted by the UN General Assembly on 25 September 2015. As a member of the UN, South Africa has committed to achieving these globally recognised goals. Specifically, SDG Target 6.1 calls for universal and equitable access to safe and affordable drinking water.
16. Any other need and desirability considerations related to the proposed activity?	Not applicable.
17. How does the project fit into the National Development Plan for 2030?	The NDP for 2030 aims to create jobs, develop and expand infrastructure, transition to a low carbon economy and unify South Africa. This project will fit into the NDP as follows: <u>Create jobs:</u> • The proposed project is expected to result in jobs for the construction phase and the operational phase. • Indirect opportunities for small businesses would be generated such as accommodation, food and service industries through the increased number of people travelling to the proposed area. • Many indirect jobs, such as the hospitality industry, transportation industry and manufacturing industry may also be created. <u>Infrastructure development and expansion:</u> • The OMMP-BRWSP project aims to provide potable water to communities, which will require the construction of the necessary infrastructure, including raw bulk water pipelines and associated facilities. <u>Transformation and unity:</u> • Employment equity will be met through the Operation and Maintenance Project Company and the contractors responsible for the construction of the pipeline and associated infrastructure. • Economic development is one of the most important requirements of the country. Engagement with the community, relevant Traditional Authority (Pulana Maroga Traditional Authority) and stakeholders has already commenced. The NDP outlines that, by 2030, a Public Infrastructure Investment Program will allocate 10% of GDP to water resources, energy, and transport. It further commits to creating more efficient infrastructure

Need and Desirability (Timing)

Question	Response
	for water supply, improving water access for all South Africans, and ensuring access to safe drinking water (NDP, 2013).
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	Table 5-3 lists the general objectives of integrated environmental management and indicates how the project supports them
Table 5-3: Consideration of NEMA objectives	
Section 23(2) of NEMA: The general objective of integrated environmental management is to:	Description as to how the proposed development has taken these general objectives into account.
(a) promote the integration of the principles of environmental management set out in section 2 of NEMA into the making of all decisions which may have a significant effect on the environment;	The underlying principle of this BA process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project by Specialists to ensure that the project will be undertaken in an environmentally responsible manner. In recognition that social responsibility is something which needs to be actively developed, a PPP will be undertaken. This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information.
(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;	This BAR includes the list of potential impacts associated with this project. Each aspect was evaluated to determine the significance of the impact and mitigation measures have been proposed to reduce negative impacts and to enhance positive impacts. The standard EMPr has been updated to include the recommendations from the respective specialists to guide the construction and operational phases in an environmentally and socially sound manner (Refer to Annexure F).
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.	Specialist studies were commissioned to ensure that specific impacts are adequately assessed, and appropriate mitigation measures are proposed.
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment.	The PPP that is undertaken for the proposed project is described in detail in Section 4. The PPP will be done in accordance with Regulation 41 of the 2014 EIA Regulations (GN R982 of 2014) and the applicable best practice guidelines.
(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment.	The final alignment was proposed once the ZNJV EAP team with the engineering team had been to site as part of a site screening assessment. Detailed designs and layouts of infrastructure along and within the site footprint will take sensitivities and buffer zones into account, as detailed in the specialist assessments in Section 7 and Annexure D .
(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	Recommendations and mitigation/ enhancement measures for each of the impacts identified in Section 7 have been included in the EMPr in Annexure F. The purpose of these recommendations is to minimise the disturbance to the environment, and enhance possible opportunities associated with locating the proposed development at this particular site. Where negative impacts are unavoidable, strict management and rehabilitation is recommended to minimise the potential negative impacts.
19. Please describe how the principles of environmental	Section 2 of NEMA lists principles that underpin Sustainable Development and the consideration of environmental impact within the Act. These principles are critical to achieve Sustainable

Need and Desirability (Timing)**Question**

management as set out in section 2 of NEMA have been taken into account.

Response

Development and to balance competing demands for resources from economic system, social, and ecological systems. These principles are applicable to the “actions of all organs of state that may significantly affect the environment” and it is therefore crucial to apply them to the proposed development, for decision-makers to be confident that their decision to allow a development, promotes sustainable development.

The underlying principle of this BA process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project to ensure that the project will be undertaken in an environmentally responsible manner. Recognising that social responsibility is something that needs to be actively developed, PPP will be undertaken (as detailed above in **Section 4**). This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information. Furthermore, knowledge from I&APs will be included in all forms, including traditional or ordinary knowledge. The PPP and consultation with the directly affected landowners will also aim to improve environmental awareness in the area [Section 2(4)(h) of NEMA].

Key organs of state that may have interest in the project have been proactively identified, and an effort has been made to promote intergovernmental coordination as far as possible to reduce the potential for conflicts of interest, caused by lack of information or inappropriate communication channels. Proof of this correspondence is detailed in **Section 4** and **Annexure C**.

Environmental management has been considered to place people and their needs at the forefront of its concern, aiming to serve their physical, psychological, developmental, cultural and social interests equitably [Section 2(2) of NEMA].

However, it is crucial that ecological considerations are also considered through this process and avoidance, minimising or rehabilitating measures are detailed for the disturbance of ecosystems and loss of biodiversity, pollution and degradation of the environment, disturbance of landscapes, and sites that constitute the nation’s cultural heritage, waste, and the use and exploration of non-renewable natural resources [Section 2(4)(a)(i-v) of NEMA]. Where a negative impact is unavoidable, measures have been considered to remedy the disturbance and address the effects [Section 2(4)(p) of NEMA].

The nature of this BA process has been to undertake a risk-averse and cautious approach, and where relevant the worst-case scenario has been assessed. Each specialist has detailed their methodology as well as their assumptions and limitations about their assessments, and these reports have been included in full in **Annexure D**. The specialists undertook their site visits in December 2023. The findings of these assessments have been amalgamated into this BAR which have assessed the impact of this proposed development.

Should this BAR be granted a positive environmental authorisation, stringent environmental health and safety standards will be required. It will also acknowledge the right of workers to refuse work that is

Need and Desirability (Timing)	
Question	Response
	harmful to human health, or the environment, and be informed of any potential dangers [Section 2(4)(e & j)]. In addition, this process has been undertaken in a manner that meets the principles and objectives of the South African legislation, and also meets global and international responsibilities relating to the environment by contributing to the renewable energy targets and reducing the reliance on carbon heavy energy sources using fossil fuels [Section 2(4)(n)].

6 CONSIDERATION OF ALTERNATIVES

This section aims to address the following requirements of the regulations:

Appendix 1. (3) A BAR (...) must include -

- (g) A motivation for the preferred site, activity and technology alternative;
- (h) a full description of the process followed to reach the proposed preferred alternative, within the site, including –
 - (i) details of all the alternatives considered;
 - (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;
 - (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;
 - (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
 - (v) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;
 - (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and
 - (xi) a concluding statement indicating the preferred alternative development location within the approved site.

The NEMA requires that alternatives are considered during the BA process. The DEA&DP Guideline on Alternatives (2013)⁹ states that: *“every EIA process must identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives were found, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not proceeding, is required during the assessment phase. What would, however, have to be provided to the Department in this instance is proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the preferred option and the no-go option exist.”*

The 2014 EIA Regulations (GN R982 of 2014) provide the following definition: “*Alternatives*”, in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to the –

- a) property on which or location where the activity is proposed to be undertaken;
- b) type of activity to be undertaken;
- c) design or layout of the activity;
- d) technology to be used in the activity;
- e) operational aspects of the activity; and
- f) includes the option of not implementing the activity (“No-Go” alternative).

This EIA application involves seeking EA for components of Phase 2F, which is part of the overall OMMP-BRWSP project, along with its associated infrastructure.

The project was first evaluated for different alternatives in the original impact assessment process and has since been authorised in the RoD under the ECA (Ref No.: **03/2/4** and **12/12/20/553**). However, due to issues with servitude encroachments, the authorised alignment has been re-evaluated using a Multi-Criteria Analysis (MCA) approach.

⁹ This guideline has been used as a best practice tool since it is the most recent guideline on alternatives.

A MCA workshop was conducted by a multi-disciplinary team to determine the most feasible and reasonable pipeline alignment routes/locations for the proposed OMMP-BRWSP. The scoring criteria for the analysis were based on the following system:

- 0 – Fatal flaw;
- 1 – Not favourable (has most impacts and/or risks);
- 2 – Slightly unfavourable (average impacts and/or risks); and
- 3 – Favourable (least impacts and/or risks).

The most suitable locations were selected based on the following factors, which were scored using the above system:

Table 6-1: Weighing criteria

Factors	Description
Feasibility	• Topography and angles of the slopes to ensure a gravitational pipeline scheme could be developed; • Possible invert levels of the pipeline; • Existing infrastructure (roads, Eskom powerlines etc.); • Access to land; • Location of human settlements; and • The details from the original EIA undertaken for the scheme.
Geotechnical Suitability	• The material required for construction; • The volume of the material required; and • The requirements for blasting.
Environmental and Social	• Impacts on heritage features; • Red data species (fauna and flora); • Land capability and vegetation cover; • Rivers and other water features; drainage lines; • Surrounding communities; and • Visual impacts.

The outcome of the MCA workshop concluded that the originally authorised alignment is no longer feasible. This is due to the placement of infrastructure such as houses, businesses, Eskom power lines, and municipal services along the original route. Furthermore, efforts were made to avoid protected trees, encountered along the route, and to remain within the boundaries of the Lebalelo Scheme. Constructing the pipeline along the original alignment would therefore be costly and would disrupt the livelihoods of local residents.

As a result, the ZNJV team proposed a slight adjustment to the alignment to ensure it is ranked as the most favourable option. It is important to note that certain areas could not be avoided, and the relevant specialist impact assessments (refer to the impact assessment discussion in **Section 7** below) have recommended appropriate mitigation measures for these areas.

6.1 LOCATION ALTERNATIVES

6.1.1 RAW WATER PIPELINE REALIGNMENT

The design of the horizontal and vertical alignments for Phase 2F was completed before 2016, during the detailed and preliminary design stages respectively. Since then, the servitudes of the pipeline route have faced various encroachments, including expanding rural development, illegal mining activities, legal mining expansions, and the planning of bulk services such as Eskom transmission lines. Additionally, there has been erosion along roads and the enlargement of dongas and streams.

As a consequence of the expansions mentioned above, it may be necessary to relocate and resettle several households in these areas to accommodate the project. However, in an effort to mitigate this

social impact, certain adjustments were made to the approved pipeline alignment in 2023. These adjustments aimed to reduce the number of households affected. As illustrated in **Figure 5-1** above, a proposed pipeline realignment is observed from chainage 14220, reconnecting with the originally approved 2017 route at chainage 10580. Other deviations are indicated in **Figure 5-2** and **Figure 5-3**. These deviations entail encroachment into a few residential yards or existing infrastructure. It is imperative to implement appropriate measures to ensure that these affected parties receive reasonable and appropriate compensation. Furthermore, these areas have been assessed by the specialists, and the impacts, along with the proposed mitigation measures, are discussed in **Section 7**.

6.2 TECHNOLOGY ALTERNATIVES

6.2.1 RAW WATER PIPELINE REALIGNMENT

Alternative 1 (Preferred Alternative):

Excavating a trench and installing the infrastructure is the approved method by the DWS. This approach ensures that the pipeline is buried underground, including beneath rivers, to protect it from damage caused by vandalism and environmental conditions. When crossing rivers, the pipeline will be concrete-encased and buried at a depth greater than the 100-year river scouring depth, ensuring the infrastructure is safeguarded throughout its lifetime. All infrastructure will be constructed in accordance with DWS requirements.

For the construction of the scheme, the following equipment and general construction technologies will be used:

- Excavators and TLBs for trenching.
- Front-end loaders and trucks to transport materials.
- Cranes to lay the pipes.
- Rock breakers, rock peckers, and blasting to trench through rock.
- Pumps to de-water the trench and excavations, allowing work to continue in areas where water ingress occurs.
- Concrete batching facilities and equipment to construct other structures such as scour chambers, pump stations, reservoirs, and pigging stations (which allow for cleaning of the pipeline to prevent bacterial growth).

The scheme will be operated from a control room in Groblersdal via a fibre optic cable, making the entire system automated during operation. However, the scheme has been designed to allow for manual operation if needed.

Alternative 2:

An overland pipeline is prone to vandalism and theft. Additionally, this method of installation is not approved by the DWS. Furthermore, large-diameter pipelines present additional concerns, such as acting as physical barriers and posing safety risks.

Alternative 3:

Pipe jacking or tunnelling could be considered; however, it is costly and unnecessary if excavation is a feasible option.

Note: Alternatives 2 and 3 were not subjected to specialist assessment and will therefore not be discussed further in this report. Only Alternative 1 is considered feasible and has been assessed in detail.

6.3 NO-GO ALTERNATIVE

The assessment of alternatives must always include the “no-go” option as a baseline against which all other alternatives must be measured. The no-go option represents the status quo which normally presents the option of not implementing the activity. The assessment of the No-Go is a requirement of NEMA but also considered a global best practice. This assessment can provide a baseline scenario against which the project (or its alternatives) can be compared. In this instance, the no-go alternative would mean that the objective to meet the water resource demand within the Olifants catchment area will not be achieved. As a result, the communities in the FTLM and the Lepelle Nkumpi Local Municipality, through which the pipeline traverses, would not have access to clean potable water. Additionally, without the development of this project, the DWS will not be able to fulfil the commitments made by the Constitution of South Africa and the government to provide all South Africans with basic human needs. In addition to supplying water and creating jobs for the community, a community social investment project will also be developed and implemented for the impacted communities. This is another way the government can contribute to achieving sustainability for all South Africans.

This is not a feasible alternative. The no-go alternative would only have been seriously considered if significant environmental or social red flags, or fatal flaws, had been identified at sites considered for the pipeline development and associated infrastructure —issues which are not present in this application.

7 BASELINE ENVIRONMENT AND ENVIRONMENTAL IMPACT ASSESSMENT

The description of the affected environment provided below draws on existing knowledge from published data, previous studies, site visits to the site and surrounding area, specialist studies and discussions with various role players. The high-level identification of potential impacts which may occur as a result of the proposed activities described in **Section 5**, is broad and covers the phases of the project life cycle. Cumulative impacts have been assessed per environmental aspect in the BAR and by specialists.

The specialist assessments conducted, and compliance statement compiled as part of the BA process have been included as **Annexure D** to this report. As such, the baseline descriptions of the footprint, followed by the predicted impact assessments are detailed below, as assessed by the specialist team.

7.1 PROJECT BASELINE INFORMATION

7.1.1 CLIMATE

The climate of the study area can be described as semi-arid, lying in the rain shadow of the escarpment which has an annual rainfall of 400 mm and mean temperature of 22°C.

7.1.2 SURFACE WIND FIELD

The SDM experiences an average monthly wind speed of 0.72 m/s. Wind patterns are predominantly from the south-south-west (30.6%) and south-west (20.4%). The CDM generally observes wind speeds of between 4 – 6 m/s. The predominant wind direction is from the north-east (18%) and south (15%).

7.1.3 TEMPERATURE AND HUMIDITY

The average monthly temperature in the SDM ranges between 4 and 32°C. The average maximum daytime temperature of 32 °C occurs in January with the lowest average minimum temperature of 4°C occurring in July. Temperatures in the CDM are generally mild to warm in summer with an average summer maximum of 26°C. Winters are generally cool (average minimum temperature of 6°C; average maximum of 16°C) although low temperatures do occur.

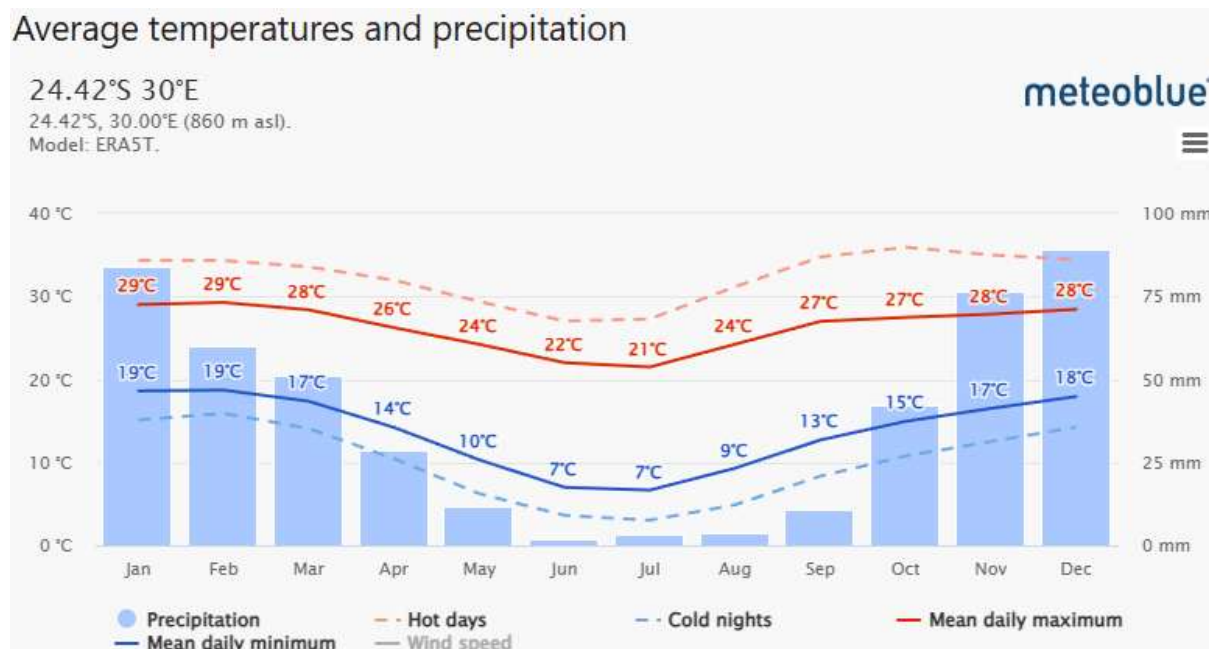


Figure 7-1: Sealane Average Temperature and Precipitation for the Period 1993 – 2023 (EHRCON, 2024)

7.1.4 PRECIPITATION

The average annual rainfall for the SDM is 551 mm and the average maximum monthly rainfall in the summer month of December/January/February is 267 mm. Little rainfall occurs during the winter month of July with an average monthly precipitation of 3 mm. The average annual rainfall in the CDM ranges from 300 mm in the north to 1 000 mm in the south. The district has a semi-arid climate with hot, wet summers and cool, dry winters.

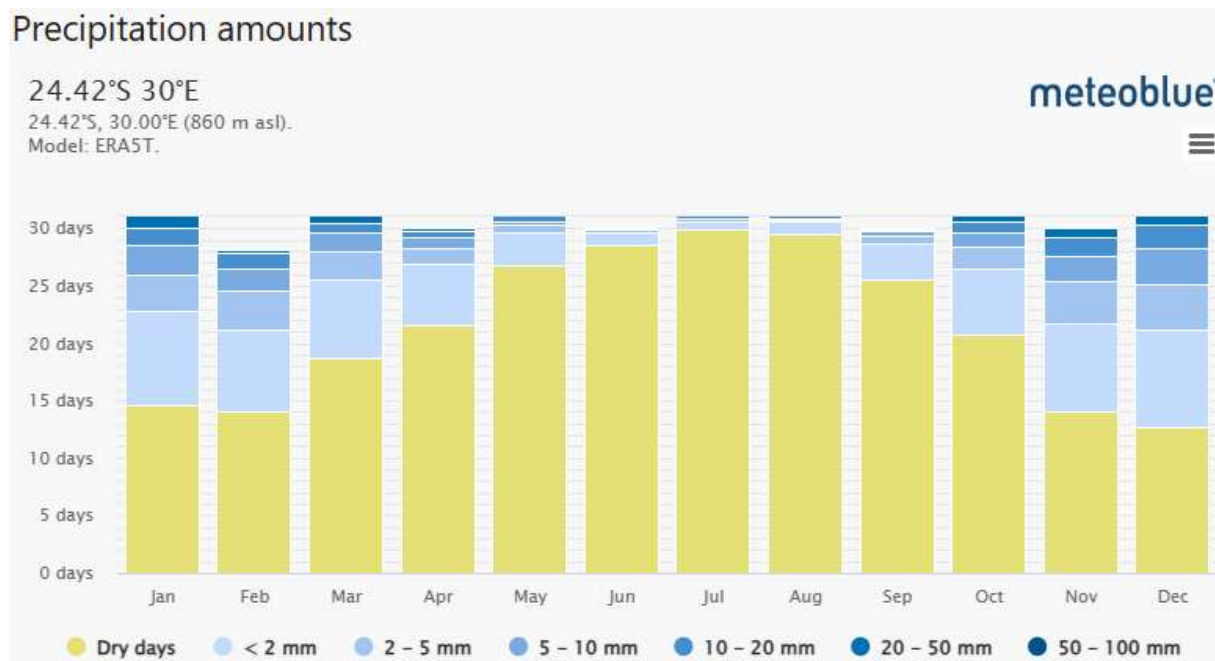


Figure 7-2: Sealane Average Monthly Rainfall for the Period 1993 – 2023 (EHRCON, 2024)

7.1.5 TOPOGRAPHY AND LANDUSE

The main economic activities in Sekhukhune are mining and irrigated agriculture. Platinum, Chrome, Gold and Palladium mines situated in the eastern part of the district, around the Leolo Mountains. The rocks and soils of the Sekhukhuneland region hold some of the highest concentrations of heavy metals in the world including chromium, platinum, titanium, and vanadium. This has led to an enormous growth in the mining sector, with many more mines planned for the area.

Development of the Dilokong Corridor, an area rich in mineral deposits that stretches northeast of Sekhukhune through Fetakgomo and Tubatse, is expected to provide increased economic opportunity in the district. There are commercial irrigated farms near Groblersdal and Marble Hall in the southwest and Zebediela in the north; however, only 30% of the district's land area is under commercial farming.

In 2014, the sectors that contributed the most to CDM's economy were Community services (33.0%), Finance (20.8%), and Trade (21.6%). The Agricultural sector contributed the least to the economy at 1.9%. At present, agriculture besides farming includes forestry, fruit cultivation, dairy, poultry, mushroom and bee keeping.

The topography of the entire Phase 2F alignment ranges from 740 m to 950 m Above Mean Sea Level (AMSL).

7.2 AGRICULTURAL COMPLIANCE STATEMENT (SOILZA, 2024)

The agricultural compliance statement was compiled by SoilZa. The assessment was based on an on-site investigation conducted on 10 November 2024 and was further informed by existing climate, soil, and agricultural potential data for the site. The objective of the agricultural assessment is to answer the question: will the proposed development cause a significant reduction in agricultural production potential, and most importantly, will it result in a loss of arable land?

7.2.1 SITE SENSITIVITY VERIFICATION

The agricultural sensitivity of the site, as classified by the screening tool, is shown in **Figure 7-3**. The screening tool classifies the pipeline route as ranging from low to very high agricultural sensitivity. The high and very high sensitivity classification is due to a combination of some land being classified as cropland (high sensitivity) and some being classified as high or very high sensitivity because of its land capability rating. This assessment confirms the high sensitivity rating by the screening tool that is based on the cropping status component of sensitivity.

The direct relationship between land capability rating, agricultural sensitivity, and rain-fed cropping suitability is shown in **Table 7-1**, including differences between the summer and winter rainfall areas.

Table 7-1: Relationship between land capability, agricultural sensitivity, and rain-fed cropping suitability.¹⁰

Land capability value	Agricultural sensitivity	Rain-fed cropping suitability	
		Summer rainfall areas	Winter rainfall areas
1 - 5	Low	Unsuitable	Unsuitable
6	Medium		Suitable
7			
8	High		
9 - 10			
11 - 15	Very High		

The classified land capability of the site ranges from 3 to 11. According to the strict definitions of agricultural sensitivity, the site must be classified as high sensitivity because its inherent land capability is likely to be above 8 in many places along the route. However, the very high sensitivity rating (land capability value of 11) only occurs in a few pixels along the route and is unlikely to occur in reality. This assessment verifies a classified land capability up to 10, but disputes one of 11.

¹⁰ Note that a value of 8 is defined as high agricultural sensitivity in NEMA's agricultural protocol but does not show as high on the screening tool's output due to an error in the tool. In this assessment, all areas of value 8 are treated as being high sensitivity.

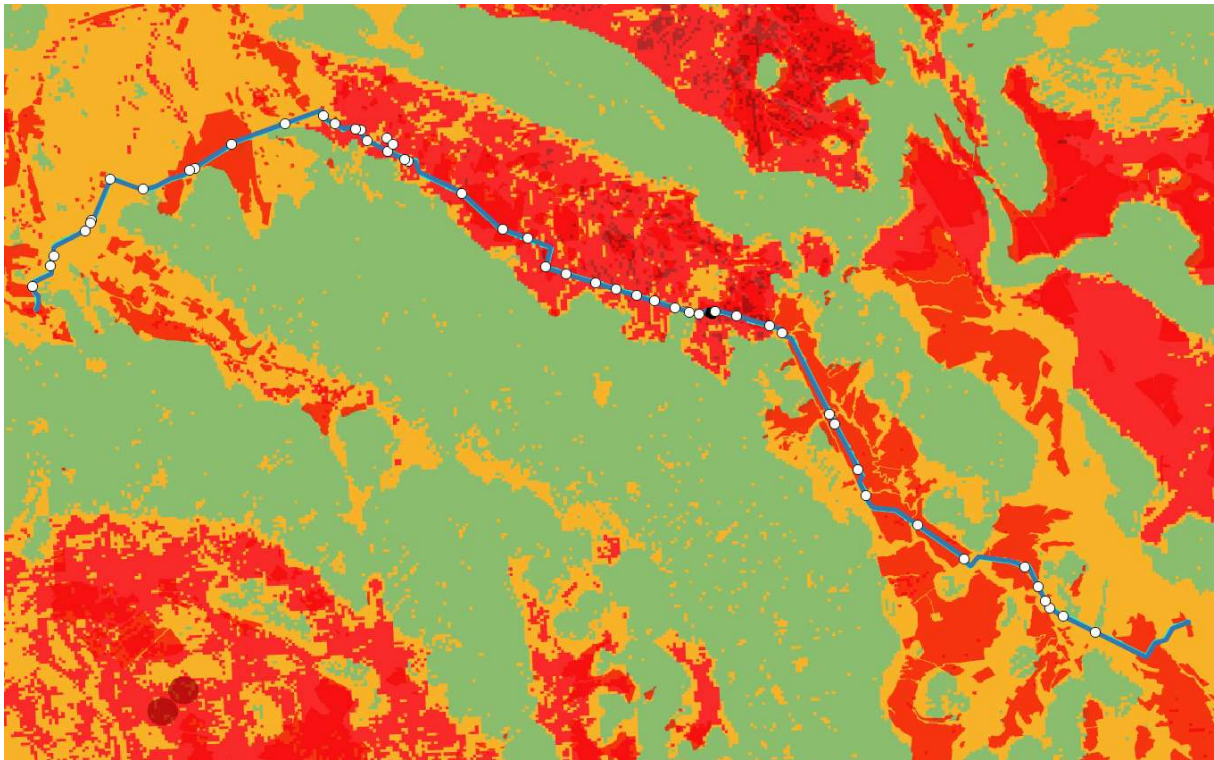


Figure 7-3: The pipeline route overlaid on agricultural sensitivity, as classified by the screening tool (green = low; yellow = medium; red = high; dark red = very high).

This assessment disputes the very high sensitivity rating of the pipeline route by the screening tool and verifies the overall sensitivity rating as being high because of the land's assessed agricultural production potential and current agricultural land use. However, although the sensitivity is high in places, the impact significance is low.

7.2.2 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

The cropping potential of parts of the site is limited by the combination of climate constraints (fairly low rainfall), terrain constraints in places, and soil constraints. Soil limitations that prevent crop production are predominantly the result of limited depth due to underlying bedrock, clay, or hardpan, or the result of poor drainage. Because of these constraints, part of the site is unsuitable for viable rainfed crop production and its viable agricultural use is limited to grazing. In places, where soil conditions allow, there is extensive subsistence cropping. The rest is used only as grazing land.



Figure 7-4: Typical site conditions (SoilZa, 2024).

7.2.3 ASSESSMENT OF THE AGRICULTURAL IMPACT

7.2.3.1 Impact Identification and Assessment

There is only ever a single agricultural impact of any development, and that is a net change to the future agricultural production potential of land. The significance of an agricultural impact is a direct function of the following three factors:

1. the size of the footprint of impacted land
2. the baseline production potential (particularly cropping potential) of that land
3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

In the case of a buried pipeline, factor 3 and factor 1 are both so small that the total extent of the loss of future agricultural production potential is insignificantly small, regardless of how much production potential the land has. The impact duration is confined to the construction period only. The pipeline is buried underground which means that agriculture can continue unaffected above it, once construction is completed. Therefore, no land, is permanently lost to agriculture. The footprint of land that will be excluded from agricultural production, even during construction, is extremely limited, with some impingement on subsistence cropland.

The potential impacts associated with soil erosion and degradation can be completely prevented with standard, generic mitigation measures that are all inherent in the project engineering and are standard, best-practice for construction sites, and are included in the EMP. Such impacts are therefore not significant.

The main concern of agricultural impact is to protect against a threat to national food security due to the loss of agricultural production potential, mainly through loss of arable land. The proposed development will cause no long-term loss of agricultural production potential, and the agricultural impact is therefore assessed as being of very low significance. There will be some minor disturbances to agricultural activities during construction.

7.2.3.2 Cumulative Impact Assessment

The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential.

Due to its negligible agricultural impact, the assessed development will not contribute to the cumulative impact. The cumulative agricultural impact of the proposed development is therefore assessed here as being of low significance and therefore as acceptable. The development will not have an unacceptable negative impact on the agricultural production capability of the area, and it is therefore recommended, from a cumulative agricultural impact perspective, that the development be approved.

7.2.3.3 Assessment of Alternatives

Because of the insignificant agricultural impact of the proposed pipeline, there can be no material difference between the agricultural impacts of the non-preferred and the preferred alternatives along the proposed route.

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There are no agricultural impacts of the no-go alternative, but this is not significantly different from the very low impacts of the development and there is therefore no preferred alternative between the development and the no-go, if assessed purely from an agricultural impact perspective.

7.2.4 MITIGATION MEASURES

Where construction related disturbances have any potential to lead to channelling of runoff water with consequent erosion, the water runoff must be safely controlled by way of bunds and ditches to be safely disseminated downstream.

The following steps must be implemented for mitigation of impact on soil capability along the excavated trench for the pipeline:

1. When excavating for the pipeline, the upper 150 mm (15 cm)¹¹ of topsoil - as recommended in the project and contract specifications — must be excavated first and stockpiled.
2. The subsoil must then be excavated and stockpiled **separately** from the topsoil stockpile.
3. When the trench is refilled after the pipeline is installed, the subsoil must first be backfilled into the trench.
4. Thereafter, the stockpiled topsoil must be evenly spread at the surface on top of the subsoil.
5. The soil should be backfilled to be raised approximately 450 mm (30 cm) above the surface - as per contract specifications- because it will settle over time and potentially create a water flow path with consequent erosion if it settles to form a depression.

7.2.5 ADDITIONAL ASPECTS REQUIRED IN AN AGRICULTURAL ASSESSMENT

7.2.5.1 Micro-siting

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimise fragmentation and disturbance of agricultural activities. Because of the low agricultural impact, micro-siting is not necessary and will make no material difference to agricultural impacts and disturbance.

7.2.5.2 Confirmation of Linear Activity Impact

The agricultural protocol requires confirmation, in the case of a linear activity, that the land can be returned to the current state within two years of completion of the construction phase. It is hereby confirmed that the land along the buried pipeline can be returned to the current state of agricultural production potential within two years of construction, except for small surface infrastructure footprints, such as air valves and valve chambers.

¹¹ Recommended by the specialist.

7.2.6 SPECIALIST CONCLUSION

The overall conclusion of this assessment is that the proposed development is acceptable because it leads to no loss of future agricultural production potential.

The screening tool classifies the pipeline route as ranging from low to high agricultural sensitivity. This assessment confirms the high sensitivity rating of the pipeline route by the screening tool because of the land's assessed agricultural production potential and current agricultural land use. However, although the sensitivity is high in places, the impact significance is low.

The cropping potential of most of the site is limited by the combination of climate constraints (low moisture availability), terrain constraints in places, and soil constraints. Soil limitations that prevent crop production are predominantly the result of limited depth due to underlying bedrock, clay, or hardpan, or the result of poor drainage. Because of these constraints, much of the site is unsuitable for viable rainfed crop production and its viable agricultural use is limited to grazing. Almost all of the route is used only as grazing land, with patches of subsistence cropping in limited places.

An agricultural impact is a change to the future agricultural production potential of land. In this case, the impact duration is confined to the construction period only. The pipeline is buried underground which means that agriculture can continue unaffected above it, once construction is completed. Therefore, no land is permanently lost to agriculture and almost no cropland is impacted.

The proposed development will cause negligible loss of agricultural production potential, and the agricultural impact is therefore assessed as being of very low significance. From an agricultural impact point of view, it is recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions other than that the recommended mitigation is implemented.

7.3 AIR QUALITY IMPACT ASSESSMENT (EHRCON, 2024)

EHRCON (Pty) Ltd (EHRCON) was commissioned to assess the air quality impacts associated with the proposed scope changes for Phase 2F. The objectives of this study were to characterise and describe ambient emissions from the construction, operation, and rehabilitation phases of the Phase 2F Project, and to assess their potential impact on the health of the receiving community.

7.3.1 POLLUTION SOURCES AND RECEPTORS

7.3.1.1 Pollution Sources

Four "hot-spot" areas were selected for dispersion modelling based on the current understanding of the air quality within the Province, the location of significant sources as well as available emissions data.

These are:

- **Polokwane region:** a region with a high number of sources and no up-to-date ambient air quality data to determine the current state of air.
- **Lephalale region:** the only region within the province with power stations and large-scale coal mining activities.
- **Phalaborwa region:** the only area with fertiliser manufacturing, a copper smelter and large opencast mining operations.
- **Steelpoort Valley:** an area with significant number of mining activities.

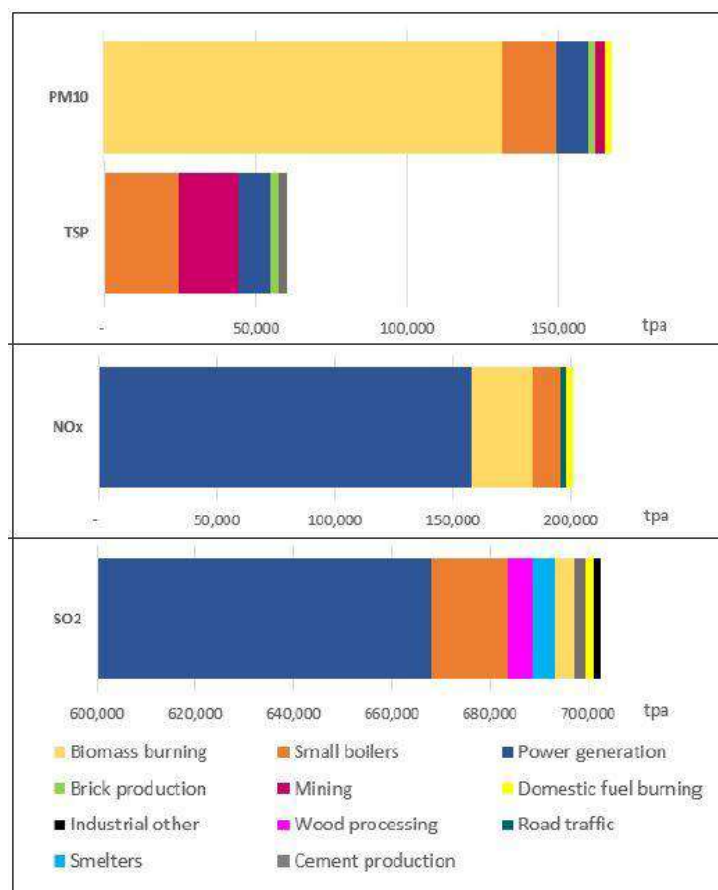


Figure 7-5: Limpopo Province Emission Per Source Group.

Some of the concerns identified were:

- ▶ The predicted impacts within the Polokwane area are mainly localised.
- ▶ The area around Lephalale is of concern, due to the planned development rather than the current situation. Current Ground Level Concentrations (GLCs) PM₁₀ are however a concern around the opencast mines in the area where it is predicted to exceed standards at nearby settlements.
- ▶ The main area of concern is around Phalaborwa due to very high SO₂ concentrations impacting the town.
- ▶ The Steelpoort area due to the numerous mining operations within proximity to villages and homesteads resulting in high PM₁₀ GLCs.

Dispersion modelling carried out as part of the baseline assessment indicated that ambient air quality standards of PM₁₀ and SO₂ may be exceeded from time-to-time near Lephalale, Phalaborwa and in the Steelpoort Valley. This implies a potential of Zones 3¹² or 4¹³ being approached, requiring action by Air Quality Officers. However, as no substantive air quality measurements have been conducted in these areas, other than SO₂ by Phalabora Copper, it is suggested that insufficient information exists to indicate which of the two air quality control zones is applicable. It was recommended, therefore, that current monitoring requirements are aimed at a Zone 3 (purple zone) level in those regions. Until better information becomes available, it was recommended that a Zone 2¹⁴ classification be given to the other areas in the province.

¹² **Purple Zone:** Class 3 Air Quality Area: The areas where ambient air quality remains within the standards, but sustained air quality management interventions are required to, at least, maintain or improve this situation.

¹³ **Orange Zone:** Class 4 Air Quality Area: The areas where ambient air quality represents a possible threat to health and well-being and requires immediate and sustained air quality management interventions to, at least, bring the area into compliance with the standards within agreed time frames.

¹⁴ **Blue Zone:** Class 2 Air Quality Area: The areas where ambient air quality remains within Alert Levels, but “pre-emptive” air quality management interventions are required other than basic good air quality governance.

7.3.1.2 Air Quality Monitoring

7.3.1.2.1 Ambient Particulate Matter Monitoring

Ambient PM₁₀ and PM_{2.5} concentrations (and meteorological parameters) were monitored at Dilokong Hospital, Driekop and the Samancor Chrome Winterton Recreational Club from October 2015 until March 2016.

Figure 7-10 and **Figure 7-11** include the particulate matter monitoring locations.

During 2015, eleven exceedances of the 24-hour PM₁₀ standard were recorded at Dilokong Hospital, indicating non-compliance with the PM₁₀ standard as only four exceedances of the standard are permitted per calendar year. PM_{2.5} concentrations were low, with no exceedances recorded, indicating compliance with the standard. One exceedance of the PM₁₀ standard was recorded on in February 2016, with no exceedances of PM_{2.5} being recorded.

Figure 7-6 and **Figure 7-7** present the daily average PM₁₀ and PM_{2.5} concentrations recorded over the period 7 October 2015 to 5 February 2016 at Dilokong Hospital. For 2015, the PM₁₀ annual average was 52.20 µg/m³, exceeding the annual standard (40 µg/m³), while the PM_{2.5} annual average was 8.25 µg/m³, remaining well below the annual standard of 25 µg/m³.

For 2016, the PM₁₀ running annual average was 34.03 µg/m³, falling below the annual standard, while the PM_{2.5} running annual average was 5.50 µg/m³, remaining well below the new more stringent annual standard of 20 µg/m³.

No exceedances of PM₁₀ or PM_{2.5} were recorded at Samancor Chrome Winterton Recreational Club.

Figure 7-8 and **Figure 7-9** present the daily average PM₁₀ and PM_{2.5} concentrations recorded over the monitoring period of 6 February to 2 March 2016 at Samancor Chrome Winterton Recreational Club.

The PM₁₀ running annual average was 36.14 µg/m³, falling below the annual standard while the PM_{2.5} running annual average was 6.39 µg/m³, falling well below the new more stringent annual standard of 20 µg/m³.

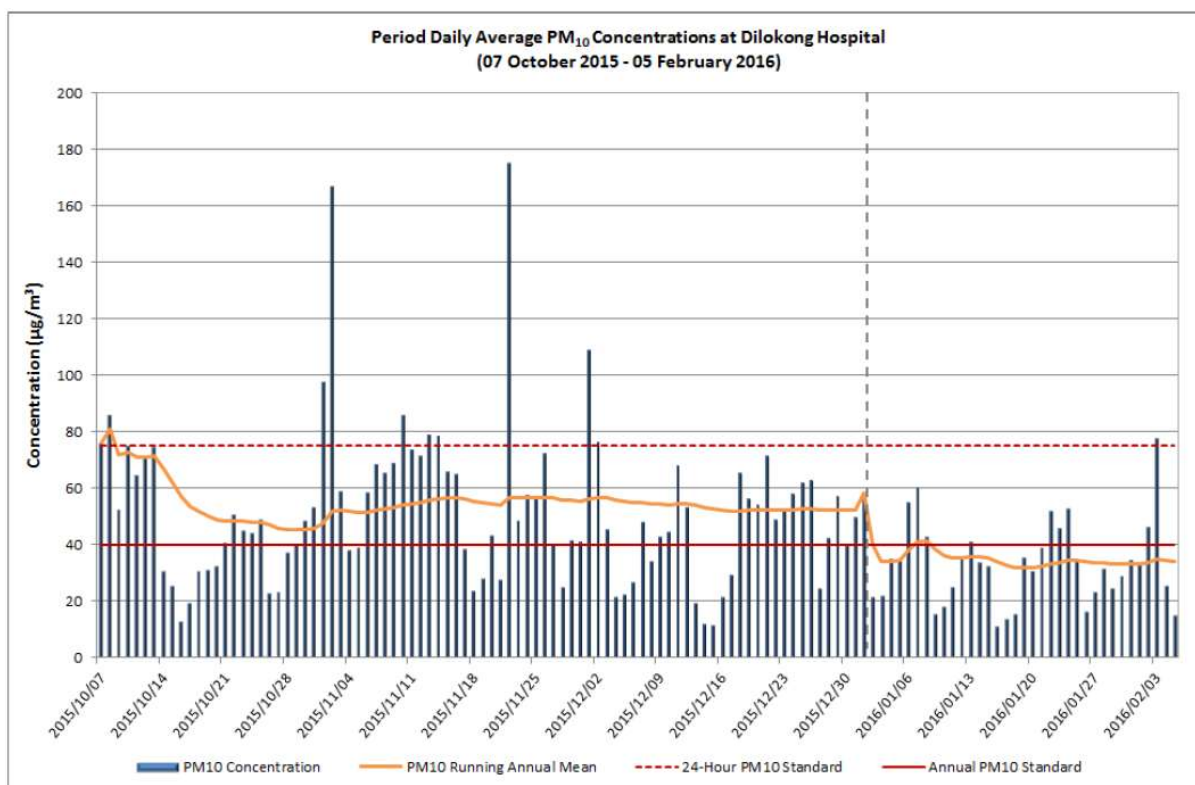


Figure 7-6: Daily Average PM₁₀ Concentrations at Dilokong Hospital.

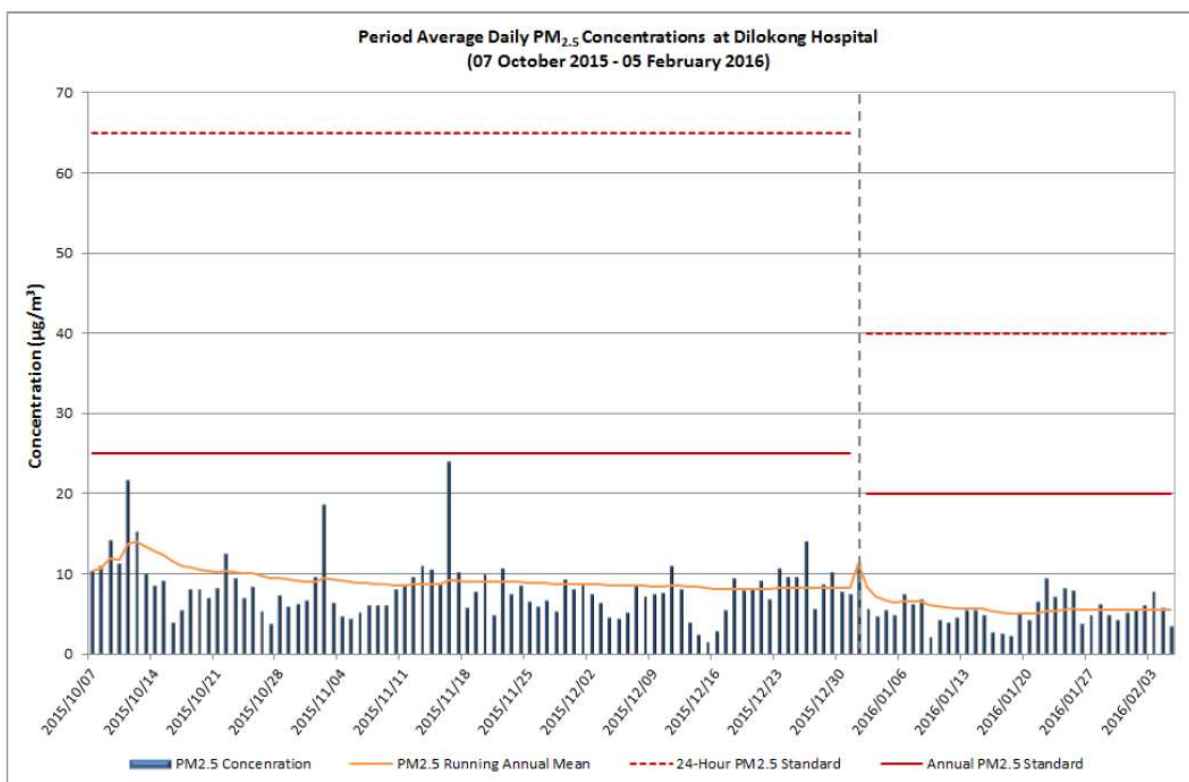


Figure 7-7: Daily Average PM_{2.5} Concentrations at Dilokong Hospital.

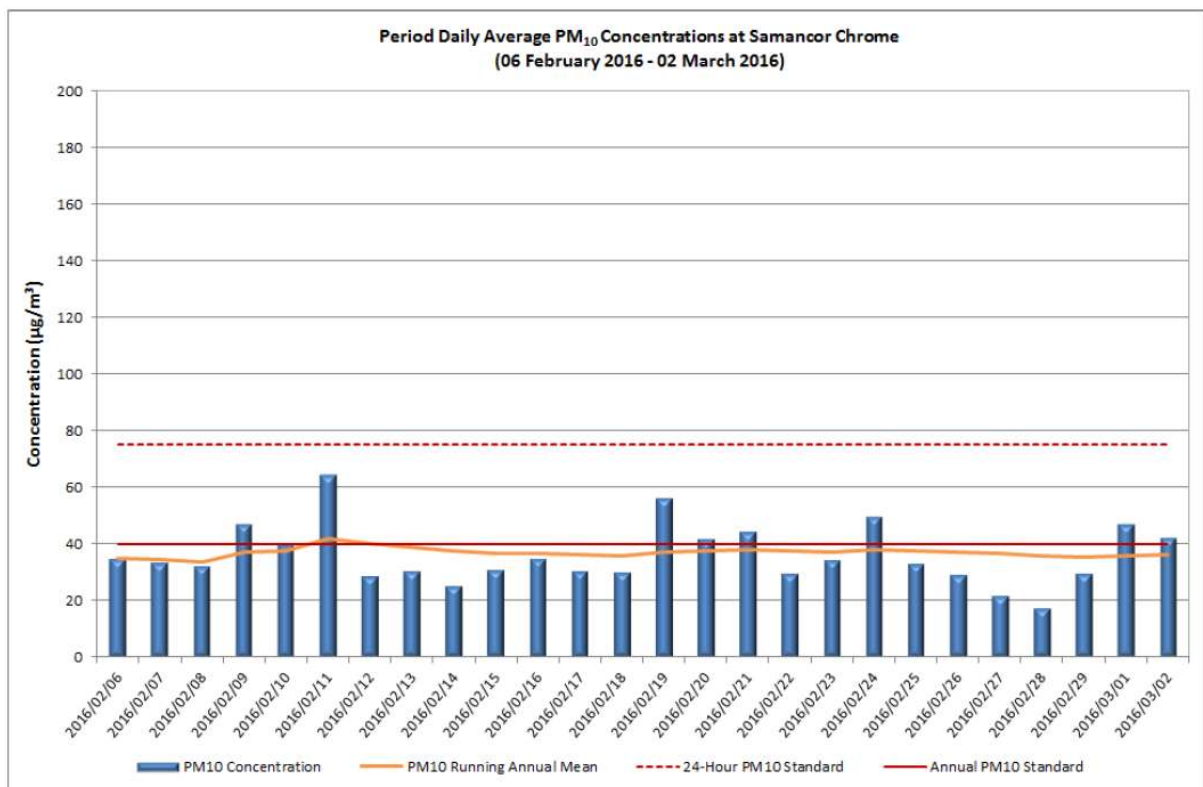


Figure 7-8: Daily Average PM₁₀ Concentrations at Samancor Crome Winterton Recreational Club.

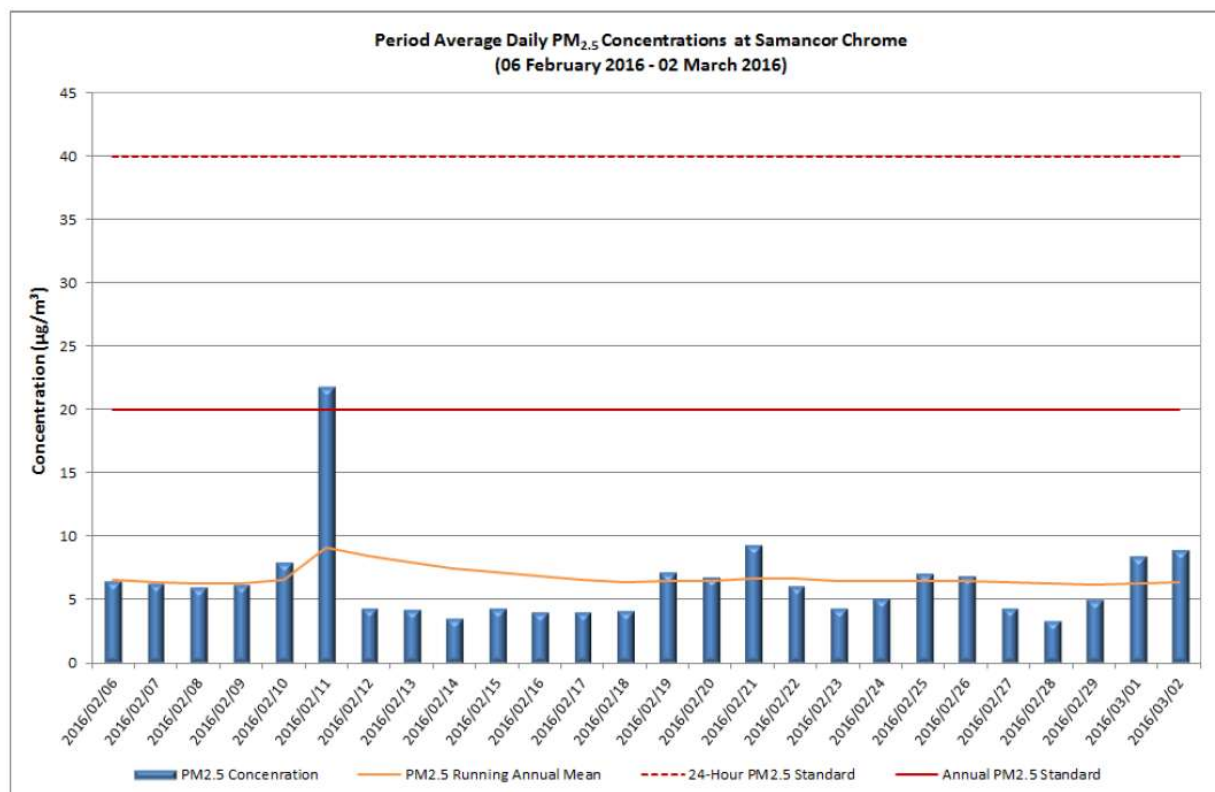


Figure 7-9: Daily Average PM_{2.5} Concentrations at Samancor Crome Winterton Recreational Club.

7.3.1.2.2 Ambient Dust Deposition

Ambient dust deposition monitoring was conducted from October 2015 to March 2016. Eleven dust deposition monitoring stations were deployed along Phase 2F. The monitoring stations are indicated in **Figure 7-10** and **Figure 7-11**.

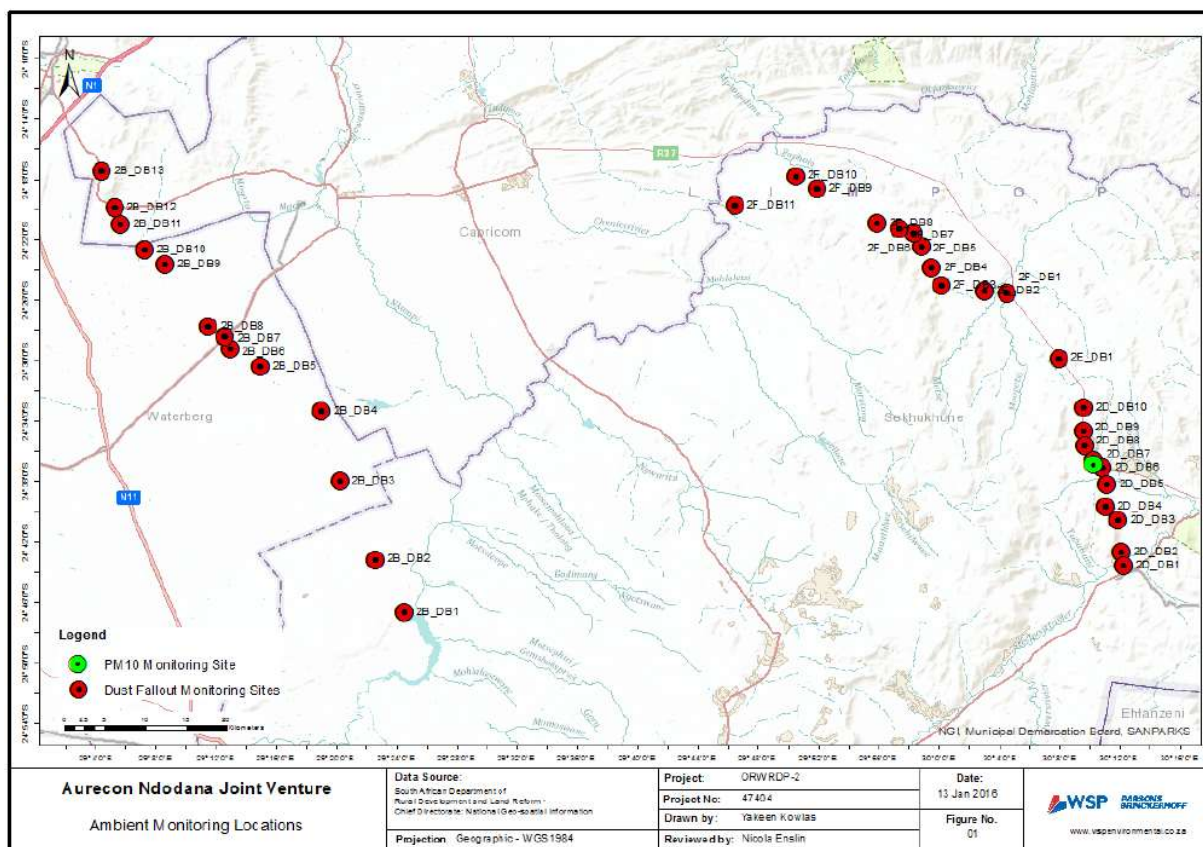


Figure 7-10: Dust Fallout and Particulate Monitoring (Dilokong Hospital) Locations for OMMP-BRWSP.

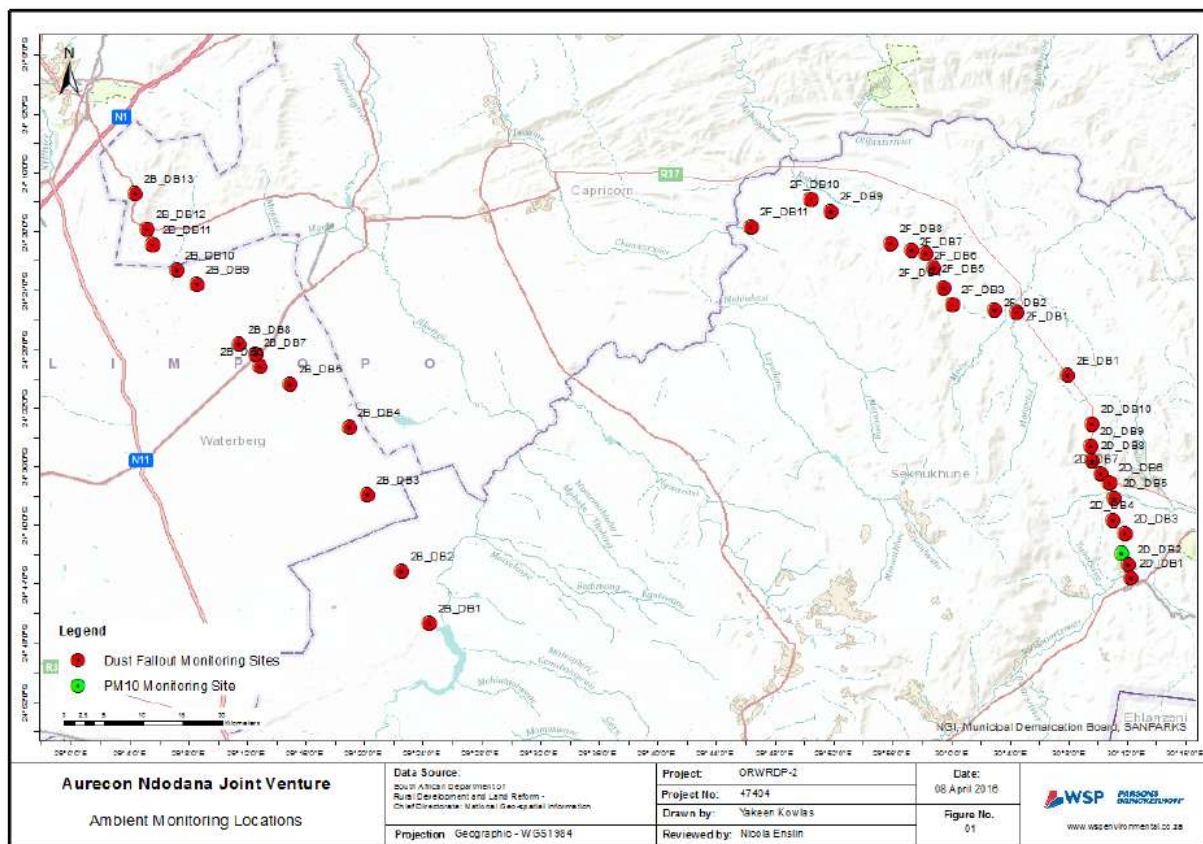


Figure 7-11: Dust Fallout and Particulate Monitoring (Samancor Chrome) Locations for OMMP-BRWSP.

Table 7-2 presents the site descriptions, site classifications as well as the coordinates for each monitoring station. **Figure 7-12** provides an overview of the dust fallout levels measured at Phase 2F.

In 2015, one exceedance was recorded at 2F-DB3 (December 2015). During 2016 an exceedance was recorded at 2F-DB1 (January 2016). None of the other monitoring stations reported any exceedances.

Table 7-2: Phase 2F Dust Fallout Monitoring Stations Descriptions, Classifications and Coordinates.

Description	Classification	Latitude (S)	Longitude (E)
2F-DB1	Residential	24°25'32.09"	30° 4'33.71"
2F-DB2	Residential	24°25'21.61"	30° 3'4.10"
2F-DB3	Residential	24°25'0.66"	30° 0'10.58"
2F-DB4	Residential	24°23'49.78"	29°59'33.65"
2F-DB5	Residential	24°22'28.78"	29°58'52.03"
2F-DB6	Residential	24°21'32.69"	29°58'20.96"
2F-DB7	Residential	24°21'15.66"	29°57'21.92"
2F-DB8	Residential	24°20'52.04"	29°55'57.14"
2F-DB9	Residential	24°18'38.12"	29°51'54.40"
2F-DB10	Residential	24°17'47.47"	29°50'32.39"
2F-DB11	Residential	24°19'44.72"	29°46'28.27"

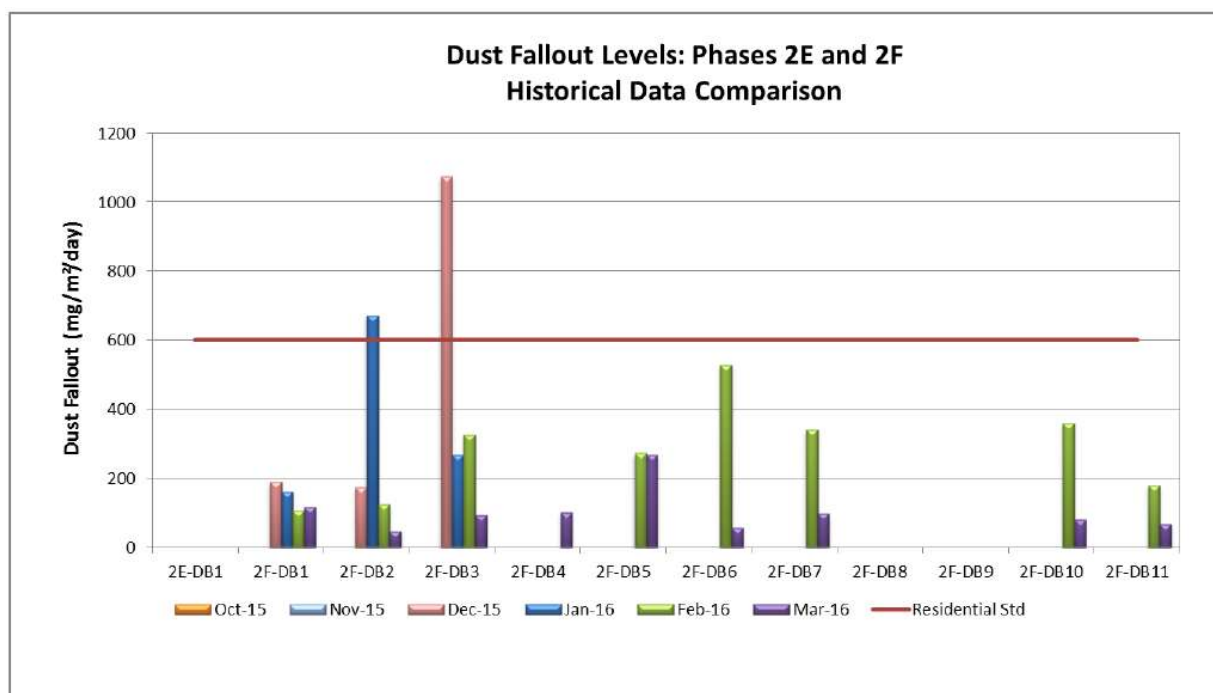


Figure 7-12 : Dust Fallout Levels Measured at Phase 2E and 2F.

7.3.1.3 Pollution Receptors

The impact will possibly include an area of up to 150 m and can extend to 1 km in worse case scenarios. Sensitive receptors include community areas, educational institutions, medical facilities, recreational facilities, places of worship and villages. Other receptors located within the vicinity of the project include mines and associated infrastructure (i.e. Twickenham Platinum Mine, Cromex Mining Mecklenburg, Sefateng Chrome Mines and Bokoni Platinum Mine).

7.3.2 SEKHUKHUNE DISTRICT MUNICIPALITY AND CAPRICORN DISTRICT MUNICIPALITY

There are several key sources of pollutants in the SDM, which include industrial processes, household emissions, agriculture, transportation, fire, waste disposal and wastewater treatment.

Capricorn has been rated as having a potentially poor air quality due to the commercial /industrial nature of the Polokwane municipal area - this means that the air quality is within the standards, but sustained air quality management interventions are required to at least maintain or improve the situation.

The main sources of air pollution within the CDM, based on the potential for human health risks, are emissions from industries, domestic fuel burning and vehicle emissions. Two major emitters are found within the district; they are Polokwane Smelters and Silicon Smelters. Several other smaller sources are found including but not limited to boiler operations.

Primary atmospheric emissions released from these sources include SO₂, NO_x, CO, Particulate matter (PM_{2.5} and PM₁₀) and VOCs. Secondary pollutants such as Ozone (O₃) are formed in the atmosphere through the chemical transformation of precursors such as VOCs and NO_x. The Polokwane municipal area and specifically the urban areas of Polokwane have been identified as a hot spot within the district.

There are two monitoring stations situated within the SDM, Steelpoort and Dilokong. Ambient air quality monitoring conducted by the LEDET includes a station in Polokwane, Phalaborwa and two Eskom owned stations at Marapong and Medupi. CDM has a monitoring station in Polokwane.

Anglo Platinum monitors SO₂ and PM_{2.5} concentrations at four monitoring stations within the vicinity of the smelter. Based on monitoring results provided by Anglo Platinum, SO₂ concentrations in 2004 were below the proposed air quality standard while PM_{2.5} concentrations were exceeded on several occasions.

Monitoring data for the Dilokong station and Anglo Platinum South Farm station were included in the Air Quality Assessment, as the monitoring stations are situated closest to the study area.

7.3.2.1 Particulate Matter

Figure 7-13 shows the 24-hour average PM₁₀ concentrations (blue line) for the Dilokong monitoring station.

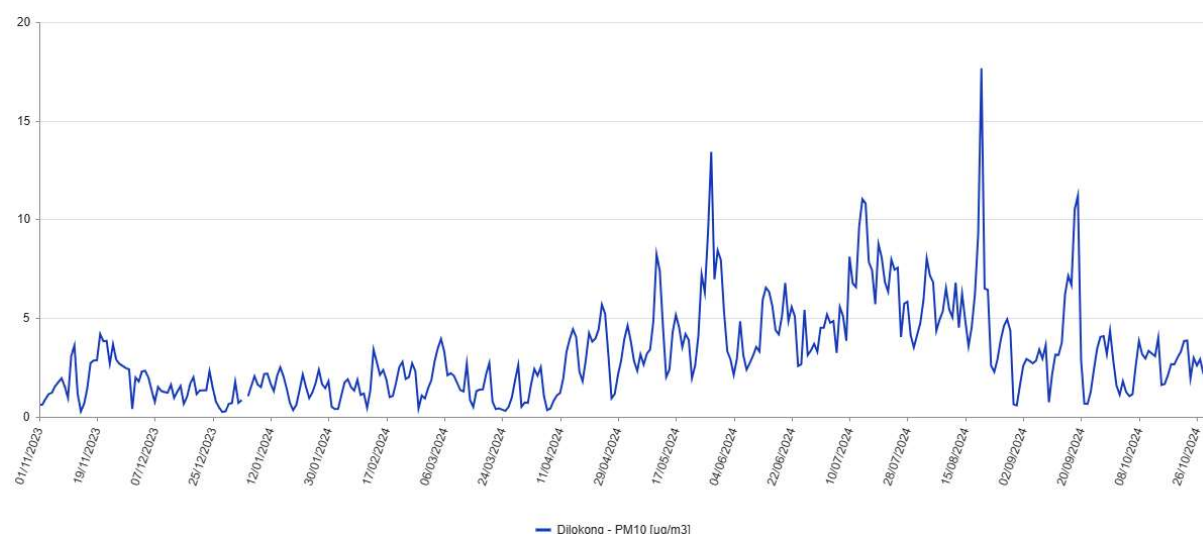


Figure 7-13: Dilokong Daily Average PM₁₀ Concentration (SAAQIS 2024).

Figure 7-14 shows the 24-hour average PM₁₀ concentrations (blue line) for the South Farm monitoring station.

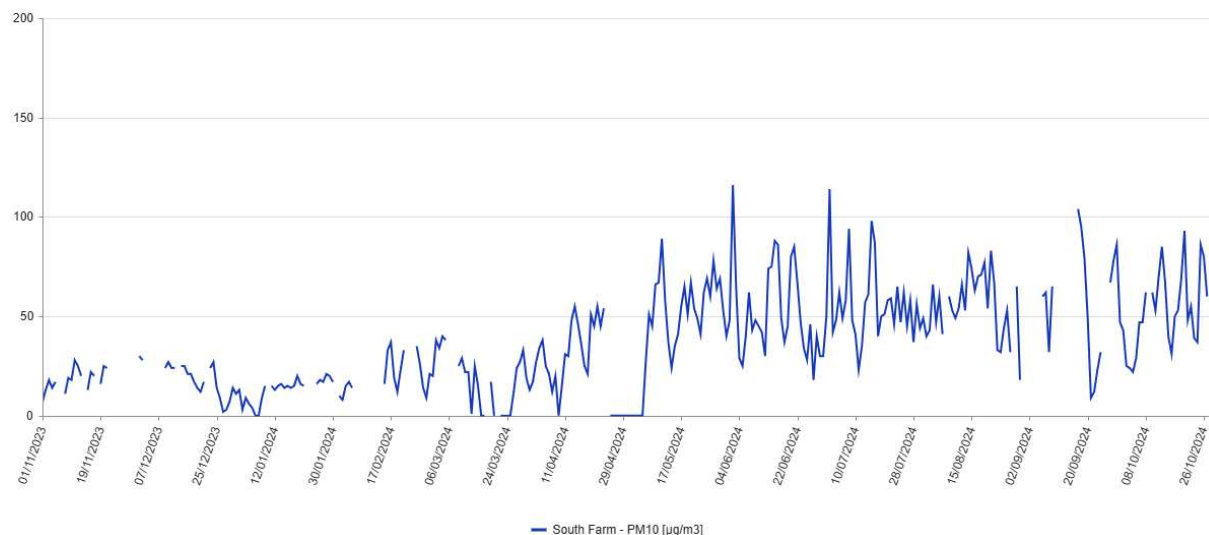


Figure 7-14: South Farm Daily Average PM₁₀ Concentration (SAAQIS 2024).

Figure 7-15 shows the 24-hour average PM_{2.5} concentrations (blue line) for the Dilokong monitoring station. **Figure 7-16** shows the 24-hour average PM_{2.5} concentrations (blue line) for the South Farm monitoring station.

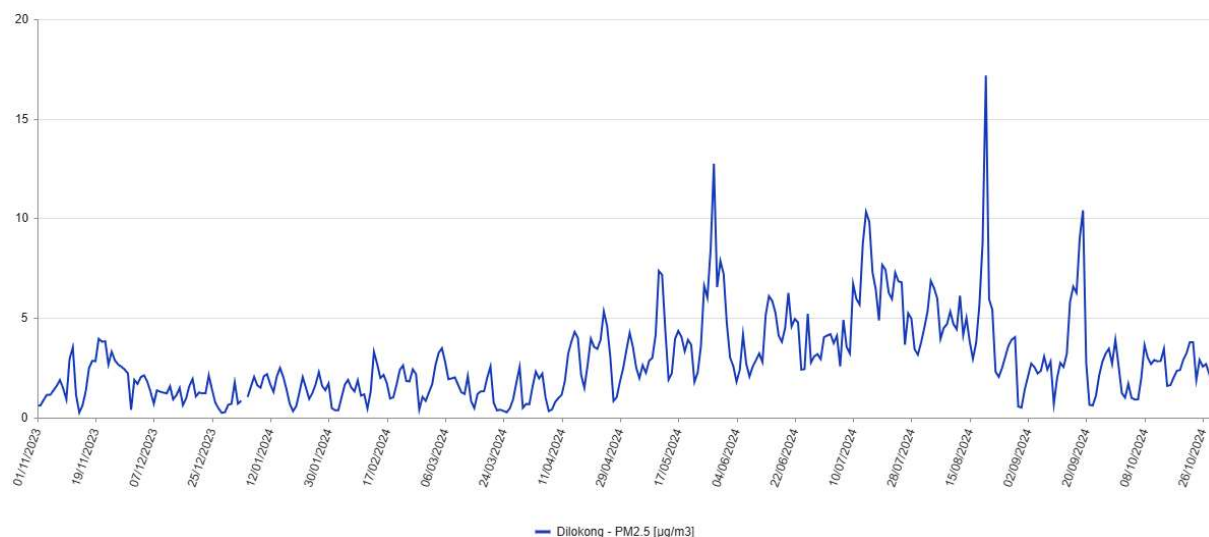


Figure 7-15: Dilokong Daily Average PM_{2.5} Concentration (SAAQIS, 2024).

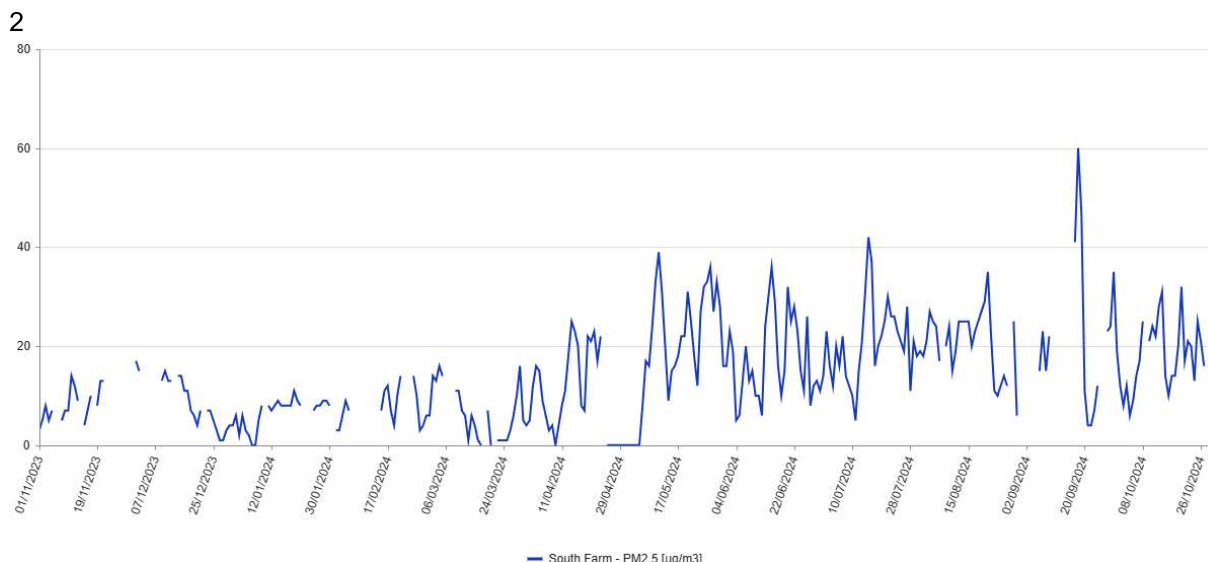


Figure 7-16: South Farm Daily Average PM_{2.5} Concentration (SAAQIS, 2024).

7.3.2.2 Sulphur Dioxide

Figure 7-17 shows the 24-hour average SO₂ concentrations (blue line) for the Dilokong monitoring station.

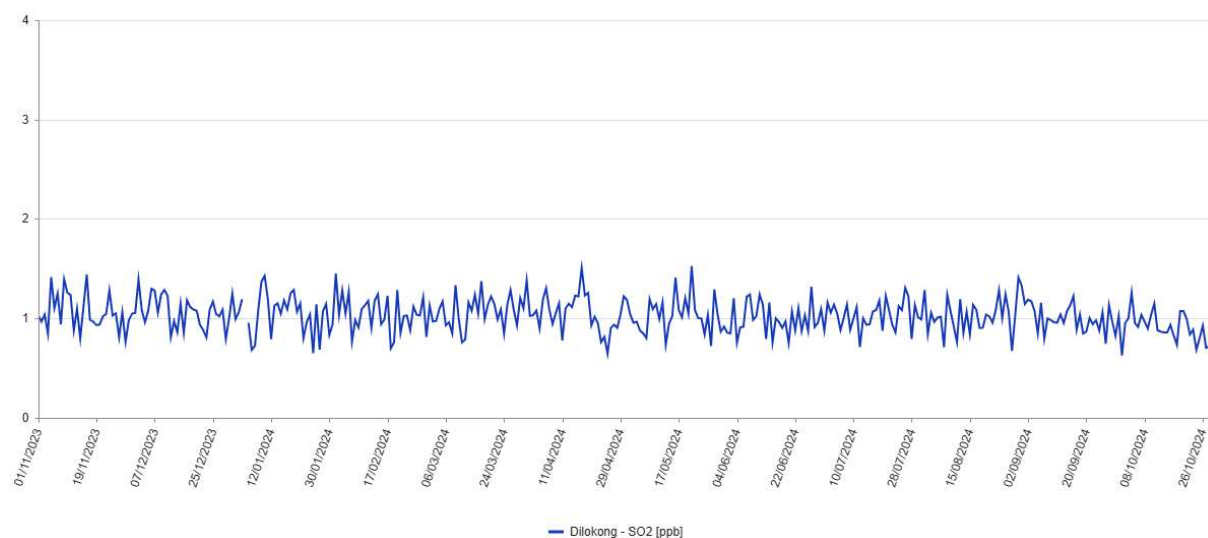


Figure 7-17: Dilokong Daily Average SO₂ Concentration (SAAQIS, 2024).

Figure 7-18 shows the 24-hour average SO₂ concentrations (blue line) for the Dilokong monitoring station.

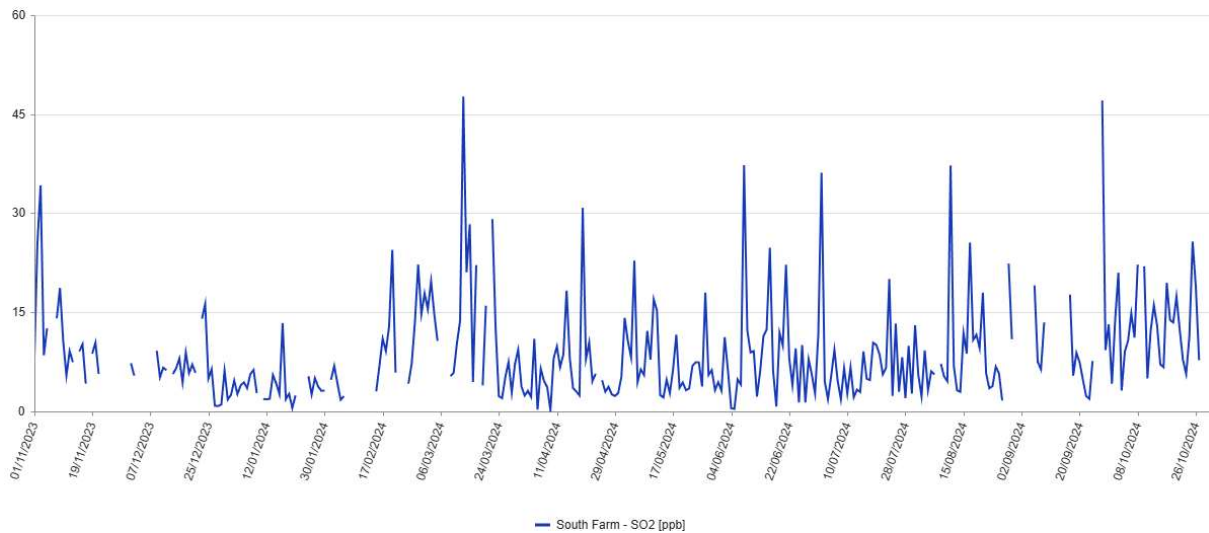


Figure 7-18: South Farm Daily Average SO₂ Concentration (SAAQIS, 2024).

7.3.2.3 Nitrogen Oxides

Figure 7-19 shows the 24-hour average NO_x concentrations (blue line) for the Dilokong monitoring station. No NO_x monitoring data was available for the South Farm monitoring station.

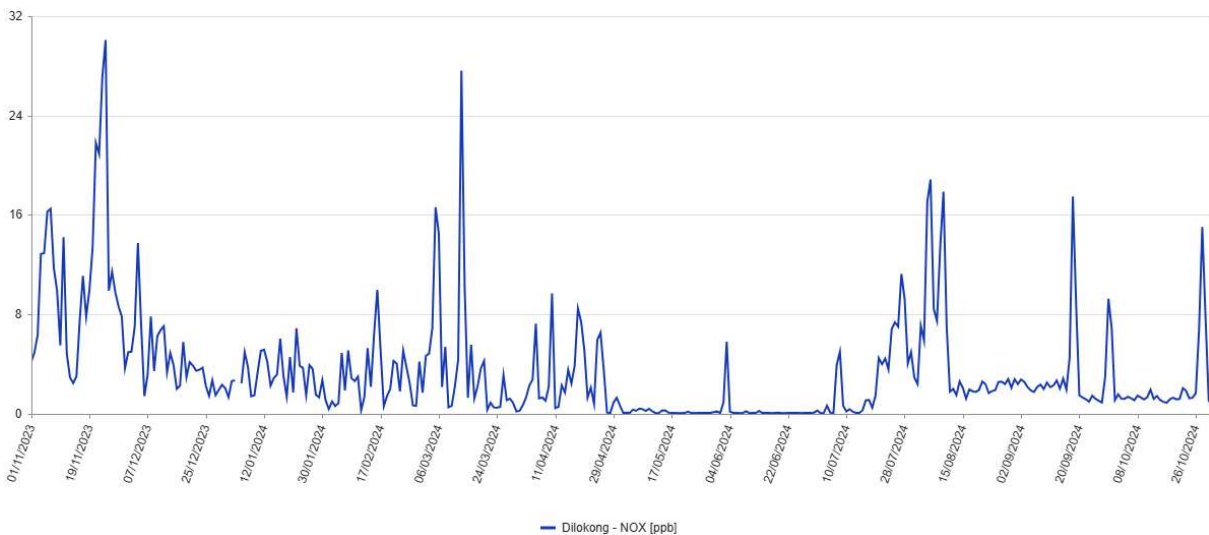


Figure 7-19: Dilokong Daily Average NO_x Concentrations (SAAQIS, 2024).

7.3.3 IMPACT ASSESSMENT

7.3.3.1 Model Results and Discussion

Dispersion results for the Phase 2F project are presented for the following scenarios:

- Dust deposition rates during Construction Operations.
- PM₁₀ concentrations during Construction and Rehabilitation Operations

NO₂, SO₂, CO and PM_{2.5} emissions were quantified, but not modelled due to the relatively low expected risk.

7.3.3.1.1 Dust Deposition during Construction

Dispersion model output plots for dust deposition during construction are reflected in **Figure 7-20**.

Maximum deposition rates around the Klipfontein Balancing Dam are expected to exceed the residential standard of 600 mg/m²/day up to a maximum distance of 150 m from the centre of construction operations.

It is unlikely that deposition rates will exceed current background levels beyond 150 m from the construction alignment.

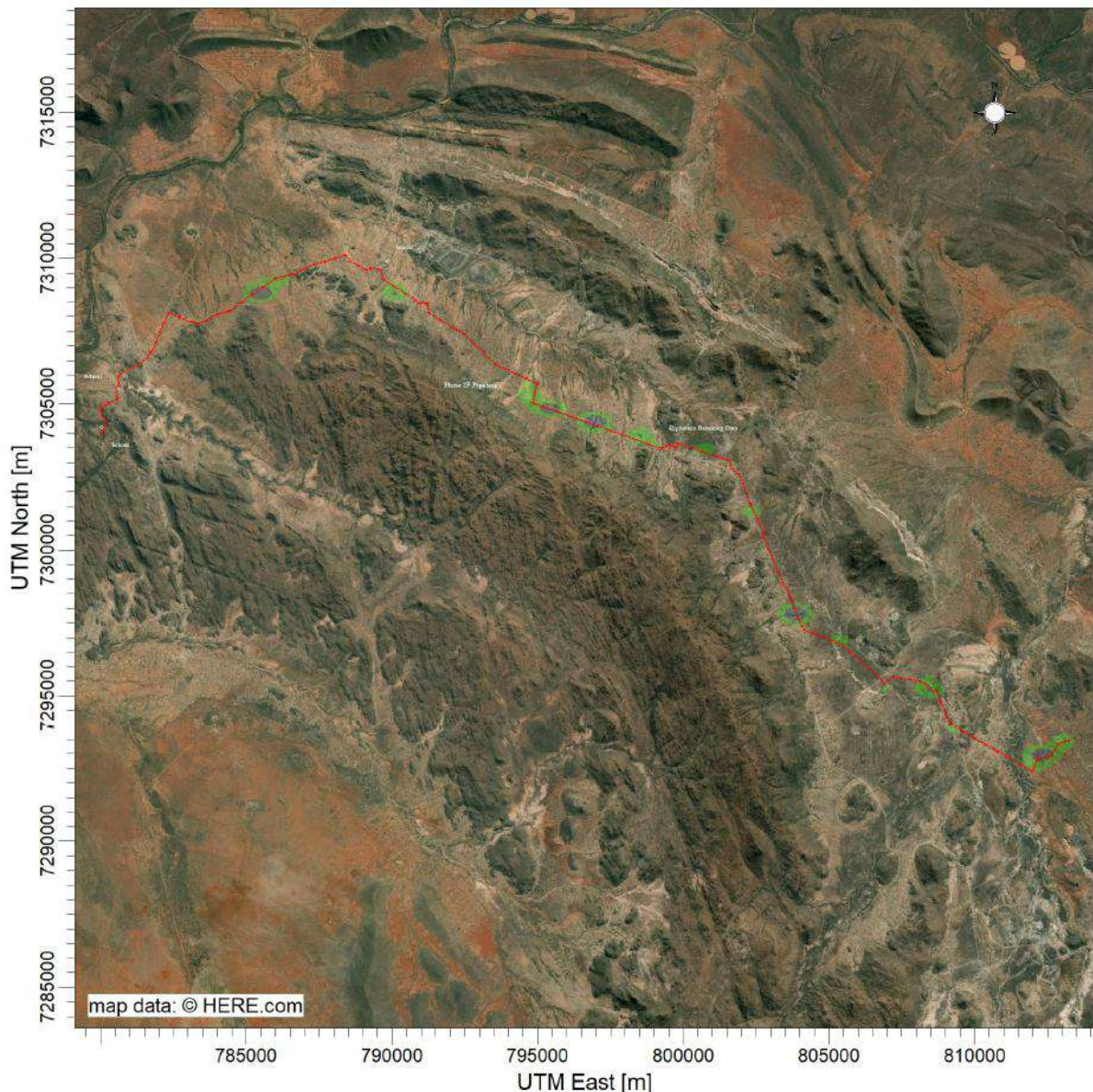


Figure 7-20: Daily Average Dust Deposition Rate – Construction.

7.3.3.1.2 PM₁₀ during Construction and Rehabilitation

Contravention of the daily average PM₁₀ standard may exceed the allowable number of four per annum around the Klipfontein Balancing Dam, up to a distance of 500 m during construction and up to distance of 250 m during rehabilitation (**Figure 7-21**). Further contraventions of the daily standard will most likely occur infrequently along the alignment.

Annual average PM₁₀ concentrations are expected to be insignificant (i.e. <50% of the standard) throughout the life of the project, as seen in **Figure 7-22**.

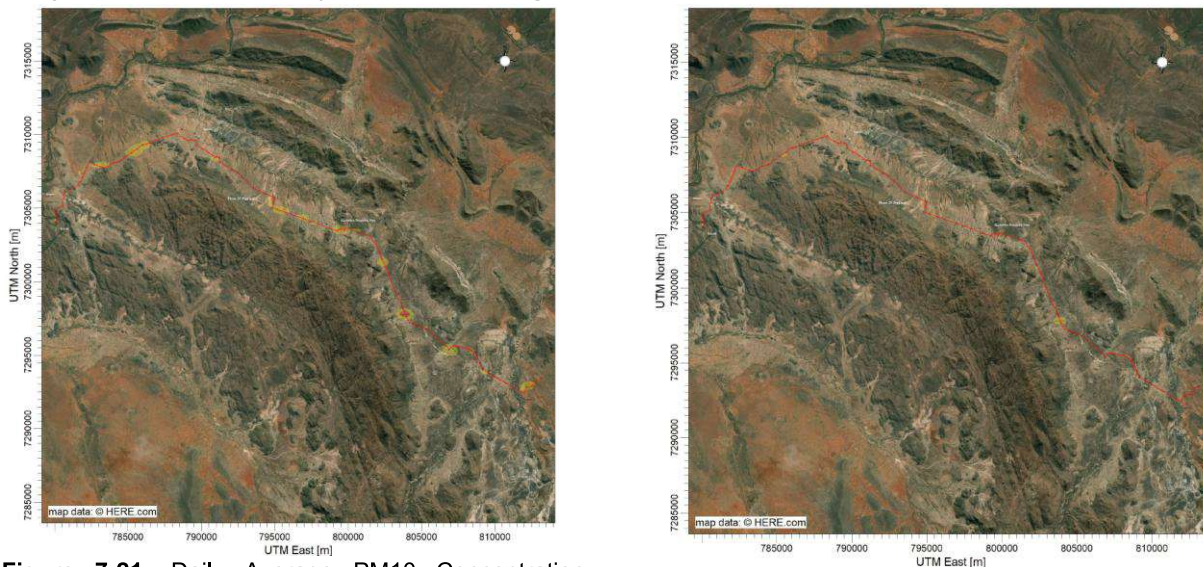


Figure 7-21: Daily Average PM₁₀ Concentration – Construction (top) / Rehabilitation (Bottom).

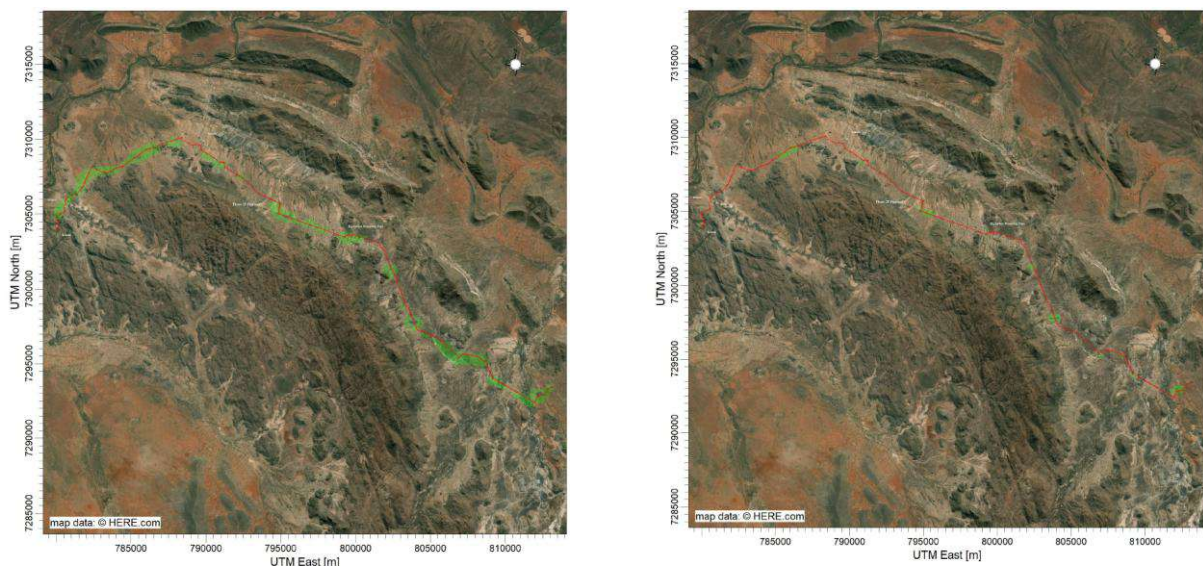


Figure 7-22: Annual Average PM₁₀ Concentration – Construction (top) / Rehabilitation (Bottom).

7.3.3.2 Significance Analysis Assessment

The table below summarises the results of the Particulate Emissions Significance Analysis.

Table 7-3: Phase 2F Particulate Emissions Significance Analysis.

Table 4-3-1: Table 4-3-1: Particulate Emissions Significance Analysis:								
Item/Receptor	Consequence Intensity + Duration + Extent				Significance Consequence x Probability			Motivation
	Impact of particulate emissions			Rating	Consequence Probability	Rating		
	Intensity	Duration	Extent					
CONSTRUCTION								

Item/Receptor	Impact of particulate emissions	Consequence Intensity + Duration + Extent				Significance Consequence x Probability			Motivation	
		Intensity	Duration	Extent	Rating	Consequence	Probability	Rating		
1.	<250m	3	2	3	Slight	8	4	Negligible	Negligible to moderate damage to natural or social systems or resources.	
2.	250 to 500m	3	2	3	Slight	8	4	Negligible		
3.	>500m	1	2	3	Slight	6	4	Negligible		
REHABILITATION										Impact could continue for less than 2 years. The impact could extend across the site and to nearby properties.
4.	<250m	2	2	3	Slight	7	4	Negligible		
5.	250 to 500m	2	2	3	Slight	7	4	Negligible		
6.	>500m	1	2	3	Negligible	5	4	Negligible	Mitigation through administrative control and best industry practise (see Section 5.2 of the Air Quality Impact Assessment report). Residual impact at background levels. High assessment confidence.	
OPERATION										
7.	<250m	1	2	2	Negligible	5	4	Negligible		

The table below summarises the results of the Gaseous Emissions Significance Analysis.

Table 7-4: Phase 2F Gaseous Emissions Significance Analysis.

Item/Receptor	Impact of gaseous emissions	Consequence Intensity + Duration + Extent				Significance Consequence x Probability			Motivation
		Intensity	Duration	Extent	Rating	Consequence	Probability	Rating	
CONSTRUCTION, REHABILITATION & OPERATION									
1.	<250m	1	2	2	Negligible	5	4	Negligible	Negligible damage to natural or social systems or resources. Impact could continue for less than 2 years. The impact could extend across the site and to nearby properties. Mitigation through administrative control and best industry practise (see Section 5.2 of the Air Quality Impact Assessment report). Residual impact at background levels. High assessment confidence.

In support of an emission reduction strategy, the OMMP-BRWSP must confirm or, where necessary revise, the current understanding of the significance of specific pollutants and sources. To fulfil this objective, emissions were ranked based on the emissions inventory and the impact significance analysis.

From the emissions inventory the following observations can be made:

- A total emission rate of 226.41 g/s was calculated for Phase 2F.
- Construction emissions will most possibly be the largest source of ambient pollution (87.4%), followed by rehabilitation (12.4%) and operations (0.2%).
- PM comprises approximately 98.4% of the pollution load. PM₁₀ is the criteria pollutant of concern and contributes about 27.4% of the pollution load. TSP and PM_{2.5} contribute 68.3% and 2.7% respectively.

From the impact significance analysis, the following observations can be made:

- The incremental impact of all pollutants during construction, rehabilitation and operations are expected to be negligible. Current industry standard techniques should be maintained and supplemented with administrative control measures to maintain the residual impact at the nearest sensitive receivers at current background levels.

7.3.4 SPECIALIST RECOMMENDATIONS

7.3.4.1 Administrative Measures

In view of the predicted ambient pollutant concentrations resulting from emissions from the Phase 2F project, the following is recommended:

- Ambient monitoring in combination with modelling and emission inventory to assess the effectiveness of control measures at source and receivers, on an annual basis.

The recommended performance assessment and reporting programme for continued dustfall monitoring during the Phase 2F project are provided in

Table 7-5.

Table 7-5: Dustfall Monitoring Reporting Programme.

Criteria	Dustfall Monitoring
Monitoring objectives	Assessment of compliance with dustfall limits within the main impact zone of the project. Facilitate the measurement of progress against environmental targets within the main impact zone of the operation. Temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation. Tracking of progress due to pollution control measure implementation within the main impact zone of the project. Informing the public of the extent of localised dust nuisance impacts occurring in the vicinity of the operation.

Criteria	Dustfall Monitoring
Monitoring location(s)	Four (4) single buckets should be installed around the Klipfontein Balancing Dam site and at least one (1) single bucket should be installed per kilometre of the alignment. The following factors can severely affect the validity of data from a monitoring site: • Sites with restricted air flows in the vicinity of the monitor: Sites should not be adjacent to walls, buildings or trees that impede or distort the air flow. In general, the site should be in an open area, free of structures higher than 1 m within a 20 m radius of the gauge. • Obstacles between source to be monitored and the gauge. • Local sources of pollution and extraneous contamination that can affect the gauge. • Accessibility and security from vandalism are major considerations in the selection of a site.
Sampling techniques	Single bucket dust gauges measure the fallout of windblown settleable dust. Instruments to be deployed in accordance with ASTM D1739.
Accuracy of sampling technique	Margin of accuracy given as ± 200 mg/m ² /day.
Sampling frequency and duration	On-going, continuous monitoring to be implemented facilitating data collection over 30-day averaging period. Monitoring may be suspended after the first six months of operation.
Commitment to QA/QC protocol	Comprehensive QA/QC protocol implemented.
Interim environmental targets (i.e. receptor-based performance indicator)	Relevant dust deposition standards not to be exceeded more than twice per annum and not in consecutive months.
Frequency of reviewing environmental targets	Annually (or may be triggered by changes in air quality regulations).
Action to be taken if targets are not met	Source apportionment and review of standard control measures and implementation of contingency measures where applicable.
Procedure to be followed in reviewing environmental targets and other elements of the monitoring strategy (e.g. sampling technique, duration, procedure)	Procedure to be drafted in liaison with interested parties considering: (i) trends in local and international ambient particulate guidelines and standards and/or compliance monitoring requirements, (ii) best practice regarding monitoring methods, (iii) current trends in local air quality, i.e. is there an improvement or deterioration, (iv) future development plans within the air shed (etc.)
Progress reporting	At least annually to the necessary authorities.

7.3.4.2 Best Available Industry Techniques

7.3.4.2.1 Fugitive Emissions from Unpaved Surfaces

Unpaved roads will most possibly be significant sources of dust emissions. Three types of measures may be taken to reduce emissions from unpaved roads:

- Measures aimed at reducing the extent of unpaved roads such as paving. Permanent improvements in road surfaces results in continuous control efficiencies
- Traffic control measures aimed at reducing the entrainment of material by restricting traffic volumes and reducing vehicle speeds.
- Measures aimed at binding the surface material or enhancing moisture retention, such as wet suppression and chemical stabilisation. The control efficiencies obtained by wet suppression and chemical stabilisation are cyclic. As efficiency decays over time, periodic re-application is required.

7.3.4.2.2 Fugitive Emissions from Paved Surfaces

The following measures are aimed at reducing fugitive dust emissions from paved surfaces:

- Construction integrity of all paved areas should be regularly inspected and frequently repaired if required.
- Set an acceptable speed limit for all onsite vehicles (30 kilometers per hour for construction vehicles and 40 kilometers per hour for light and passenger vehicles).

- Minimise travelling distance and unnecessary traffic.
- Measures which entail periodic removal of deposited material, i.e. broom and vacuum sweeping, may also be adopted to reduce dust generation.

7.3.5 KEY FINDINGS

The air quality impact study concludes the following:

- The process falls within the FTLM, within the SDM and LNLN, within the CDM of the Limpopo Province.
- Ambient monitoring data from the SDM Dilokong Hospital station and Anglo Platinum South Farm station was included in the study.
- A total emission rate of 226.41 g/s was calculated for Phase 2F.
- Construction emissions will most possibly be the largest source of ambient pollution (87.4%), followed by rehabilitation (12.4%) and operations (0.2%).
- PM comprises approximately 98.4% of the pollution load. PM₁₀ is the criteria pollutant of concern and contributes about 27.4% of the pollution load. TSP and PM_{2.5} contribute 68.3% and 2.7% respectively.
- Dispersion of emissions from the process was modelled using the ISC-AERMOD View model based on the standard Gaussian solution.
- The results present the spectrum from maximum ground level concentration to maximum impact area, and accounts for annual averages.
- GLCs were predicted for atmospheric conditions based on local meteorological data for the period 1 July 2023 to 30 June 2024.
- Winds are mostly from the north easterly sector 45.1%. Calm periods are the exception (2.8%) and wind speeds are mostly light, between 0.5 and 2.1 m/s (45.6%). Moderate winds between 2.1 and 3.6 m/s occur 27.3% and brisk winds above 3.6 m/s, 17%. Strong winds above 5.7 m/s occur 7.3%.
- Maximum deposition rates around the Klipfontein Balancing Dam are expected to exceed the residential standard of 600 mg/m²/day up to maximum distance of 250 m from the centre of construction operations. It is unlikely that deposition rates will exceed current background levels beyond 150 m from the construction alignment. The impact of dust deposition during rehabilitation and operation are not significant.
- Contravention of the daily average PM₁₀ standard may exceed the allowable number of four per annum around the Klipfontein Balancing Dam, up to a distance of 500 m during construction and up to distance of 250 m during rehabilitation. Further contraventions of the daily standard will most likely occur infrequently along the alignment.
- Annual average PM₁₀ concentrations are expected to be insignificant (i.e. <50% of the standard) throughout the life of the project.
- The incremental impact of all pollutants during construction, rehabilitation and operations are expected to be negligible. Current industry standard techniques should be maintained and supplemented with administrative control measures to maintain the residual impact at the nearest sensitive receivers at current background levels.
- Ambient monitoring should be used in combination with modelling and emission inventory to assess the effectiveness of control measures at source and receivers, on an annual basis.
- Monitoring of ambient air quality will assist effective air quality management and open communication to all stakeholders.

7.4 CIVIL AVIATION COMPLIANCE STATEMENT (PARIVISION, 2024)

The Civil Aviation Compliance Statement was compiled by Hein Reid of Parivision.

An impact analysis, applying intensity, duration, and extent criteria, shows negligible risk, with no significant impacts on airstrips or restricted airspace. In accordance with GN No. 320 (20 March 2020) a Compliance Statement was compiled.

7.4.1 ANALYSIS OF SENSITIVITY FEATURES

Figure 7-23 below illustrates the high sensitivity for Civil Aviation within the proposed development footprint.

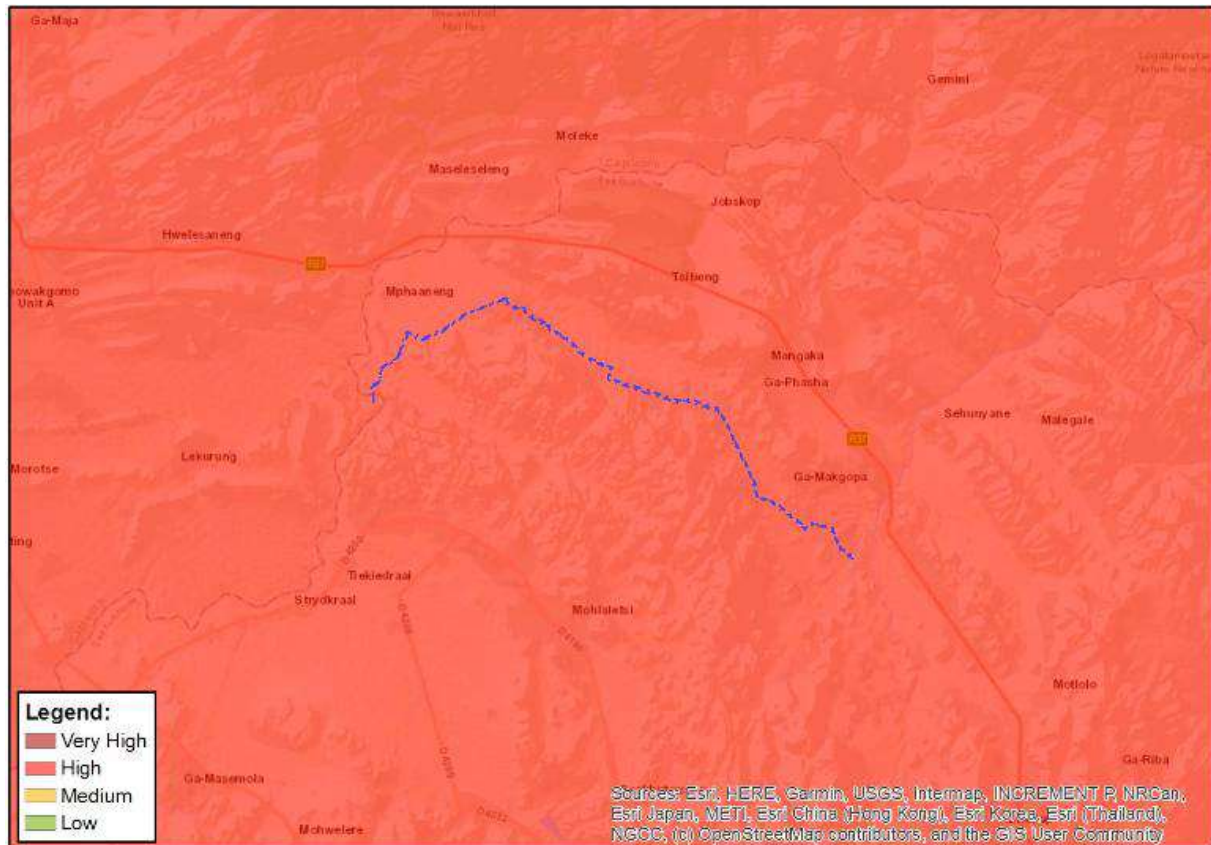


Figure 7-23: High Civil Aviation Theme Sensitivity

The DFFE screening tool report for EA shows three sensitivity features:

- a. **High – Within 8 km of other civil aviation aerodrome.** The Winterveldt Mine Airport (ICAO: FAWT) is the nearest airfield. It is situated 25 km to the south-southeast of the nearest point of the Phase 2F proposed development. **Figure 7-24** below shows the position of FAWT in relation to the proposed development. At 25 km from the proposed development site, the sensitivity rating will be low.

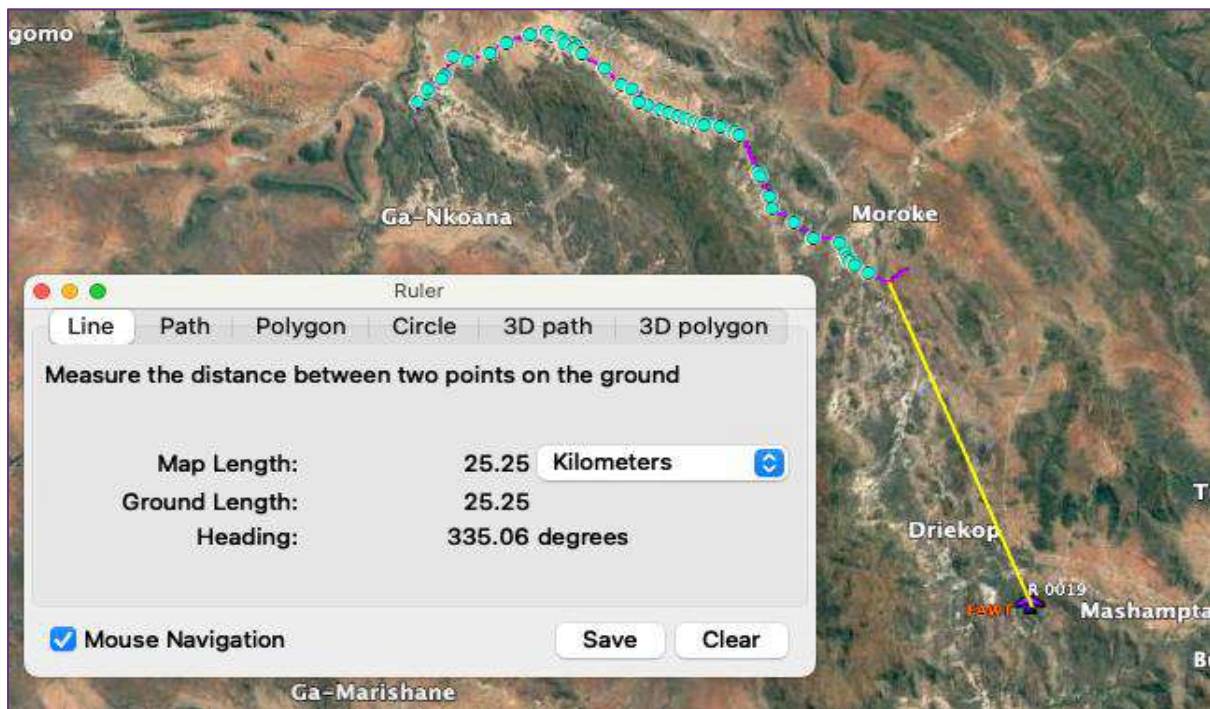


Figure 7-24: Position of Winterveldt Airstrip.

FAWT is designated for daytime operations only and primarily serves the logistical and transport needs of a nearby mine, handling approximately 12 flights per month¹⁵. The flight activity contributes to the high sensitivity rating in the DFFE screening tool report, as the site's activities could potentially interact with established aviation routes and safety protocols associated with FAWT.

- b. **High – Dangerous and Restricted Airspace:** The proposed development is near restricted airspace.
 - i. **FAR 71:** Restricted Flying Area (FAR) 71: Transvaal Military Middle Flying Area (Upper) Flight Level (FL) 105 - FL195¹⁶. FAR 71 is situated above the proposed development area. It extends upwards from around 10 500 feet (~3200 m).
 - ii. **G465:** The G465 Airway is an established aviation route in South Africa, used for air traffic operating across the southern part of the country. It extends over the proposed development area from an altitude of 10500 feet (~3200 m) and above. It is a designated Air Traffic Service (ATS) route, which provides a pre-defined controlled route for aircraft to follow, enhancing the efficiency and safety of en-route flights. Normal International Rules of The Air apply to traffic operating along the G465 Airway.
 - iii. **UG 465:** UG465 is an upper-level ATS route in South Africa, like the G465 airway but specifically designated for air traffic at higher altitudes. UG 465 is positioned immediately above G465. The "U" prefix in UG465 denotes that it is an "upper" (higher) airway, which typically starts at FL245 (24,500 feet / ~7500 m) or higher. This upper airway is used by aircraft flying at cruising altitudes. Normal International Rules of The Air apply to traffic operating along the G465 Airway.

Figure 7-25 below shows the position of FAR71, G465 and UG465.

¹⁵ Source: Airport Managing Authority.

¹⁶ SA AIP, ENR, DD 15 October 2024.



Figure 7-25: Position of FAR71, G465 and UG465 relative to proposed development.

Medium – Between 8 and 15 km of other civil aviation aerodrome The Steelpoort Airstrip (ICAO: FASO) is located 47 km from the nearest point of the Phase 2F proposed development, primarily serving the mining industry in the area. It is not a registered airstrip; it is used for occasional charter flights. As for FAWT airstrip. **Figure 7-26** below shows the position of the Steelpoort Airstrip 47 km to the southwest. At 47 km from the proposed development site, the sensitivity rating will be low.

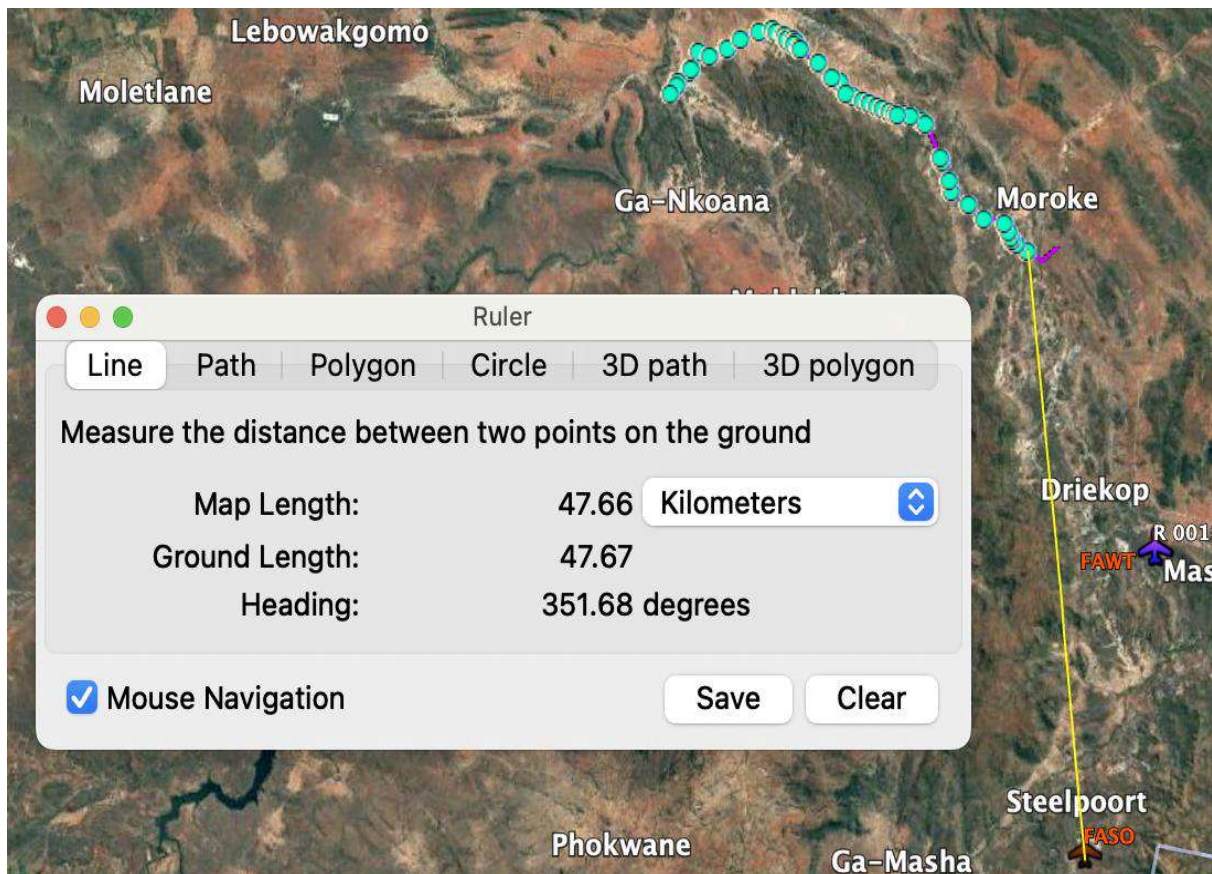


Figure 7-26: Steelpoort Airstrip.

7.4.2 IMPACT ASSESSMENT SUMMARY

Based on the findings, the proposed developments have minimal to no impact on nearby airstrip or airspace operations:

- a. Winterveldt Airstrip: No impact is anticipated at FAWT as the development is beyond 25 km.
- b. Restricted Airspace: No impact.
- c. Steelpoort Airstrip (FASO): No impact on operations at FASO.

Overall, the developments do not affect airstrip operations or require any changes to airspace.

7.5 DEFENCE COMPLIANCE STATEMENT (PARIVISION, 2024)

The Defence Compliance Report was compiled by Hein Reid of Parivision. Due to the very low significance of pre-mitigation impacts, a full assessment of Defence Impact Assessment was deemed unnecessary. However, to meet regulatory and oversight requirements, a Compliance Statement was prepared for each category of defence.

7.5.1 IMPACT IDENTIFICATION

7.5.1.1 DFFE Screening Tool Report

The DFFE screening tool report shows a medium sensitivity due to a Military and Defence Site. It is important to note that the key focus area is of medium sensitivity. **Figure 7-27** below shows the medium defence sensitivity area for the proposed development footprint.

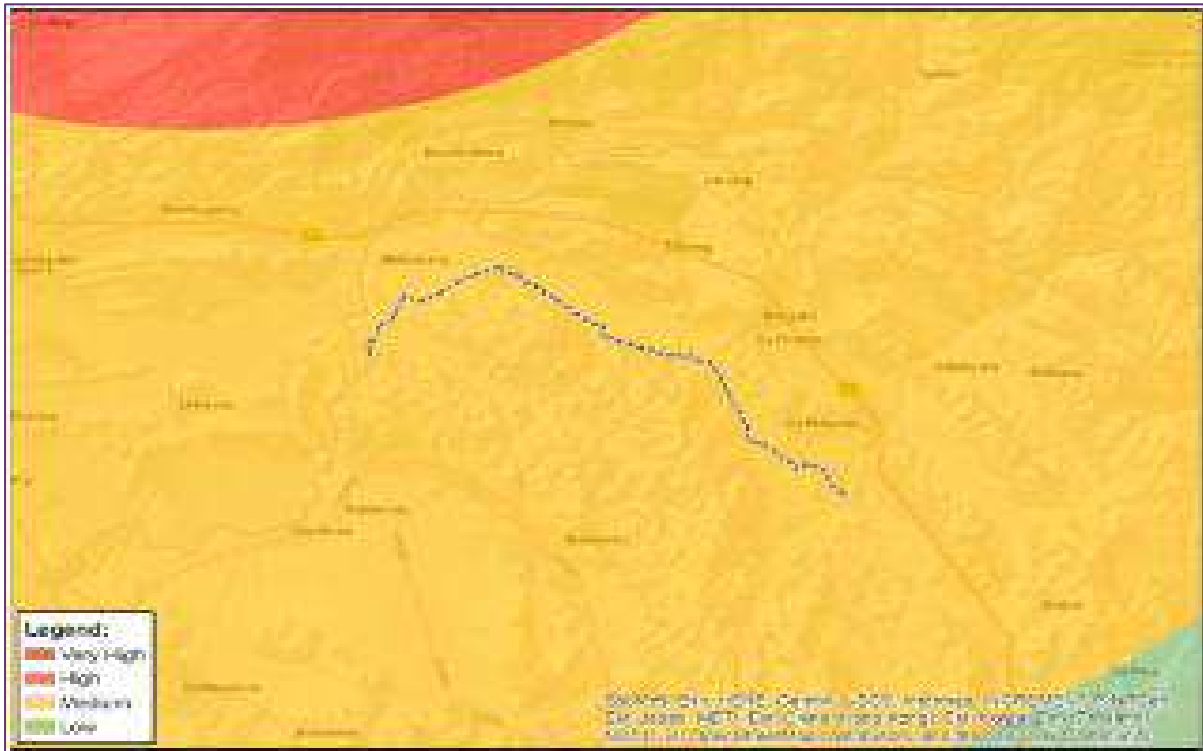


Figure 7-27: Defence Theme Sensitivity Area.

7.5.1.2 Site Sensitivity Verification

Based on the DFFE screening tool report, a site sensitivity verification conducted through desktop analysis, and other relevant information, the sensitivity rating for the site is confirmed as Medium in accordance with the Defence Protocol. The vertical extent of the proposed infrastructure will not exceed 10 m above ground level. Furthermore, an impact assessment has determined that the proposed development will not have any adverse effect on defence-related activities in the surrounding area. Overall, the development is anticipated to have a very low impact on nearby defence installations.

7.6 HERITAGE IMPACT ASSESSMENT (PGS HERITAGE, 2024)

The HIA report was compiled by PGS Heritage. PGS conducted a survey of the proposed development footprints through three site visits: one in November 2024 and two in January 2025.

7.6.1 OVERVIEW OF THE STUDY AREA AND SURROUNDING LANDSCAPE

7.6.1.1 Heritage Screening

Figure 7-28 presents the results of the environmental screening assessment for the archaeological and cultural heritage theme. According to the screening tool report, in this case, the proposed development occurs within an area of low archaeological and cultural heritage sensitivity, although areas of high and very high sensitivity occur in proximity to the proposed footprints. The development's location is within an already-disturbed landscape, combined with the presence of sensitive heritage resources (such as burial grounds and graves). PGS agrees with the overall rating of low sensitivity with areas of high sensitivity in between.

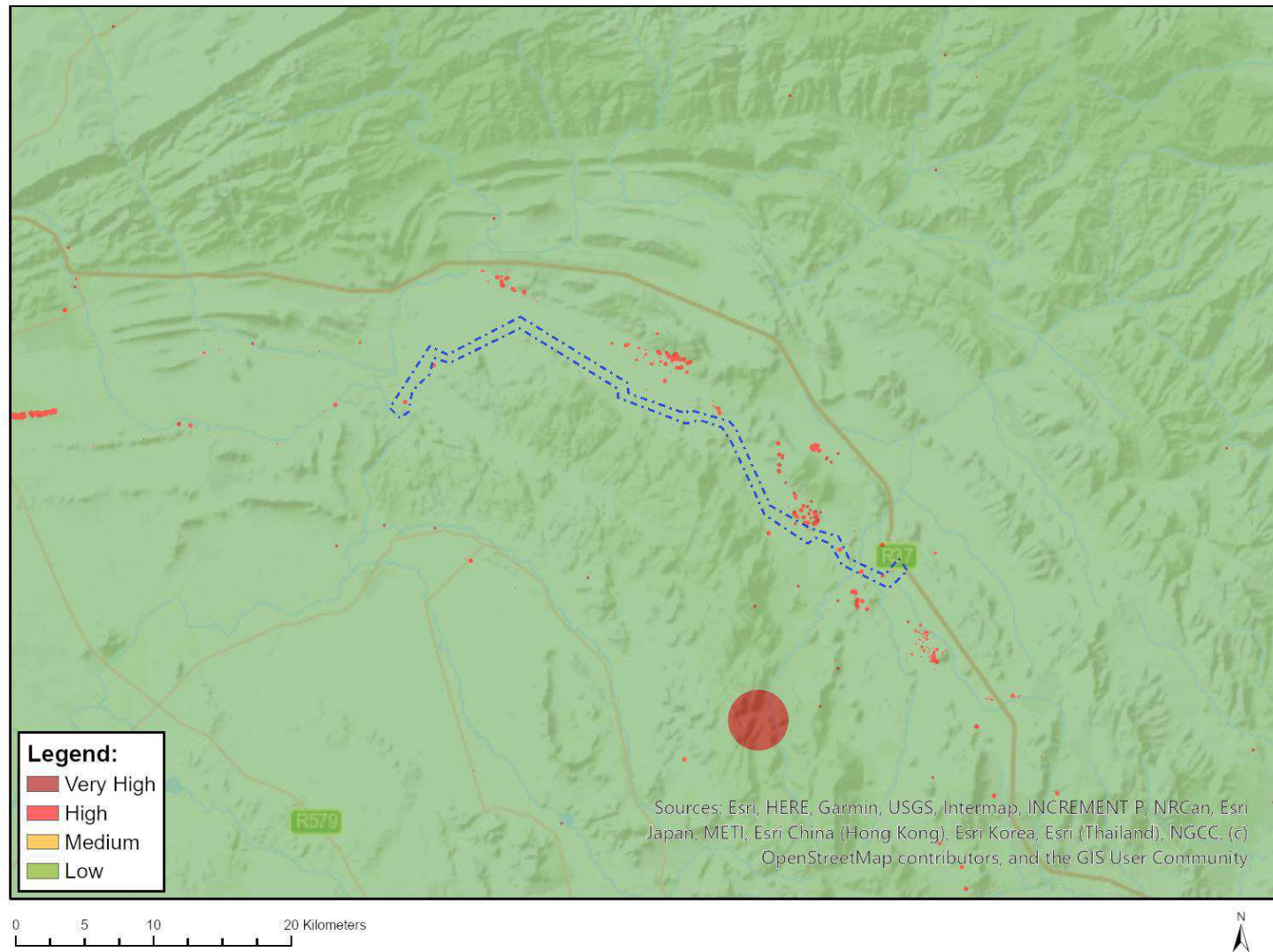


Figure 7-28: Screening Tool Map indicating a Low Sensitivity Rating for Archaeology and Cultural Heritage for the Project Area with areas of High Sensitivity in between (broad outline of the study area in blue).

7.6.1.2 Heritage Sensitivity

Table 7-6 lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 7-6: Tangible Heritage Site in the Study Area.

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA Sections 3 and 35
Structures	Possibly older than 60 years	NHRA Sections 3 and 34
Burial grounds	Graves	NHRA Sections 3 and 36

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (**Table 7-7**).

Table 7-7: Landform Type to Heritage Find Matrix.

Landform Type	Heritage Type
Permissions to Occupy (PTO) Stands and residential areas	Burial grounds and graves
Farmsteads	Historical and/or archaeological material

7.6.1.3 Fieldwork Findings¹⁷

Figure 7-29 and **Table 7-8** below presents the heritage resources identified during this survey. Photographs, and more detailed descriptions of the identified heritage resources are included in Appendix B of the HIA. PGS identified 14 heritage resources during the site survey in the Phase 2F project area, including:

- Archaeological resources, comprising four Iron Age grinding stones;
- Modern built heritage resources, including five modern structures, one example of a stone property boundary and one example of a stone structure commonly used when harvesting firewood;
- Two burial grounds (cemeteries); and
- One modern church that was used by the members of the local community but is currently not in use.

¹⁷ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under Section 27 of the NHRA.



Table 7-8: Heritage Resources Identified during the Field Survey of the Phase 2F Project Area.

Site No	Site Co-ordinates		Time Period	Brief Site Description	Grading	Heritage Significance
	X	Y				
Oli1	-24.33314	29.76694	Historical / Modern	This site is likely a recent structure with concrete stairs at the front, concrete flooring and large flat and rounded sandstones mixed with concrete to form the base. Only the base remains. The location correlates with the location of a hut feature noted on the 1964 topographical map. The modern structure was likely built over what remained of the structure noted in the topographical map.	High	Grade 3 - A (IIIA ¹⁸)
Oli2	-24.33182	29.76936	Modern	The site appears to be a concrete slab. However, it is heavily overgrown and mostly destroyed and as such no other indicators of what it could be are present.	N/A	Not Conservation Worthy (NCW ¹⁹)
Oli3	-24.3317	29.76979	Modern	Appears to be a rectangular sand/mudbrick structure with four rooms. The sand has been compacted and mixed with small stones. The outside walls are possibly made from mudbrick. The structure has mostly been destroyed and only some wall bases remain.	N/A	NCW
Oli4	-24.33196	29.76918	Modern	Two recent standalone structures both with single stone coursing represents this site. All that presently remains are the stonewall bases and there appears to only be one compartment for both. Both are heavily overgrown.	N/A	NCW
Oli5	-24.33086	29.7716	Modern	This site comprises a large recent mudbrick structure with a red cement base. There are 6 compartments with most of the compartments being almost totally destroyed except for one section which has semi-intact mudbrick walling.	N/A	NCW
Oli6	-24.30656	29.8619	Historical / modern	A cemetery with approximately 230 graves is present comprising of 14 rows with approximately 20 graves in each row. Most of the graves are formally-dressed and indicated with headstones. Some graves include metal 'cages' or fences and others are marked by soil mounds. The oldest identified headstone is 1889 and the youngest 2019, although the soil mounds may be more recent. The Local Guide indicated that the cemetery is still in use.	High	Grade 3 - A (IIIA)

¹⁸ High significance: Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.

¹⁹ No research potential or other cultural significance: A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.

Site No	Site Co-ordinates		Time Period	Brief Site Description	Grading	Heritage Significance
	X	Y				
Oli7	-24.30889	29.86455	Modern	An old church with an associated structure to its right and associated “decorations” to the south is present at this site. The Local Guide identified this site and provided some information, indicating that it is no longer in use. The church is constructed of bricks and cement with metal lintels while the structure to the right has been largely demolished. A possible grave was observed near the church. Additional graves are potentially present.	High	Grade 3 - A (IIIA)
Oli8	-24.35223	29.95323	Historical / modern	This site comprises a low line of stones indicating a farm boundary. This boundary may still be indicating the boundary between neighbouring houses.	N/A	NCW
Oli9	-24.44822	30.07299	Modern	Dual lowlines of stones forming a platform to keep harvested wood off the wet ground and away from termites are present here. Members of the community harvesting firewood across the Project area commonly construct such features. A similar structure is situated just to the east of this feature.	N/A	NCW
Oli10	-24.44836	30.073	Iron Age	Half of a lower grinding stone.	Negligible	NCW
Oli11	-24.45056	30.07511	Iron Age	A complete upper grinding stone.	Negligible	NCW
Oli12	-24.45083	30.07609	Iron Age	A lower grinding stone.	Negligible	NCW
Oli13	-24.44985	30.07733	Iron Age	Lower grinding stone.	Negligible	NCW
Oli17	-24.33955	29.90592 ²⁰	Modern	A graveyard of at least 2 visible graves located in a maize field. The Local Guide contacted the Next-of-Kin to arrange access, but the landowner had locked the access gate at the time of the survey and could not be contacted to provide access. Due to this lack of access, the fieldwork team could not confirm the age or the size of this burial ground.	High	Grade 3 - A (IIIA)

²⁰ This location is approximate, as access to the property on which the graves are located could not be arranged at the time of the survey.

7.6.1.4 Archaeological Artefacts and Sites

Some general background scatters of Stone Age lithics and Iron Age potsherds were observed on several properties within the project area. Given the erosion prevalent on site, it is likely that these artefacts have been washed out of their original context and are *ex situ*. They therefore present minimal information potential. Given this, and their presence across much of the study area, individual scatters were not recorded. Their presence is, however, noted as it represents the possibility of an *in situ* site being encountered during project-related activities. **Figure 7-30** and **Figure 7-31** below present some photographs of these resources.



Figure 7-30: Background Scatter of Stone Tools (PGS Heritage, 2025).



Figure 7-31: Background Scatter of Ceramic Potsherds (PGS Heritage, 2025).

Four examples of Iron Age grinding stones were identified during the site surveys (**Oli10**, **Oli 11**, **Oli12** and **Oli13**). No other indicators of Iron Age settlement were observed. This suggests that the grinding stones may be out of their depositional context and are of limited information potential. As such, PGS considers them to be of negligible heritage value and are deemed NCW.

7.6.1.5 Modern Structures

Oli1, **Oli2**, **Oli3**, **Oli4**, and **Oli5** all represent the remains of structures that are no longer in use. These appear to be modern and are not likely to be older than 60 years of age. This is supported by information from the Local Guide for this property, who indicated that she knew who used to live in these houses and described them as moving to a different property within the area. While she could not remember exactly when the houses were built or abandoned, it seems to be within a relatively recent timeframe.

Historical homesteads are afforded high significance, as they are often associated with burials. This applies specifically to miscarriages, stillborn babies and young infants who may pass away after being born. Traditionally, these burials are placed underneath the house (usually the kitchen) to provide the spiritual protection of the child in the afterlife. However, the same Local Guide described above, indicated that this is not practiced within her community and that all infant burials are included in one specific cemetery which serves the community under the Traditional Authority. This cemetery is located on a different property outside of a potential impact from the proposed infrastructure and so was not inspected by the fieldwork team.

This notwithstanding, the location of **Oli1** corresponds to the location of the hut feature indicated in the 1964 topographical maps. It is likely that the modern structure identified at **Oli1** was built over what remained of the hut feature. It is possible that the hut feature represents a historical homestead and therefore may have potential for infant burials to be present. As such, **Oli1** is considered to be of high significance and a Grade 3 A (Grade III A) rating.

Given their age and the limited potential for infant burials to have occurred here, PGS considers **Oli2**, **Oli3**, **Oli4**, and **Oli5** resources to be of no heritage value (as they are below the minimum threshold to be considered heritage structures under Section 34 of the NHRA) and are therefore NCW.

Similarly, because they are modern structures, **Oli8** and **Oli9** are considered NCW. **Oli8** represents a low line of stones to demarcate property boundaries, and **Oli9** represents a temporary stone structure used at present by members of the community harvesting firewood in the local green areas.

Oli7 represents the remains of a church that was used by members of the community on the farm Middelpunt 420 KS. The Local Guide relevant to this property identified the site, which includes the remains of the church itself, an additional structure, and some features he referred to as ‘decorations’ linked to the church. A feature that may represent a grave was identified at this site. Given its previous use as a sacred site, and its current potential for graves, PGS considers this site to be of high significance and a Grade 3A heritage resource.

7.6.1.6 Burial Grounds and Graves

Oli6 is a cemetery of (an estimated) 230 graves. While some graves are marked by soil mounds, most are formally dressed with legible headstones. The cemetery appears to have been in use since 1889 and, according to the Local Guide, is still in use today.

Most of the graves are centred towards the middle of the demarcated boundary of the cemetery, and it appears that the area has been fenced off to allow for additional graves in the future. However, it must be noted that there is at least one grave located next to the fence line, and there may be more examples of this placement within the cemetery.

Oli17 is a smaller burial ground, although the size could not be confirmed by the fieldwork team²¹. It includes at least two visible headstones, and no information about these graves could be ascertained.

The high heritage significance of graves is globally accepted. Graves are intrinsically unique and irreplaceable and carry high social importance. For this reason, they are afforded a high significance value in this assessment and have been assigned a Grade 3A (Grade III A) rating.

7.6.2 IMPACT ASSESSMENT

Oli7 is located outside the proposed infrastructure footprints, and no impact (direct or indirect) to this site is foreseen. Similarly, **Oli9**, **Oli10**, **Oli11**, **Oli12**, and **Oli13** are located outside the proposed infrastructure footprints. No impacts to these sites are foreseen.

Oli2, **Oli3**, **Oli4**, and **Oli5** are located within the proposed pipeline footprints – **Oli5** is located within the proposed pipeline itself, and the other sites are within the temporary servitudes. **Oli8** is located in the proposed Klipfontein Dam footprint. As such, the development is expected to directly negatively impact (i.e. destroy) these sites.

No additional actions are required in terms of the NHRA for a heritage resource that is NCW or which has negligible heritage value. The recording of such sites and including these records in an HIA report are considered appropriate mitigation to conserve data through these records. As such, the HIA report does not consider the potential impacts to heritage resources that are NCW.

²¹ Access could not be arranged for the specific field within which the site was located at the time of the survey.

Table 7-9: Summary of the Impact Assessment on Heritage Resources of High Significance.

IMPACT DESCRIPTION: Direct Impact on Heritage Resources Oli1, Oli6 and Oli17				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	A direct or indirect impact on these heritage sites would be permanent.	Consequence: Extremely detrimental	Significance: Very high - negative
Extent	Regional	The effects of a direct impact on the burial grounds or individual graves may attract negative attention from a wider region, including (at a minimum) Next-of-Kin living outside the study area.		
Intensity	Very high - negative	Given the significance of these sites, any impact to these features will be of very high intensity.		
Probability	Certain	Given the location of the identified heritage sites in relation to the proposed footprint, the Project will directly impact these resources.		
MITIGATION:				
PGS recommends OMMP-BRWSP implement a 30 m²² no-go buffer zone around all four sites to avoid the potential direct impact to these heritage resources. This may require changes to the proposed infrastructure footprints. These sites must be conserved in situ through the development and implementation of a Heritage Management Plan (HMP). Where the in-situ conservation and implementation of the 30 m buffer zone is not feasible for either or both sites, OMMP-BRWSP must undertake a stakeholder engagement process to determine: • The feasibility of undertaking a Grave Relocation Process to relocate the graves included in Oli6 and/or Oli17 to avoid impacting them. Such a process must be completed following the requirements of Section 36 of the NHRA, as well as other applicable laws and by-laws; and • The owners or residents of the original hut feature (or historical homestead) at Oli1, and to confirm the presence or absence of graves or infant burials at this site. Where the family confirms the absence of any graves at this site (such as through a police affidavit), the significance of this structure can be revised to NCW. Where the presence of graves is confirmed (or where the absence cannot be confirmed), Oli1 must be treated in the same manner as Oli6 and Oli17.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Medium-term	<i>In situ</i> conservation and management of these sites would produce benefits that will extend to the medium term, at a minimum.	Consequence: Slightly beneficial	Significance: Low - positive
Extent	Site-specific	The <i>in situ</i> conservation and management of the sites will affect only the affected sites.		
Intensity	Low positive	The <i>in situ</i> conservation of these sites will constitute a small, but positive, change to these sites.		
Probability	Fairly likely	Should the abovementioned mitigations be put into place, it is likely that the benefits to the heritage sites will occur.		

²² Please refer to **Section 8.1.1** for information regarding the appropriate buffer for the project. The EAP has recommended that a **5 m buffer** be maintained around areas of heritage significance, as identified by the specialist.

7.6.3 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table 7-11** of this report.

7.6.3.1 Construction and Operational Phases

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas, and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind that delays can be costly during construction, and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance; however, foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments, such as construction camps and laydown areas, are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognise any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following Chance Find Procedure must be implemented.

7.6.3.2 Chance Find Procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the Environmental Control Officer (ECO) as well as team leaders in the identification of heritage resources and artefacts **during the implementation of the EMPr**.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

7.6.3.3 Possible Finds During Construction

The study area occurs within a generally disturbed and developed area, which includes burial grounds and graves as identified during the desktop and fieldwork phase. Soil or vegetation clearance for infrastructure as well as the proposed construction activities, could uncover the following:

- Unmarked burial grounds and graves; and
- Archaeological resources with information potential.

7.6.3.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 7-10** gives guidelines for lead times on permitting.

Table 7-10: Lead times for permitting and mobilisation.

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves affected by the development	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

7.6.3.5 Heritage Management Plan for EMP Implementation

Table 7-11: HMP for EMPr implementation.

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement the Chance Find Procedure in cases where possible heritage finds are uncovered.	Construction	During construction	• Applicant • ECO • Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Sections 34-36 and 38 of NHRA.	ECO Monthly Checklist/Report
Burial grounds and graves	All burial grounds and graves must be retained and avoided with a buffer zone of 30 m as per SAHRA guidelines. If this is not possible, the graves could be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of Section 36 of the NHRA and its regulations as well as the National Health Act and its regulations and any provincial legislation.	Pre-construction Construction	During Construction	• Applicant • ECO • Heritage specialist	ECO (monthly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA.	ECO Monthly Checklist/Report

7.6.4 SPECIALIST CONCLUSIONS AND RECOMMENDATIONS

Fourteen heritage resources were identified within the Phase 2F footprint. PGS recommends that OMMP-BRWSP establish and implement a 30 m no-go buffer zone between the proposed infrastructure and the following heritage resources:

- **Site Oli1**, which includes the hut feature marked in 1964, and may have potential graves and/or infant burials present; and
- Burial Grounds **Oli6** and **Oli17**.

Church Site **Oli7** is located outside the proposed development footprints and no impact to this site is foreseen.

Where the abovementioned no-go buffer zones cannot be implemented, PGS recommends that OMMP-BRWSP appoint a suitably qualified professional to:

- ▶ Determine whether a Grave Relocation Process is feasible for affected burial grounds (i.e., **Oli6** and/or **Oli17**) and, if so, to undertake this process, including obtaining all required permits as required in terms of Section 36 of the NHRA;
- ▶ Undertake a social consultation process to identify the residents of the 1964 hut feature and confirm the presence or absence of burials at **Oli1**:
 - Where any graves are identified (where the absence of burials can not be confirmed), **Oli1** must be treated in the same manner as **Oli6** and **Oli17**.
 - Where the absence of any graves at this site is confirmed, the significance of this site can be revised.

The remaining heritage resources are considered NCW, and no further mitigation actions are required.

To avoid or minimise impacts to heritage resources that may be present in the project area but which are not yet identified, PGS recommends that the OMMP-BRWSP develops and implements a Chance Find Procedure. This Chance Find Procedure must be implemented by LWUA as the implementation agent for this development. The Chance Find Procedure must further be implemented by all contractors and subcontractors brought in as part of the construction and operation of this project.

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on several identified heritage resources rated as being of high heritage significance. With the implementation of the recommended mitigation measures, the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

7.7 PALAEOLOGY IMPACT ASSESSMENT (BANZAI ENVIRONMENTAL, 2024)

The Palaeontological Desktop Assessment (PDA) was conducted by Banzai Environmental. This assessment is required to determine whether fossil material may be present in the planned development area and to assess the potential impact of the proposed development on the local palaeontological heritage, in compliance with the NHRA (section 38).

7.7.1 GEOLOGICAL AND PALAEOLOGICAL HISTORY

The proposed Project is depicted on the 1:250 000 Nylstroom 2428 (1978) and Pilgrim's Rest 2430 (1986) Geological Map (Council of Geoscience, Pretoria) (**Figure 7-32; Table 7-12 -**

Table 7-13). These maps indicates that the proposed Project is underlain by Quaternary superficial deposit that includes alluvium and scree (Q, yellow), as well as gabbro, norite and anorthosite (Vg) and

Dwars River Subsuite (Vdr) of the Rustenburg Layered Suite (Bushveld Complex). The PalaeoMap of South African Heritage Resources Information System (SAHRIS) (**Figure 7-33, Table 7-14**) indicates that the Palaeontological Sensitivity of the Quaternary deposit is Low (blue) while that of the Bushveld Complex is Zero (grey) as it is igneous in origin and thus unfossiliferous (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014). The DFFE Web based screening tool report indicates that the Palaeontological Sensitivity of the study area is Medium (orange) (**Figure 7-34**). Updated geology (2014, Council for Geoscience, Pretoria) indicates that the Project is underlain by the alluvium, colluvium, eluvium and gravel (n-qg) as well as the Dsjate Subsuite (rds) and Dwars River Subsuite of the Rustenburg Layered Suite of the Bushveld Complex (**Figure 7-35**).

The Quaternary superficial deposits primarily consist of unconsolidated sediments, such as clay, gravel, sand, and silt, which form relatively thin, discontinuous sediment patches or larger spreads onshore. These sediments include beach sands, channel deposits, floodplain and stream sediments, talus gravels, and glacial drift. Quaternary deposits are significant because they reflect palaeoclimatic changes through the various geological formations (Hunter et al., 2006).

Quaternary fossil assemblages are generally rare and low in diversity, though they span a broad geographical area. In some instances, these fossil assemblages may be found in extensive alluvial and colluvial deposits, often cut by dongas. Microfossils, such as non-marine mollusc shells, are also found in Quaternary deposits. Plant materials, including foliage, wood, pollen, and peat, as well as trace fossils like vertebrate tracks, burrows, termite mounds (termitaria), and rhizoliths (root casts), are also recovered.

The Bushveld Complex comprise of the largest mafic intrusion in the world and underlie an area of almost 65 000 km². The maximum thickness of these rocks is almost 8 km while individual layers can be followed for about 150 km. This intrusion is world renowned for the ore reserves of platinum-group elements namely chromium and vanadium. The Bushveld Complex is divided in 4 groups namely the Lebowa Granite Suite, Rashoop Granophyre Suite, Rustenburg Layered Suite and Rooiberg Group (Table 5). The Rustenburg Layered Suite is present in the development footprint. The Rustenburg Layered Suite reveals a complete differentiation sequence of magma and is made up of various rock layers ranging from dunite, gabbro, norite, and pyroxenite, and anorthosite to magnetite and apatite-rich diorite.

The Bushveld Complex is igneous in origin and thus unfossiliferous.

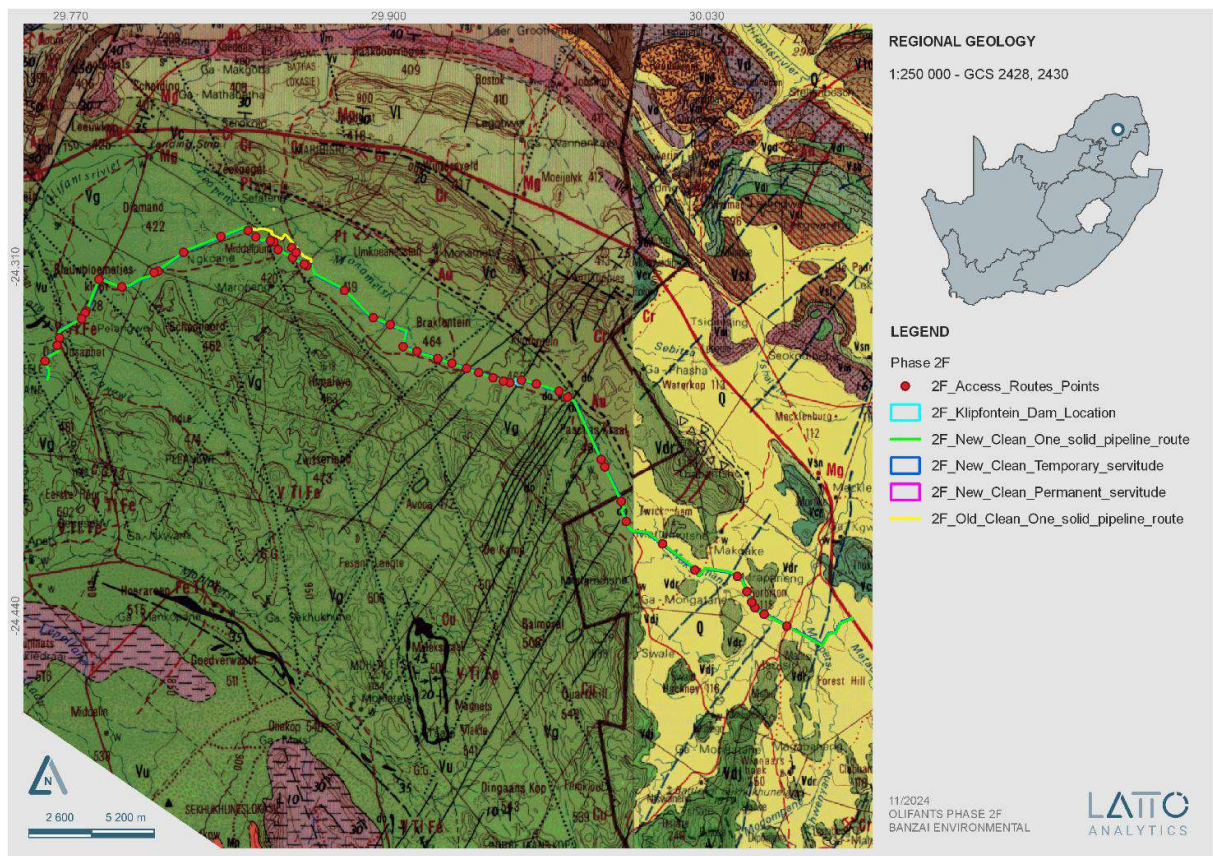


Figure 7-32: Extract of the 1:250 000 Nylstroom 2428 (1978) and Pilgrim's Rest 2430 (1986) Geological map (Council of Geoscience, Pretoria) indicates that the Project is underlain by Quaternary superficial deposit that includes alluvium and scree (Q, yellow), as well as the Dwars River Subsuite (Vdr, green) and gabbro, norite and anorthosite (Vg) both of the Rustenburg Layered Suite (Bushveld Complex) (Banzai Environmental, 2024).

Table 7-12: Legend to the 1:250 000 Pilgrim's Rest 2430 (1986) Geological map (Council of Geoscience, Pretoria). Relevant sediments are indicated in red polygons.

LITHOLOGY/LITOLUSIE			
Mn	Coarse-grained grey to pink granite, in places red near top (---); Grofkorrelrige grys tot pienk graniet, plek-plek rooi naby top (---)	Nebo Granite Nebo-Graniet	LEBOWA GRANITE SUITE SUITE LEBOWAGRANIE RASHOOP GRANOPHYRE SUITE SUITE RASHOOPGRANOFIER RUSTENBURG LAYERED SUITE GELAAGDE SUITE RUSTENBURG BUSHVELD COMPLEX KOMPLEKS BOSVELD
Mr	Granophyre; quartz-feldspar porphyry, granophyre (---); granodiorite (---); Granofier; kwarts-veldspaatporfier, granofier (---); granodioriet (---)		
Vu	Ferrogabbro; troctolite, anorthosite (▲); magnetite layer (---); magnetite pipe (▲); diorite (---); Ferrogabbro; troktoliet, anortosit (▲); magnetiet laag (---); magnetietyp (▲); dioriet (---)	Upper zone Bo-sone	
Vg	Gabbro, norite, anorthosite Gabbro, noriet, anortosit	Main zone Hoofsone	
Vc	Pyroxenite, porphyritic pyroxenite, anorthosite, leuconorite, melanorite; chromitite layer (---); Merensky Reef (---); platinum reef (---); Pirokseniet, porfiritiese pirokseniet, anortosit, leukonoriet, melanoriet; chromitiet laag (---); Merenskyrif (---); platinumrif (---)	Critical zone Kritieke sone	
Vi	Melanorite, pyroxenite, serpentized harzburgite, chromitite layer (---); Melanoriet, pirokseniet, geserpentiniseerde harzburgiet, chromitiet laag (---)	Lower zone Onderste sone	
Vgl	Quartz porphyry, altered lava Kwartzporfier, veranderde lava		
Vs	Porphyritic, spherulitic rhyolite and subordinate andesite, tuff, volcanic breccia and in places ignimbrite at top Porfiritiese, sferulitiese rioliet en ondergeskikte andesiet, tuf, vulkaniese breksie en plek-plek ignimbriet naby top		
Vh	Porphyritic, spherulitic and amygdaloidal rhyolite Porfiritiese, sferulitiese en amandelhoudende rioliet		

Table 7-13: Legend to the 1:250 000 Pilgrim's Rest 2430 (1986) Geological map (Council of Geoscience, Pretoria). Relevant sediments are indicated in red polygons.

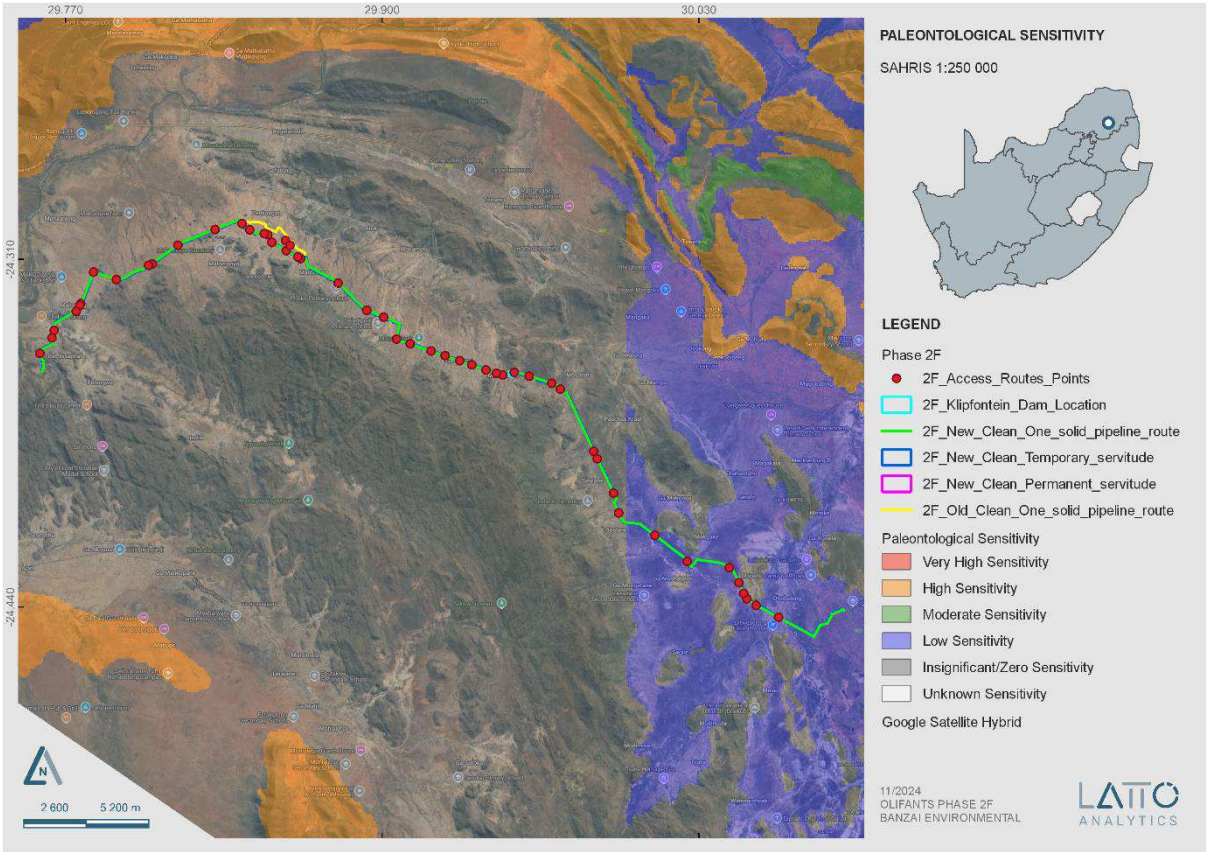
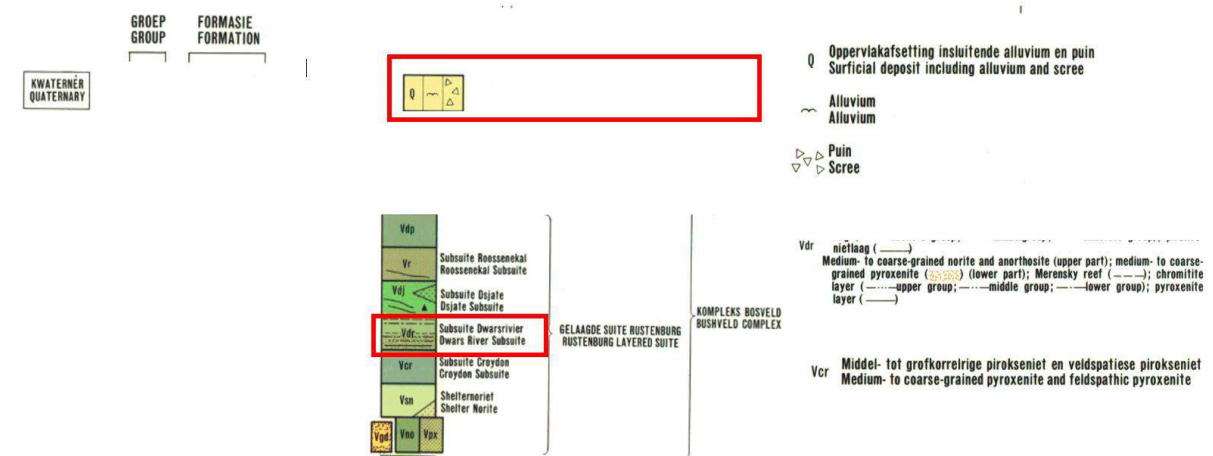


Figure 7-33: Extract of the SAHRIS PalaeoMap (Council of Geosciences) indicates that the Project is underlain by sediments with a Low (blue) and Zero (grey) Palaeontological Sensitivity (Banzai Environmental, 2024).

Table 7-14: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website).

Colour	Sensitivity	Required Action
Red	Very high	Field assessment and protocol for finds is required.
Orange/Yellow	High	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely.
Green	Moderate	Desktop study is required.
Blue	Low	No Palaeontological studies are required however a protocol for finds is required.
Grey	Insignificant/zero	No Palaeontological studies are required.

White/Clear	Unknown	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.
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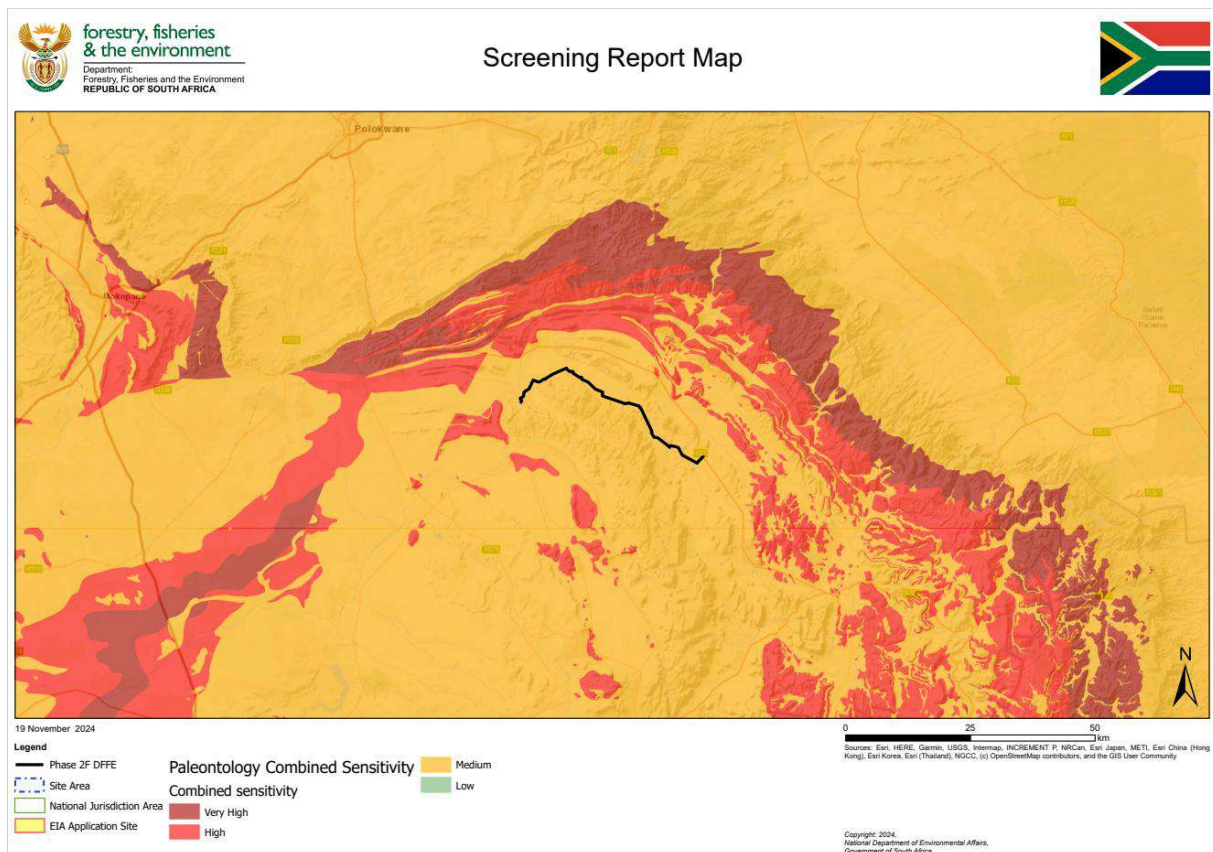


Figure 7-34: The DFFE National Environmental Web-based Screening Tool indicates that the Palaeontological Sensitivity of the Project is Medium (orange).

The Palaeontological Sensitivity of the Project area is Low (see SAHRIS PalaeoMap, **Figure 7-33**), while the National Environmental Web-based Screening Tool indicates that the Palaeontological Sensitivity of the development is Medium (yellow) (**Figure 7-34**). Due to these Sensitivities, no site investigation was conducted for the Project. However, desktop research has confirmed that the Palaeontological Sensitivity of the area is Low.

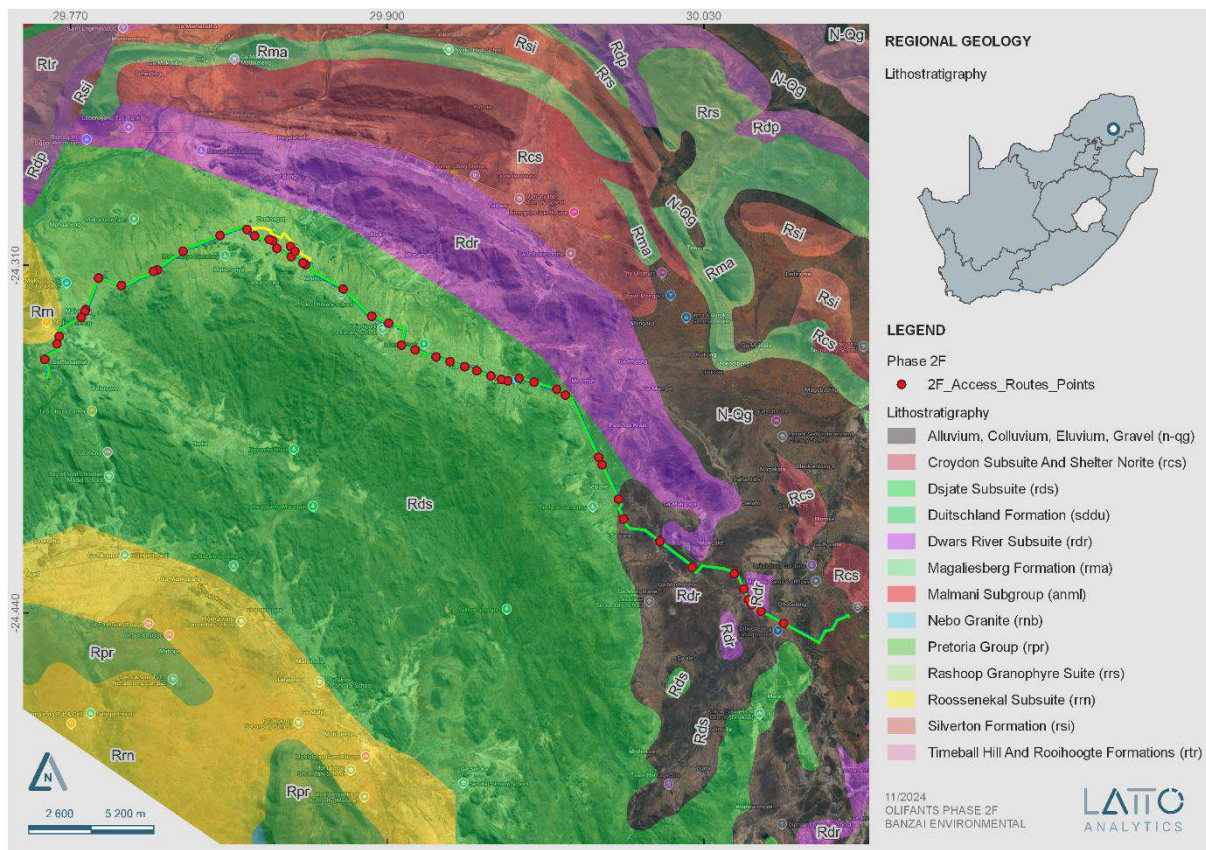


Figure 7-35: Updated geology (2014, Council for Geosciences, Pretoria) indicates that the study area is underlain by the alluvium, colluvium, eluvium and gravel (n-qg) as well as the Dsjate Subsuite (rds) and Dwars River Subsuite of the Rustenburg Layered Suite of the Bushveld Complex (Banzai Environmental, 2024).

Table 7-15: Currently accepted nomenclature and subdivisions of the Bushveld Complex (Cawthorn et al, 2006).

Lebowa Granite Suite	Nebo, Makhutso, Klipkloof, Bobbejaanskop and Verena Granites		
Rashedo Granophyre Suite	Stavoren and Diepkloof Granophyres, Rooikop Porphyritic Granite, Zwartbank Pseudogranophyre		
Rustenburg Layered Suite	Upper Zone	Subzone C (Ol-Ap diotite) Subzone B (Ol-Mt gabbro-norite) Subzone A (Mt gabbro-norite)	
	Main Zone Upper	Upper Subzone (gabbro-norite) Lower Subzone (gabbro-norite, norite)	
	Critical Zone	Upper Subzone (norite, anorthosite, pyroxenite) Lower Subzone (pyroxenite) Lower Subzone (pyroxenite)	
	Marginal Zone	(norite)	
Rooiberg Group	Schrikklouf Formation (flow-banded rhyolite)		
	Kwaggasnek Formation	(dacite,	rhyolite)
	Dullstroom Formation (basaltic andesite)		

7.7.2 PALAEOLOGY IMPACT ASSESSMENT

The table below provides a summary of the impact assessment regarding the loss of fossil heritage.

Table 7-16: Loss of fossil heritage.

IMPACT DESCRIPTION: Loss of Fossil Heritage				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
PRE-MITIGATION				
Dimension	Rating	Motivation		

Duration	Long-term	Fossils are irreplaceable	Consequence: Slightly detrimental	Significance: Low - negative
Extent	Site-specific	Only the site will be affected		
Intensity	Low - negative	Palaeontological Sensitivity is Low to Zero		
Probability	Fairly likely	Palaeontological Sensitivity is Low to Zero		
MITIGATION:				
Chance Find Procedure:				
• If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ECO / Environmental Safety Officer (ESO) or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. • Upon receipt of the preliminary report, the Heritage Agency will inform the ECO / ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary. • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sandbags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. • If the fossil cannot be stabilized the fossil may be collected with extreme care by the ECO / ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. • Once the Heritage Agency has issued the written authorisation, the developer may continue with the development on the affected area.				
POST-MITIGATION				
Dimension	Rating	Motivation	Consequence: Negligible	Significance: Very low
Duration	Long-term			
Extent	Site-specific			
Intensity	Negligible			
Probability	Very likely			

7.7.3 FINDINGS AND RECOMMENDATIONS

The proposed Project is underlain by Quaternary superficial deposit that includes alluvium and scree, as well as gabbro, norite and anorthosite and Dwars River Subsuite of the Rustenburg layered Suite (Bushveld Complex). The PalaeoMap of the SAHRIS indicates that the Palaeontological Sensitivity of the Quaternary deposit is Low while that of the Bushveld Complex is Zero as it is igneous in origin and thus unfossiliferous (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014). The DFFE Web based screening tool report indicates that the Palaeontological Sensitivity of the study area is Medium. Updated geology (2014, Council for Geoscience, Pretoria) indicates that the Project is underlain by the alluvium, colluvium, eluvium and gravel as well as the Dsjate Subsuite and Dwars River Subsuite of the Rustenburg Layered Suite of the Bushveld Complex.

Desktop research (published data) concluded that fossil heritage of scientific and conservational interest in the development area is rare. This is in agreement with the Low Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and Medium Sensitivity of the DFFE screening tool report. A low Palaeontological Significance has been allocated for the construction phase of the Project pre-mitigation and a Very Low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the operational and decommissioning phases.

As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a neutral impact on the Palaeontological Heritage of the development. The cumulative impacts of the development is considered to be Low pre- mitigation and Low post mitigation and falls within the acceptable limits for the project.

It is therefore considered that the Phase 2F Project will not lead to damaging impacts on the palaeontological resources of the area. The development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required, pending the discovery of newly discovered fossils.

Recommendations:

- If Palaeontological Heritage is uncovered during surface clearing and excavations the Chance find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected, and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out.
- Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

These recommendations should be incorporated into the EMPr for the Project in Limpopo.

7.7.4 CHANCE FIND PROTOCOL

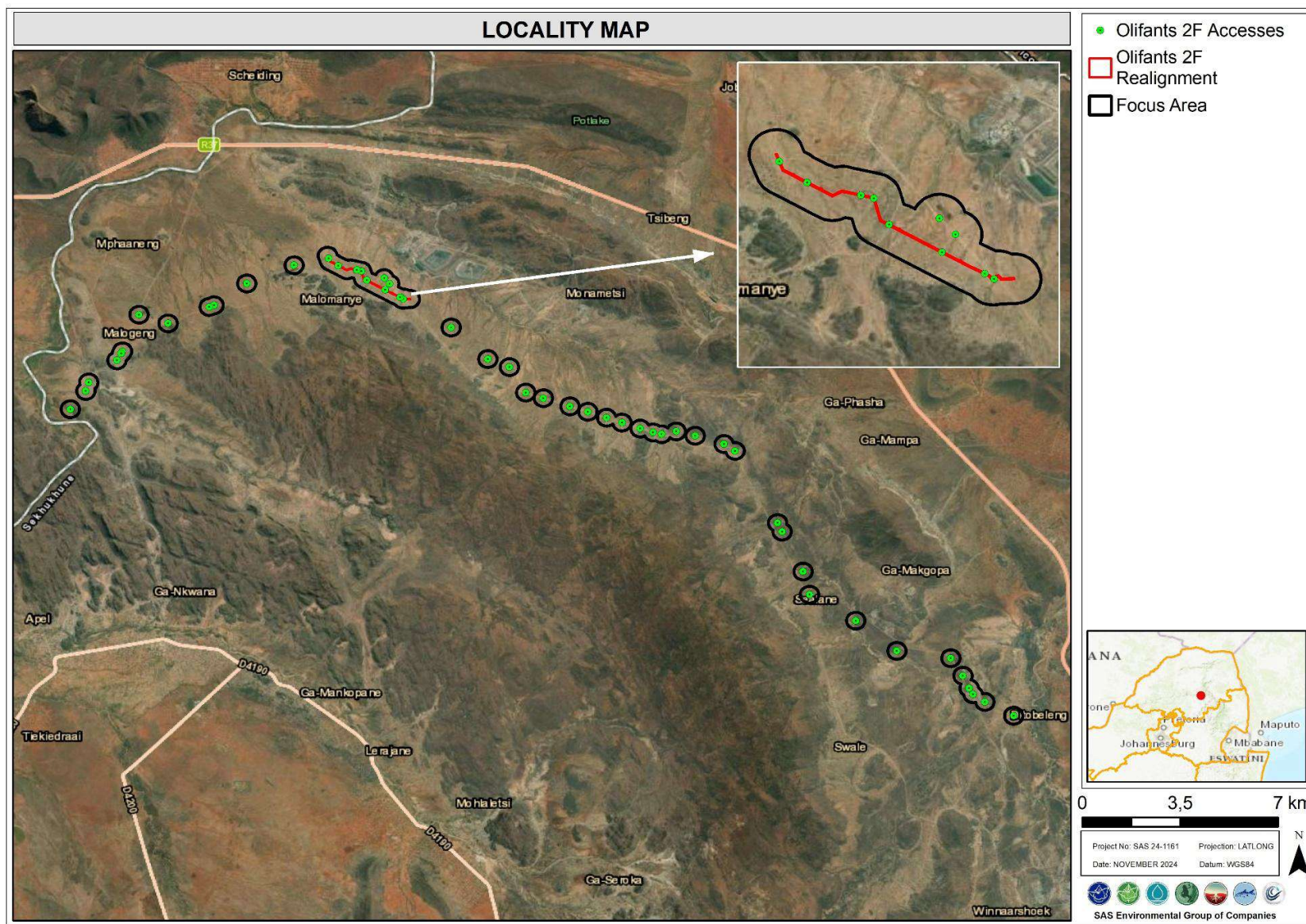
The following procedure will only be followed if fossils are uncovered during the excavation phase of the development.

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ECO / ESO or site manager. The ECO or site manager must report the find to the relevant Heritage Agency (SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
- Upon receipt of the preliminary report, the Heritage Agency will inform the ECO / ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sandbags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- If the fossil cannot be stabilised the fossil may be collected with extreme care by the ECO / ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.

- Once the Heritage Agency has issued the written authorisation, the developer may continue with the development on the affected area.

7.8 FRESHWATER AQUATIC IMPACT ASSESSMENT (SAS, 2024)

Scientific Aquatic Services (SAS) (Pty) Ltd was appointed to conduct a freshwater ecological assessment to support this EA process. The proposed access points, the pipeline deviation along with a 300 m radius around these elements are collectively referred to as the “focus area” (see to **Figure 7-36** and **Figure 7-37** below). The field assessment took place from the 30th to the 31st of October and then the 19th of November 2024. During this period, various non-perennial drainage lines located within the potential area of impact of the proposed infrastructure were assessed in detail, using the information gathered during the field assessment.



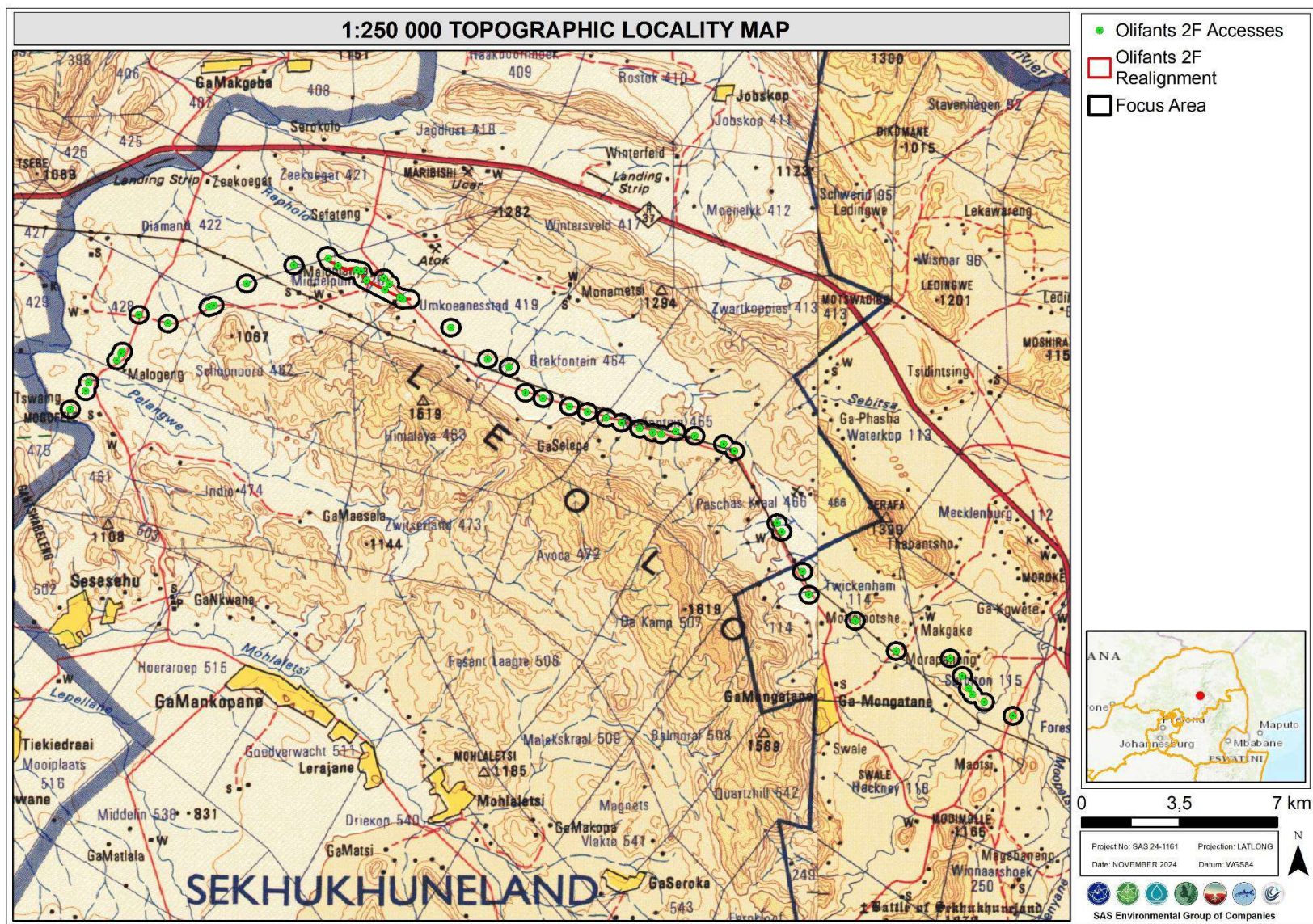


Figure 7-37: Location of the proposed infrastructure and focus area depicted on a 1:250 000 topographical map in relation to the surrounding area.

7.8.1 FRESHWATER ECOSYSTEM FIELD VERIFICATION

A field assessment was undertaken from the 30th to the 31st of October and then on the 19th of November 2024, during which the presence of any riparian or wetland characteristics as defined by the Department of Water Affairs and Forestry (DWAF) (2008) and by the NWA were noted (please refer to Section 4 of the freshwater ecological report).

7.8.2 RESULTS OF THE DESKTOP ANALYSIS

7.8.2.1 Analyses of Relevant Databases

This section contains data accessed as part of the desktop assessment and are presented as a “dashboard” report below (**Figure 7-34**).

Table 7-17: Desktop data relating to the characteristics of the freshwater ecosystems associated with the focus area and wider 2F alignment [Quarter Degree Squares (QDS) 2429BD & 2430AC].

Aquatic ecoregion and sub-regions in which the focus area is located		Detail of the focus area in terms of the NFEPA (2011) database	
Ecoregion	Eastern Bankenveld	FEPA CODE	Portions of the access points in the south eastern sections are located within an Upstream Management (Code 4) catchment, while the rest of the focus area is not indicated to be within a FEPA catchment. Upstream Management Areas are sub-quaternary catchments in which human activities need to be managed to prevent the degradation of downstream river FEPAs and Fish Support Areas. Upstream Management Areas do not include management areas for wetland FEPAs, which need to be determined at a finer scale.
Catchment	Olifants North		
Quaternary Catchment	B52E, B52G, B52J & B71E		
WMA	Olifants		
SubWMA	Middle Olifants		
Dominant characteristics of the Eastern Bankenveld (Kleynhans <i>et al.</i> , 2007a)			
Ecoregion Level II	9.03	Wetland vegetation (WetVeg) Type	The focus area is indicated to be within the Central Bushveld Group 1 and Central Bushveld Group 7 WetVeg types. Group 1 is considered critically endangered (CR) while Group 7 is considered to be Least Threatened (LT) by Mbona <i>et al.</i> (2015).
Dominant primary terrain morphology	Closed hills, Mountains; Moderate and high relief, low mountains		
Dominant primary vegetation types	Mixed Bushveld		
Altitude (m a.m.s.l)	500 to 2300	NFEPA Rivers	According to the NFEPA Rivers Database, the Monametsi River traverses the focus area associated with Access Points 2F2-29 and 2F2-31 and is indicated to be in a Heavily to Critically Modified (Class Z) ecological condition.
MAP (mm)	400 to 700		
Coefficient of Variation (% of MAP)	20 to 34		
Rainfall concentration index	55 to 64	NFEPA Wetlands	The database indicates one artificial unchanneled valley bottom wetland in the focus area associated with Access Point 2F2-31. The artificial wetland is indicated as being in a Heavily to Critically Modified (Class Z) ecological condition. This feature is indicated as a Dam by the National Biodiversity Assessment (NBA) (2018) database.
Rainfall seasonality	Early summer		
Mean annual temp. (°C)	14 to 22		
Winter temperature (July) °C	2 to 20 °C		
Summer temperature (Feb) °C	12 – 30 °C	Detail of the focus area in terms of the NBA (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (National Wetland Map 5 is included in the NBA)	
Median annual simulated runoff (mm)	20 to 150		
Strategic Water Source Areas for Surface Water (2021)		According to the NBA National Wetland Map 5 Database, no natural wetlands are indicated to be traversed by the 2F realignment, the Accesses, or the associated focus area. The Artificial Wetlands Database indicates a dam in the focus area associated with Access Points 2F2-29 and 2F2-31. According to the NBA Rivers Database, the Monametsi (Rapholo) River traverses the focus area associated with Access Point 2F2-31 and is indicated to be Moderately Modified [Present Ecological State (PES): C], CR [Ecosystem Threat Status (ETS)] and Poorly Protected [Ecosystem Protection Level (EPL)].	
Surface water Strategic Water Source Areas (SWSAs) are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. The SWSA for groundwater reflect areas that have high groundwater recharge and where the groundwater forms a nationally important resource. The 2021 Mpumalanga Tourism and Parks Agency (MTPA) database (Lötter, M.C. and Le Maitre, D) was used for surface water, while the Water Research Commission (WRC) 2017 database (Le Maitre, D.C. <i>et al.</i>) was used for the groundwater SWSAs.		National Web-based Screening Tool (2020; Accessed 2024)	
The 2F realignment, the Accesses, or the associated focus area are not indicated to be within a surface water SWSA.		The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed focus area to avoid sensitive areas.	
Portions in the north are, however, indicated to be within the Northern Lowveld Escarpment groundwater SWSA.		The 2F realignment and all access points are indicated to be of low sensitivity for the aquatic biodiversity theme.	
Detail of the focus area in terms of the Land Type Data (Job <i>et al.</i> , 2019)			

The 2F realignment, the Accesses, and the associated focus area are indicated to be within Db244, Ea88, Ia177 and Ib453 land type groupings. **Db land types** accommodate duplex soils and gleycutanic soils, including Estcourt, Sterkspruit, Swartland, Valsrivier and Kroonstad soil forms. After subtracting exposed rock land, these Land Types consist of land with more than 50% duplex soils. Db refers to land where brown duplex soils are dominant. Katspruit, duplex soils and black clay soils usually occupy bottomland terrain positions with streambeds and erosion. **EA land types** accommodate high base status, dark-coloured and/or red-structured soils, usually of clay texture, associated with basic igneous rocks. More than half of the land surface is covered by vertic, melanic or red structured diagnostic horizons. Duplex soils or exposed rock may cover significant portions of the land surface, but vertic, melanic or red structured horizons are dominant. **Ia land types** are characterised by undifferentiated deep soil deposits. The soils within this landtype are typically deep pedologically youthful soils, which occur mostly along river courses, valley bottoms and in lower lying areas. Soils are usually weakly structured, with a great variety of colour (often mottled) and often, several layers have been deposited (usually by water) with different soil textures. **Ib land type** groupings are areas where 60-80% of the surface is occupied by exposed rock and stones/boulders and the slopes are usually steep. The rest of the area comprises mostly shallow soils, directly underlain by hard or weathered rock.

Detail of the proposed focus area in terms of the Limpopo Conservation Plan Version 3 (2018)

Critical Biodiversity Area (CBA)	The northern section of the focus area and access points 2F2 25-30, 2F2 01-12, and 2F2-16 are indicated as CBA 1 and 2 areas. CBA areas are irreplaceable site areas required to meet biodiversity patterns and/or ecological process targets. No alternative sites are available to meet targets. The goal is to maintain the CBA in a natural state with limited or no biodiversity loss.
Ecosystem Support Area (ESA)	The southern and central portions of the focus area are indicated to be located within ESA 1 areas. ESAs are areas with natural habitats that are important for supporting ecological processes. The goal is to avoid additional/new impacts on ecological processes.
Other Natural Areas (ONA)	The majority of the realigned pipeline and remaining access points in the south are classified as ONAs. ONAs are natural and intact areas but are not required to meet targets or identified as ESAs or CBAs.
No Natural Remaining (NNR)	The remaining portions of the realigned pipeline and access points in the central and northern sections are indicated as NNR. NNRs are areas with no significant direct biodiversity value. These are either not natural areas, or they are degraded natural areas that are not required as ESA. These areas include mining, intensive agriculture, urban, industry, and human infrastructure.

CBA = Critical Biodiversity Area; DWS = Department of Water and Sanitation; EI = Ecological Importance; ES = Ecological Sensitivity; EPL = Ecosystem Protection Level; ESA = Ecological Support Area; ETS = Ecosystem Threat Status; NBA = National Biodiversity Assessment; NFEPA = National Freshwater Ecosystem Priority Areas; PES = Present Ecological State; SAIIE = South African Inventory of Inland Aquatic Ecosystems; WMA = Water Management Area.

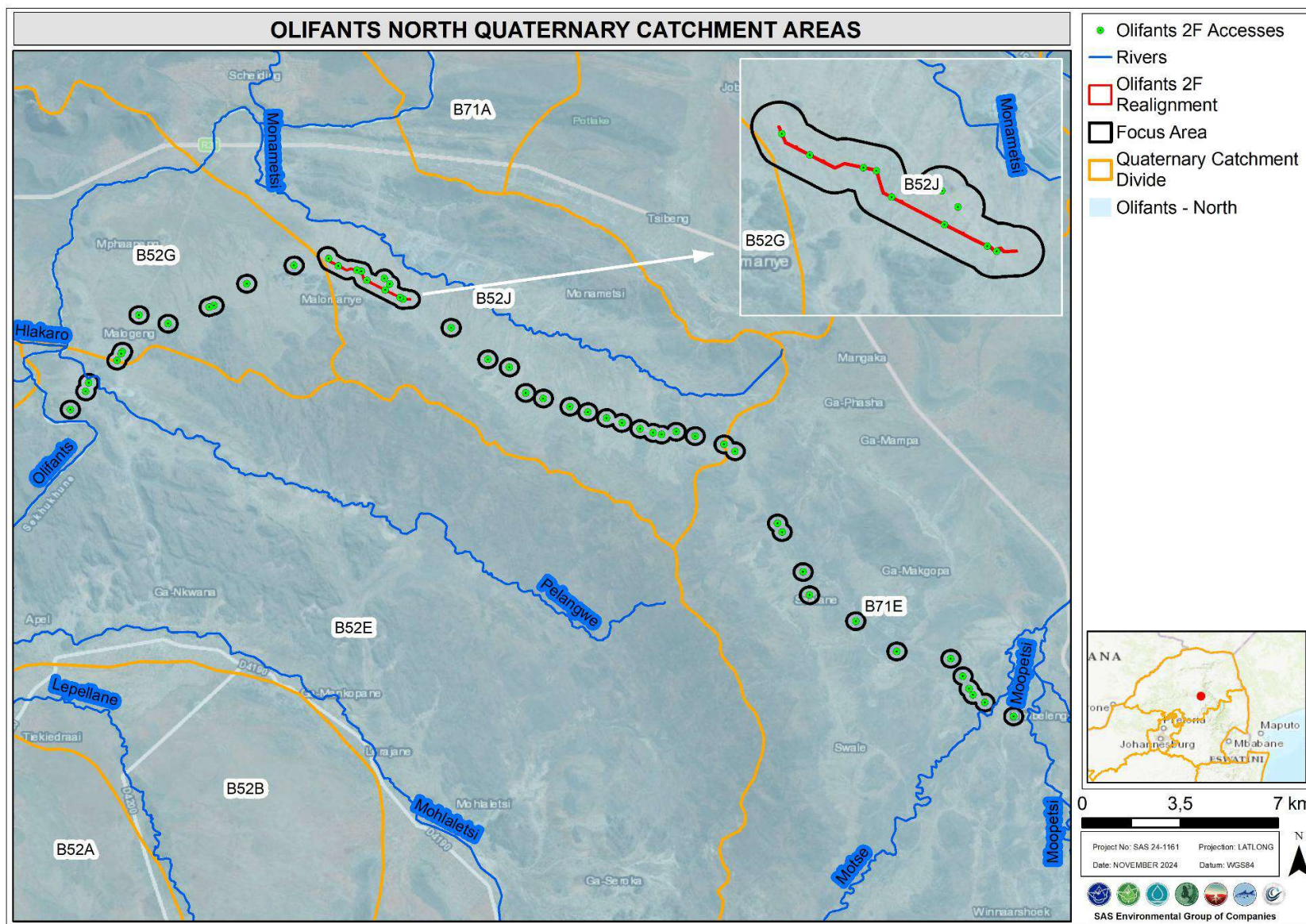


Figure 7-38: Quaternary catchments associated with the wider 2F alignment.

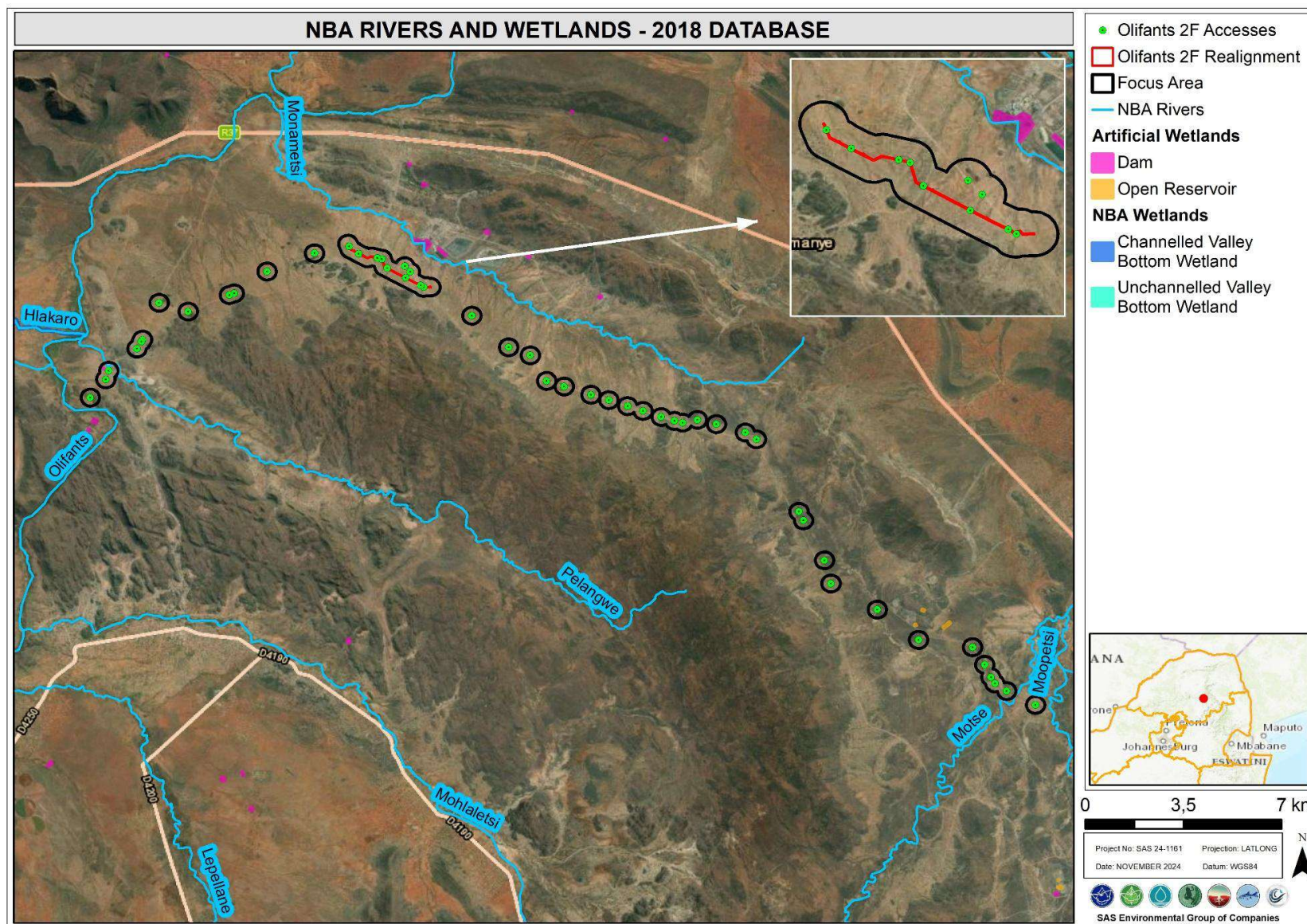


Figure 7-39: Freshwater Ecosystems associated with the wider 2F alignment according to the NBA (2018) Freshwater Database.

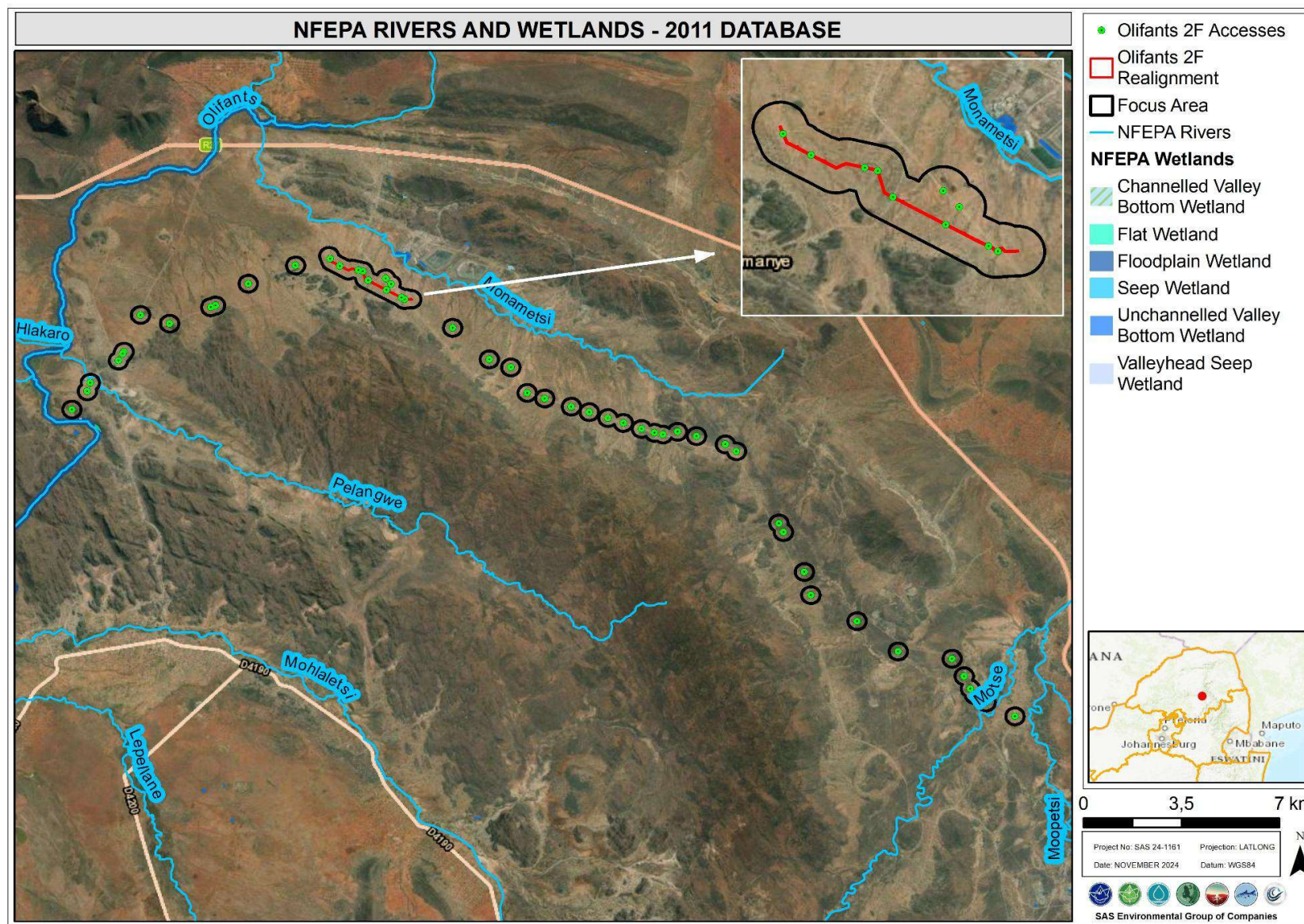


Figure 7-40: Freshwater Ecosystems associated with the wider 2F alignment according to the NFEPA (2011) Freshwater Database.

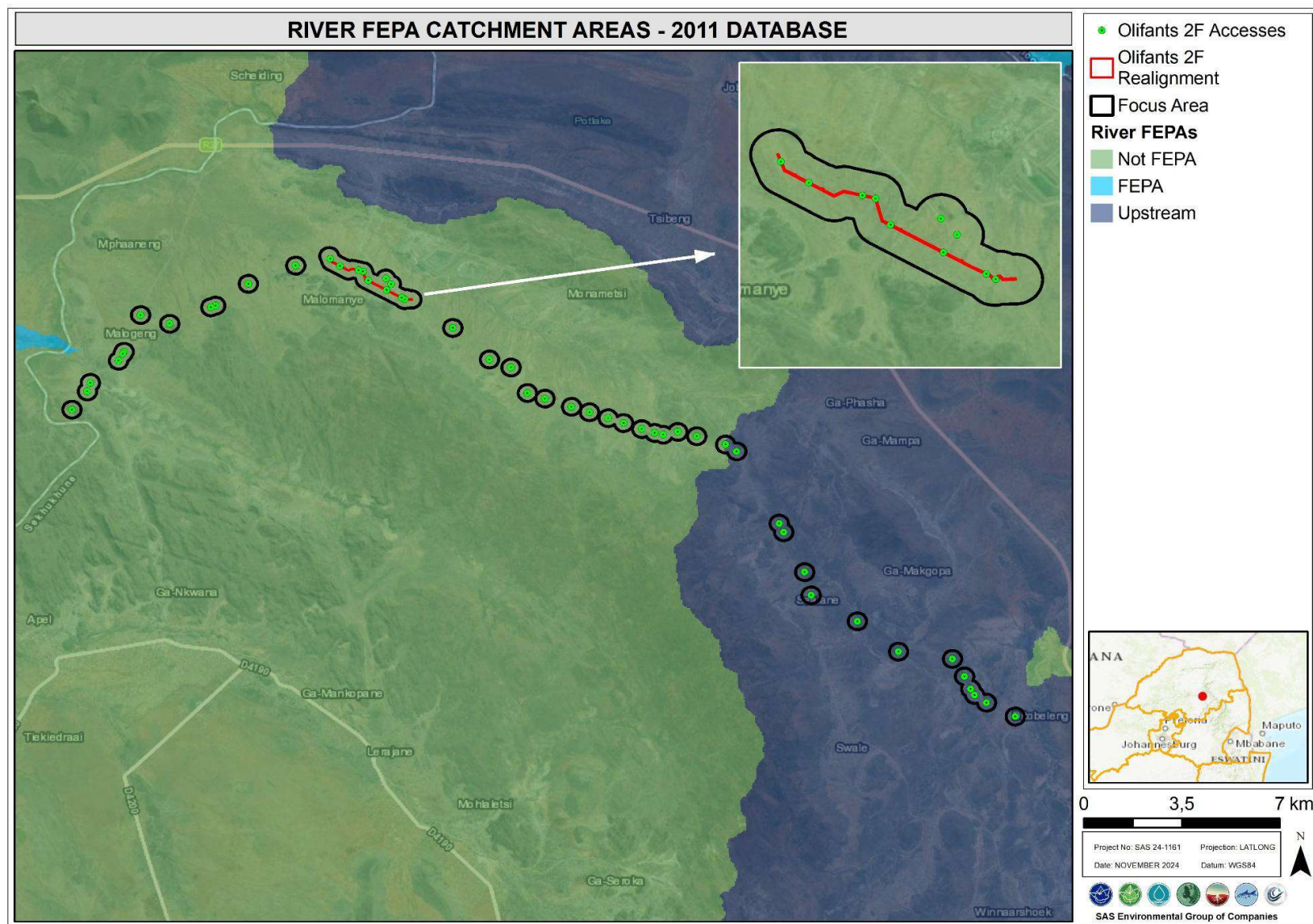


Figure 7-41: NFEPA catchments associated with the wider 2F alignment according to the NFEPA (2011) Freshwater Database.

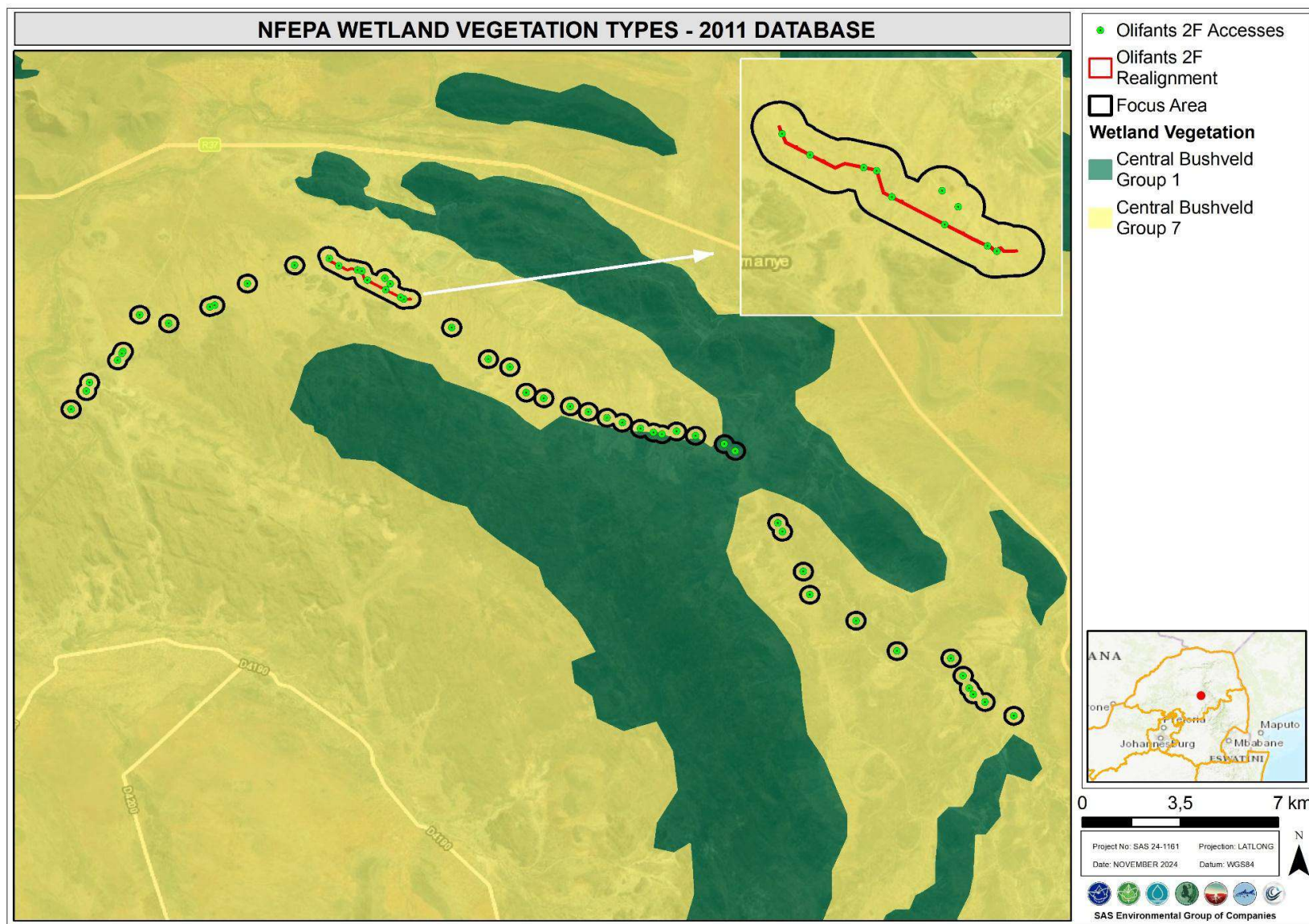


Figure 7-42: Freshwater Ecosystems in the focus area according to the NFEPA (2011) Database.

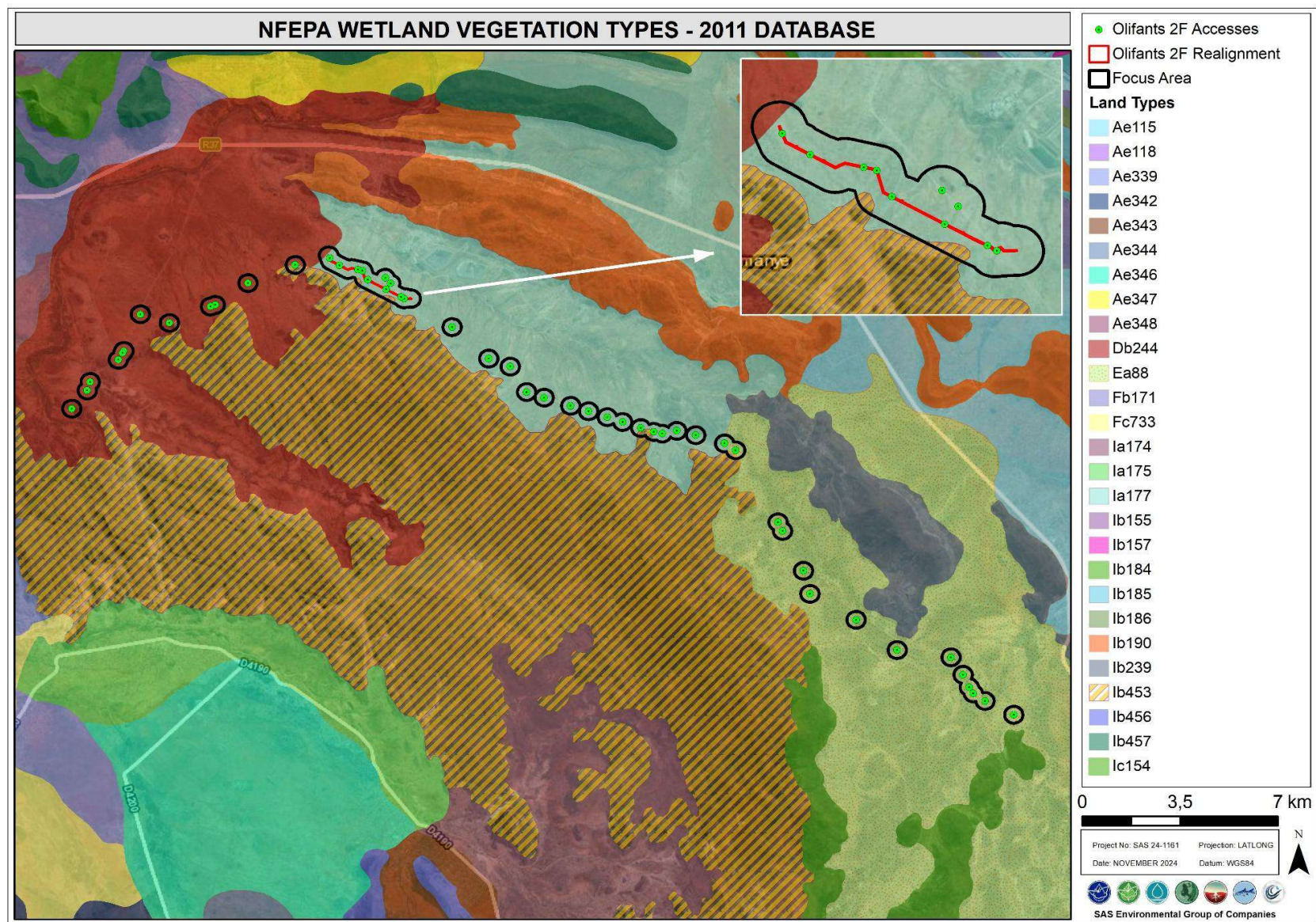
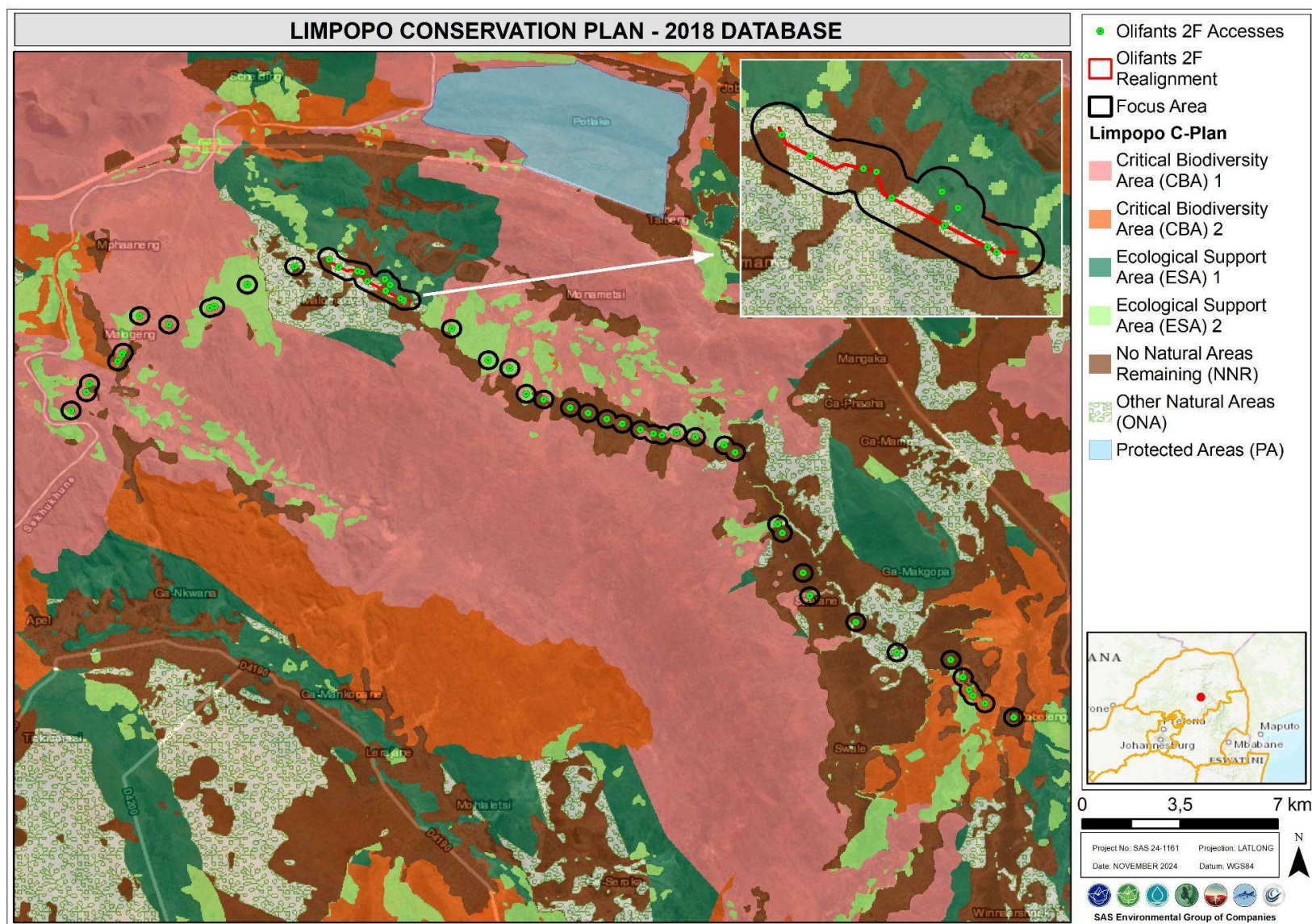


Figure 7-43: Land Types within the focus area (Job et al., 2019).



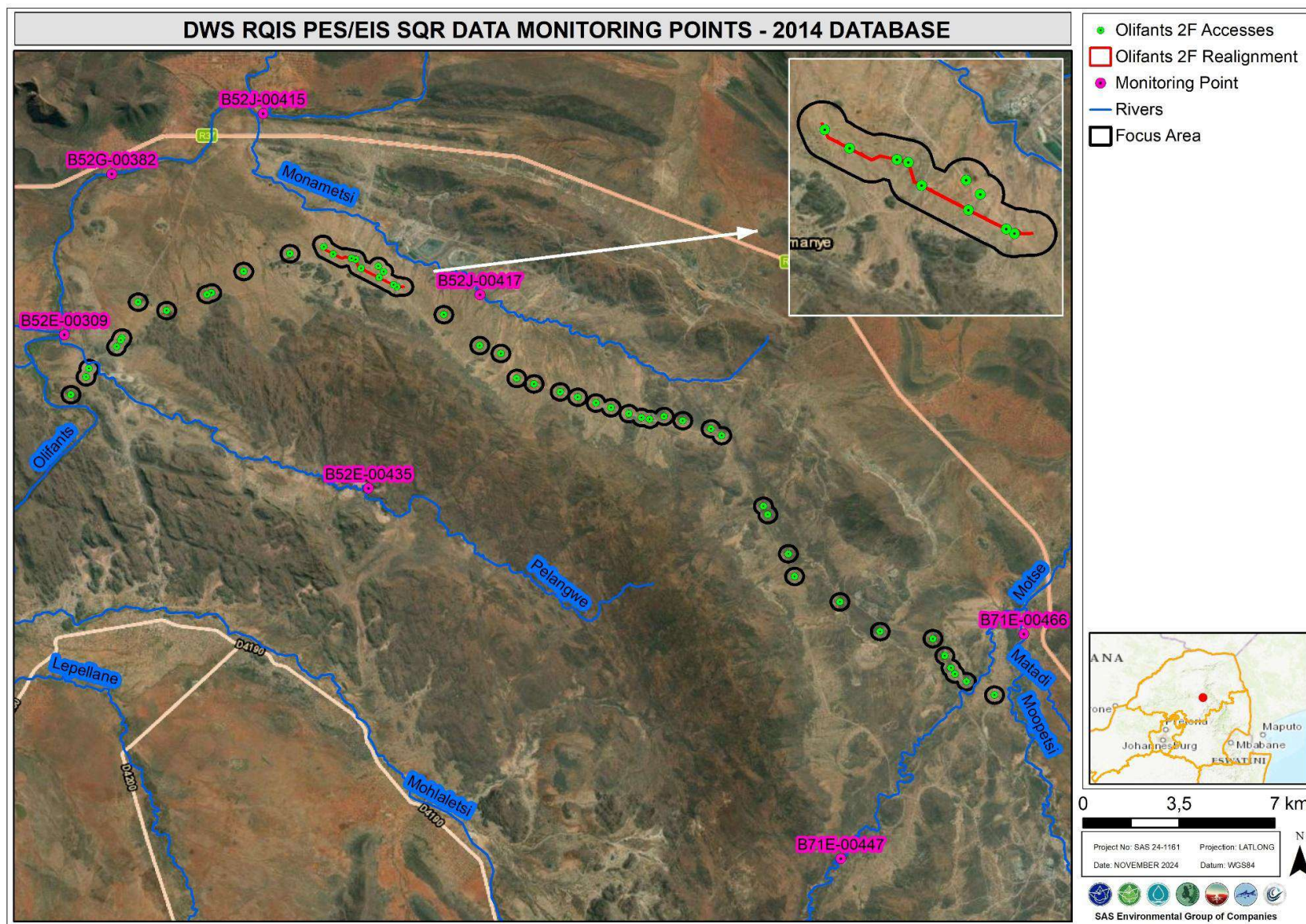


Figure 7-45: DWS Research Quality Information Services (RQIS) PES/EIS Sub quaternary catchment reach (SQR) Data Monitoring Points in relation to the focus area.



Aquatic Biodiversity Theme - Screening Report Map

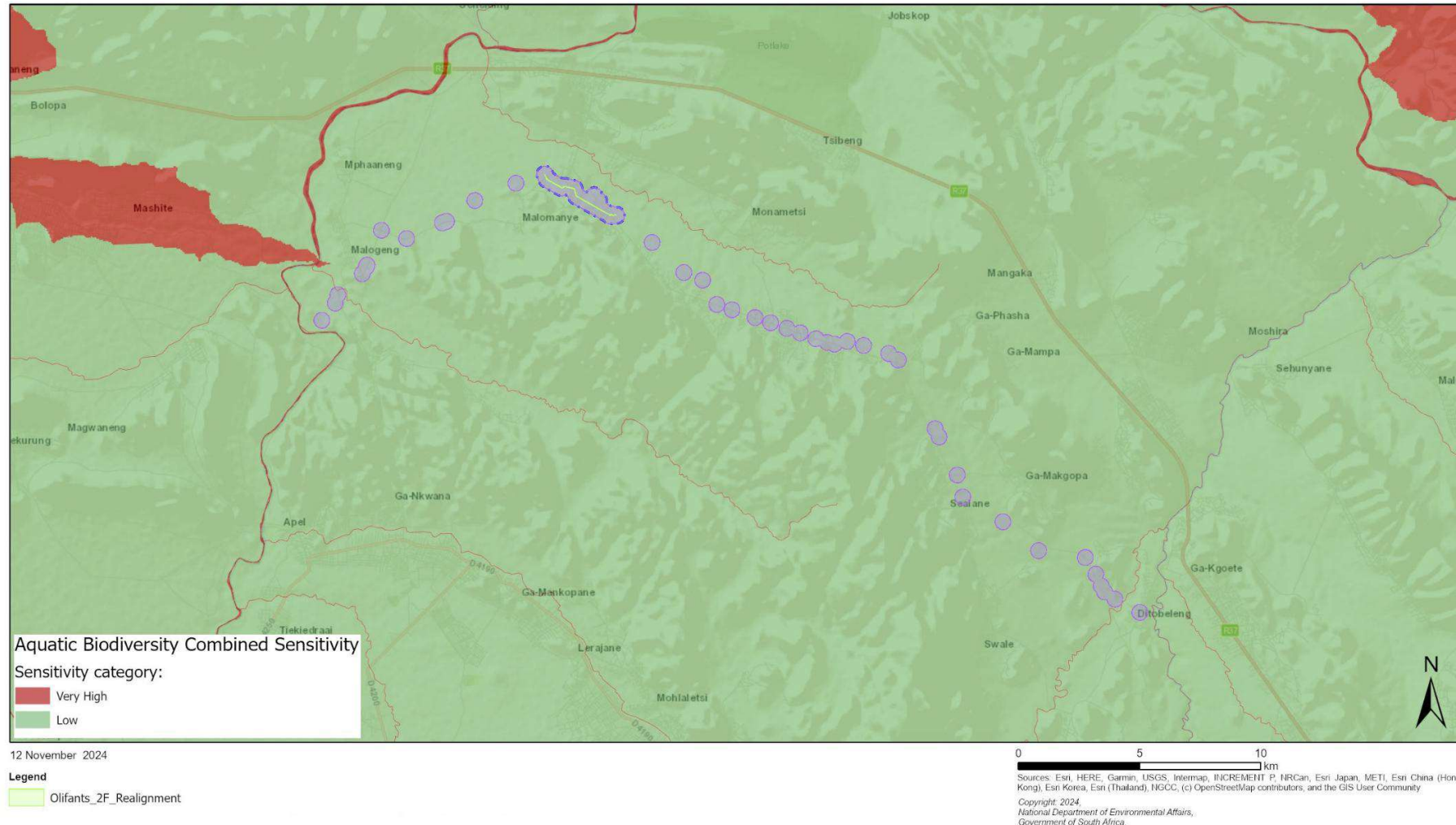


Figure 7-46: Aquatic Biodiversity Sensitivity for the wider 2F alignment as assigned by the DFFE Web-based Screening Tool.

7.8.2.2 Ecological Status of Sub-Quaternary Catchments (DWS RQS PES/EIS Database)

The reach of the rivers that traverse the focus area are located within the Eastern Bankenveld Aquatic Ecoregion within the B52E, B71E and B52J quaternary catchments. According to the PES/EIS database, as developed by the DWS RQIS department, the following SQRs are applicable (**Figure 7-45**):

- B52E - 00309 (Olifants River);
- B52G - 00382 (Olifants River);
- B52J – 00415 (Olifants River);
- B52J - 00417 (Monametsi (Rapholo) River);
- B71E - 00447 (Motse River); and
- B71E - 00466 (Moopetsi River).

Key information on aquatic fish species, aquatic macro-invertebrates, and background conditions associated with the above SQR points as contained in this database and pertaining to the PES, ecological importance (EI) and ecological sensitivity (ES) are described in the tables below.

Table 7-18: Freshwater fish species previously collected from or expected in the various SQR monitoring points associated with the SQRs:

Fish species	B52J-00417 (Monametsi River)	B52J – 00415 (Olifants River)	B52G-00382 (Olifants River)	B52E-00309 (Olifants River)	B71E-00466 (Moopetsi River)	B71E-00447 (Motse River)
<i>Amphilius uranoscopus</i>	-		-		-	-
<i>Chiloglanis paratus</i>	-	✓	✓	✓	-	-
<i>Chiloglanis pretoriae</i>	-	✓	✓	✓	-	-
<i>Chiloglanis swierstrai</i>	-	✓	✓	✓	-	-
<i>Clarias gariepinus</i>	-	✓	✓	✓	-	-
<i>Enteromius mattozi</i>		✓	✓	✓		
<i>Enteromius neefi</i>	-		✓		-	-
<i>Enteromius paludinosus</i>		✓	✓	✓		
<i>Enteromius trimaculatus</i>	-	✓	✓	✓	-	-
<i>Enteromius unitaeniatus</i>	-	✓	✓	✓	-	-
<i>Enteromius viviparus</i>		✓	✓	✓		
<i>Labeo cylindricus</i>	-	✓	✓	✓	-	-
<i>Labeo molybdinus</i>	-	✓	✓	✓	-	-
<i>Labeo rosae</i>		✓	✓	✓		
<i>Labeobarbus marequensis</i>	-	✓	✓	✓	-	-
<i>Marcusenius pongolensis</i>		✓	✓	✓	-	-
<i>Mesobola brevianalis</i>		✓	✓	✓	-	-
<i>Micralestes acutidens</i>		✓	✓	✓	-	-
<i>Opsaridium peringueyi</i>	-	✓	✓		-	-
<i>Oreochromis mossambicus</i>	-	✓	✓	✓	-	-
<i>Pseudocrenilabrus philander</i>	-	✓	✓	✓	-	-
<i>Schilbe intermedius</i>		✓	✓	✓	-	-
<i>Synodontis zambezensis</i>		✓	✓	✓	-	-
<i>Tilapia rendalli</i>		✓	✓	✓	-	-
<i>Tilapia sparrmanii</i>	-	✓	✓		-	-

Table 7-19: Freshwater macro-invertebrates previously collected from or expected in the various SQR monitoring points associated with the SQRs:

Aquatic macro-invertebrate taxa	B52J-00417 (Monametsi River)	B52J-00415 (Olifants River)	B52G-00382 (Olifants River)	B52E-00309 (Olifants River)	B71E-00466 (Moopetsi River)	B71E-00447 (Motse River)
Aeshnidae	-	ü	ü	ü	-	-
Ancylidae	-	ü	ü	ü	-	-
Atyidae	-	ü	ü	ü	-	-
Baetidae > 2 Sp	-	ü	ü	ü	-	-
Belostomatidae	-	ü	ü	ü	-	-
Bulininae	-	ü	ü	ü	-	-
Caenidae	-	ü	ü	ü	-	-
Ceratopogonidae	-	-	ü	ü	-	-
Chironomidae	-	ü	ü	ü	-	-
Chlorocyphidae	-	ü	ü	ü	-	-
Coenagrionidae	-	ü	ü	ü	-	-
Corbiculidae	-	ü	ü	ü	-	-
Corduliidae	-	ü	ü	ü	-	-
Corixidae	-	ü	ü	ü	-	-
Culicidae	-	ü	ü	ü	-	-
Dytiscidae	-	ü	ü	ü	-	-
Ecnomidae	-	ü	ü	ü	-	-
Elmidae/Dryopidae	-	ü	ü	ü	-	-
Gerridae	-	ü	ü	ü	-	-
Gomphidae	-	ü	ü	ü	-	-
Gyrinidae	-	ü	ü	ü	-	-
Helodidae	-	-	-	ü	-	-
Heptageniidae	-	ü	ü	ü	-	-
Hirudinea	-	ü	ü	ü	-	-
Hydracarina	-	ü	ü	-	-	-
Hydraenidae	-	ü	ü	ü	-	-
Hydrometridae	-	ü	ü	ü	-	-
Hydrophilidae	-	ü	ü	ü	-	-
Hydropsychidae 2 Sp	-	ü	ü	ü	-	-
Hydroptilidae	-	ü	ü	ü	-	-
Leptoceridae	-	ü	ü	ü	-	-

Aquatic macro-invertebrate taxa	B52J-00417 (Monametsi River)	B52J-00415 (Olifants River)	B52G-00382 (Olifants River)	B52E-00309 (Olifants River)	B71E-00466 (Moopetsi River)	B71E-00447 (Motse River)
Leptophlebiidae	-	ü	ü	ü	-	-
Libellulidae	-	ü	ü	ü	-	-
Lymnaeidae	-	ü	ü	ü	-	-
Muscidae	-	ü	ü	ü	-	-
Naucoridae	-	ü	ü	ü	-	-
Nepidae	-	ü	ü	ü	-	-
Notonectidae	-	ü	ü	ü	-	-
Oligochaeta	-	ü	ü	ü	-	-
Philopotamidae	-	ü	ü	ü	-	-
Physidae	-	ü	ü	ü	-	-
Planorbinae	-	ü	ü	ü	-	-
Pleidae	-	ü	ü	ü	-	-
Polymitarcyidae		-	-	ü	-	-
Porifera	-	ü	ü	ü	-	-
Potamonautidae	-	ü	ü	ü	-	-
Psephenidae	-	ü	ü	-	-	-
Simuliidae	-	ü	ü	ü	-	-
Sphaeriidae	-	ü	ü	ü	-	-
Tabanidae	-	ü	ü	ü	-	-
Thiaridae	-	ü	ü	ü	-	-
Tipulidae	-	ü	ü	ü	-	-
Tricorythidae	-	ü	ü	ü	-	-
Turbellaria	-	ü	ü	ü	-	-
Unionidae	-	ü	ü	ü	-	-
Veliidae/Mesoveliidae	-	ü	ü	ü	-	-

Table 7-20: Freshwater macro-invertebrates previously collected from or expected at the SQRs:

Ecological status	B52J-00417 (Monametsi River)	B52J – 00415 (Olifants River)	B52G-00382 (Olifants River)	B52E-00309 (Olifants River)	B52E-00435 (Pelangwe River)	B71E-00466 (Moopetsi River)	B71E-00447 (Motse River)
Synopsis							
PES Category Median	Seriously Modified (Class E)	Largely Modified (Class D)	Largely Modified (Class D)	Largely Modified (Class D)	Moderately Modified (Class C)	Seriously Modified (Class E)	Largely Modified (Class D)
Mean EI²³ class	Low	Moderate	High	High	High	Low	Low
Mean ES²⁴ class	Low	High	High	High	High	Very Low	Low
Length	26.60	0.50	14.00	0.20	29.50	2.40	32.97
Stream order	1	5	5	5	1	2	1
Default EC²⁵	Low (D)	High (B)	High (B)	High (B)	High (B)	Low (D)	Low (D)
PES²⁶ Details							
Instream habitat continuity MOD²⁷	Large	Small	Small	Small	Moderate	Moderate	Large
RIP/wetland zone continuity MOD	Large	Moderate	Moderate	Moderate	Moderate	Serious	Large
Potential instream habitat MOD activities	Serious	Large	Large	Large	Serious	Serious	Serious
Riparian/wetland zone MOD	Serious	Large	Large	Moderate	Moderate	Serious	Serious
Potential flow MOD activities	Small	Large	Serious	Serious	Small	Moderate	Moderate
Potential physico-chemical MOD activities	Serious	Large	Large	Large	Large	Serious	Large
EI Details							
Fish spp/SQ	-	16.00	23.00	21.00	-	-	-
Fish average confidence	-	1.00	3.35	1.00	-	-	-
Fish representivity per secondary class	-	High	Very High	Very High	-	-	-
Fish rarity per secondary class	-	Very High	Very High	High	-	-	-
Invertebrate taxa/SQ	-	53.00	54.00	54.00	-	-	-
Invertebrate average confidence	-	2.21	3.11	1.74	-	-	-
Invertebrate representivity per secondary class	-	Very High	Very High	Very High	-	-	-
Invertebrate rarity per secondary class	-	Very High	Very High	High	-	-	-

²³ EI = Ecological Importance

²⁴ ES = Ecological Sensitivity

²⁵ EC = Ecological Category; default based on median PES and highest of EI or ES means

²⁶ PES = Present Ecological State; confirmed in database that assessments were performed by expert assessors

²⁷ MOD = Modification

Ecological status	B52J-00417 (Monametsi River)	B52J – 00415 (Olifants River)	B52G-00382 (Olifants River)	B52E-00309 (Olifants River)	B52E-00435 (Pelangwe River)	B71E-00466 (Moopetsi River)	B71E-00447 (Motse River)
El importance: riparian-wetland-instream vertebrates (excluding fish) rating	Low	Very High	High	High	High	Very Low	Low
Habitat diversity class	Moderate	Low	Very Low	Very High	Very High	Low	High
Habitat size (length) class	Moderate	Very Low	Low	Very Low	Moderate	Very Low	Low
Instream migration link class	Moderate	Very High	Very High	Very High	High	High	Moderate
Riparian-wetland zone migration link	Moderate	High	High	High	High	Low	Moderate
Riparian-wetland zone habitat integrity class	Low	Moderate	Moderate	High	High	Low	Low
Instream habitat integrity class	Low	Moderate	Moderate	Moderate	Low	Low	Low
Riparian-wetland natural vegetation rating based on percentage natural vegetation in 500m	Low	Low	High	Very High	High	Very Low	Very High
Riparian-wetland natural vegetation rating (expert)	Low	Low	Low	Low	High	Very High	Low
ES Details							
Fish physical-chemical sensitivity description	-	Very High	Very High	Very High	-	-	-
Fish no-flow sensitivity	-	Very High	Very High	Very High	-	-	-
Invertebrates physical-chemical sensitivity description	-	Very High	Very High	Very High	-	-	-
Invertebrates velocity sensitivity	-	Very High	Very High	Very High	-	-	-
Riparian-wetland-instream vertebrates (excluding fish) intolerance water level/flow changes description	Low	High	High	High	High	Very Low	Low
Stream size sensitivity to modified flow/water level changes description	High	Low	Low	Low	Very High	Low	High
Riparian-wetland vegetation intolerance to water level changes description	Low	Low	Low	Low	Low	Low	Low

7.8.3 FRESHWATER RESULTS

7.8.3.1 Freshwater Ecosystem Characterisation

During the assessment, various non-perennial drainage lines were identified in the focus area. The majority of these drainage lines form tributaries of the Olifants River and form part of the generally northward draining network of drainage that flows into the Olifants River to the north of the 2F alignment. The overall drainage of systems associated with the 2F alignment can be roughly divided into two parts based on one of two larger rivers into which all drainage flows. The western parts of the alignment are within part of the upper catchment of the Rapholo River that flows into the Olifants River at the western end of the Bogalatladi Settlement. Drainage systems in the south-eastern part of the alignment forms tributaries of the Motse River, which itself drains north-eastwards and confluences with the Olifants River neat the settlement of Senyakho near the Mecklenburg Mine.

These freshwater ecosystems were classified according to the classification system (Ollis *et. al.*, 2013) as Inland Systems, falling within the Eastern Bankenveld Aquatic Ecoregion. The focus area falls within the Central Bushveld Groups 1 and 7 Wetland Vegetation Type, which are indicated as CR and near threatened (NT) respectively according to Mbona *et al.* (2015). These freshwater ecosystems were further classified at Level 3 and Level 4 of the classification system as summarised in **Table 7-21** below.

Table 7-21: Characterisation of the freshwater ecosystems associated with the focus area according to the Classification System (Ollis *et. al.*, 2013).

Freshwater Ecosystem	Level 3: Landscape unit	Level 4: HGM Type
Non-Perennial Drainage Line	Valley floor: The base of a valley, situated between two distinct valley side-slopes.	River: A linear landform with clearly discernible bed and banks, which permanently or periodically carries a concentrated flow of water. A river is taken to include both the active channel and the riparian zone as a unit.

In addition to the ephemeral / episodic drainage lines, the wider area within which the proposed development is located is characterised by numerous small, poorly defined preferential flow paths, which convey surface water during periods of rainfall but do not retain water for sufficient periods of time to allow for the formation of either riparian or wetland characteristics. Some such preferential flow paths may be indicated on topographic data, or may possess floodlines, but as they do not possess defined riparian zones or wetland characteristics, they are not depicted nor assessed in the freshwater ecological assessment report.

7.8.3.2 Freshwater Ecosystem Delineation

Figure 7-47 below indicates the presence of freshwater ecosystems in relation to the focus area.

Due to the relatively homogenous characteristics and similarities of modifying impacts (that are present within many of the freshwater ecosystems) which are common to virtually all freshwater ecosystems associated with the focus area, the various hydrogeomorphic (HGM) units (many of which possess only weakly defined riparian zones) were grouped according to the part of the wider 2F alignment and sub-catchment in which they are located. Since the drainage systems all possess very similar characteristics, the assessment of PES, EIS, and Ecoservices was applied collectively to the drainage lines in the respective areas, as any variation in the outcome of each individual drainage line unit was to be assessed, is likely to be negligible.

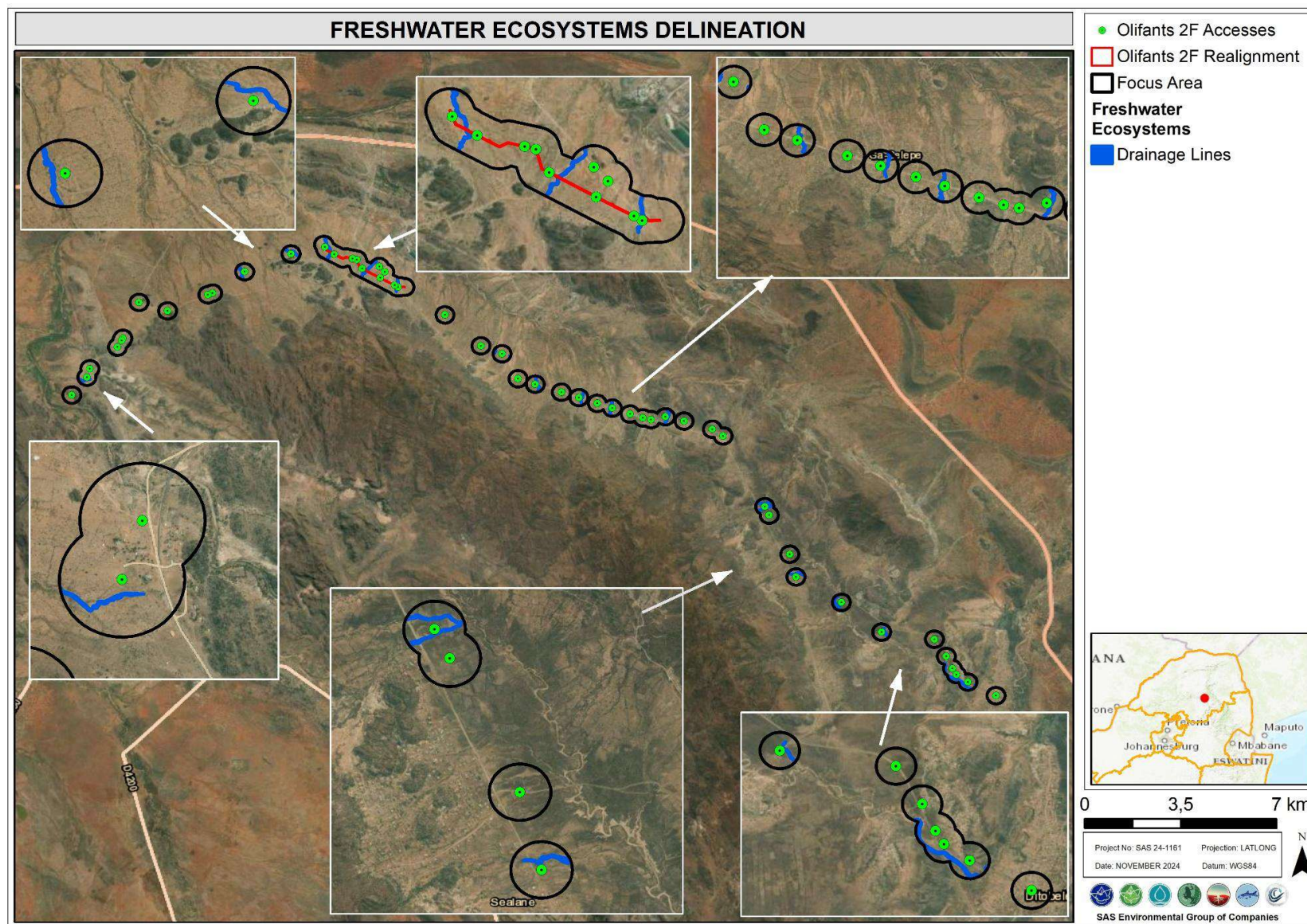
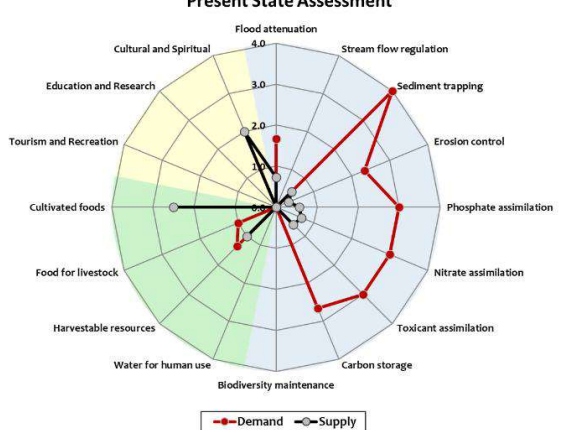


Figure 7-47: Freshwater ecosystem occurrence in the context of the focus area.

7.8.3.3 Freshwater Detailed Assessment Results

The detailed assessment of the freshwater ecosystems within the focus area is detailed in the tables below.

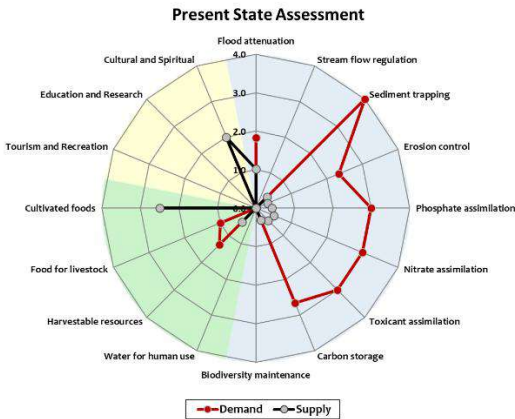
Table 7-22: Summary of the assessment of the non-perennial drainage lines associated with the access points 1-08, 1-10 and 1-13 in the catchment of the Motse River.

Ecological & socio-cultural service provision graph: Present State Assessment 	
Ecoservice provision All services – Low or Very Low The three drainage lines assessed in the Motse River catchment have been collectively assessed to provide no more than a low degree of ecological goods and service provision. This is largely due to the degraded (largely modified) state of the drainage lines. As such the ability of the drainage lines to provision services is of such a low level that for most metrics demand significantly exceeds supply. Although certain reaches exist which are in a slightly better state, the existing riparian vegetation (habitat) represents a significant deviation from reference conditions, with the natural heterogeneity of riparian vegetation being largely replaced with the indigenous encroacher <i>Dichrostachys cinerea</i>. Due to their largely modified state the drainage lines accordingly act as effective flow conduits in the landscape with very few if any hydrological regulating services provisioned.	 Photograph notes: Top left: View of the channel and riparian zone of the drainage line downstream of the existing road close to the access point 1-10; Top right: The channel of the drainage line near access point 1-13 displaying accelerated bank erosion; Bottom left: Residual riparian trees that have been felled along the drainage line upstream of access point 1-13; Bottom right: Dumping of refuse in the riparian zone of the drainage line denuded of vegetation at the access point 1-08.
PES/ discussion	Riparian IHI PES Category: D The PES of the three drainage lines located within the catchment of the Motse River in the south-eastern most part of the 2F alignment have been assigned a riparian PES score of D. This reflects a largely modified state, which is indicative of a present state where large areas of riparian habitat have been lost and limited areas of intact habitat remain.

	This denudation of natural vegetation in much of the catchments of the reaches of these drainage lines has contributed to the degradation of the drainage lines, especially through modification of runoff patterns. The altered hydrological regime has led to accelerated bank erosion with the omni-present livestock contributing to development of lateral erosion. Livestock along with chronic levels of natural resource use in the form of felling of trees and shrubs for woody vegetation has denuded large sections of the reaches of both herbaceous and woody vegetation.		
EIS discussion	EIS Category: Low The EIS of the three drainage lines in the Motse River catchment was assessed to be low due to the degraded nature of the drainage lines and the limited presence of areas of residual intact riparian habitat. This level of degradation has resulted in the drainage lines effectively functioning as drainage conduits for stormwater and overland flow and the drainage lines perform very little hydrological functioning. Due to their state of degradation the drainage lines are unable to provide any cultural or social benefits due to the effective absence of any harvestable resources or livestock grazing resources.	REC, RMO & BAS Category	REC Category D RMO: Maintain BAS: D (Maintain) Due to their low EIS twinned with the largely modified PES score, the current state of the drainage lines should be maintained. In the context of the development of the accesses to the pipeline, measures to ensure that no direct impact of riparian / instream habitat or pollution of the downgradient drainage lines must be implemented.
Watercourse drivers and receptors discussion (hydraulic regime, geomorphological processes, water quality and habitat and biota):			
The south-eastern part of the 2F alignment is located in the catchment of the Motse River, a tributary of the Olifants River. The catchment of the river and its tributaries (adjacent to which certain of the access points are located) comprise of a mix of areas of peri-human settlement interspersed with vacant areas used for informal agricultural practices, and most of the catchment except for hills and rocky outcrops has been significantly transformed from a natural state. The drainage lines at access points 1-10 and 1-13 drain catchments that extend up to the quaternary catchment divide in the hilly terrain to the west of the pipeline. Under natural circumstances the predominance of rocky terrain and shallow soils are expected to limit infiltration and during rainfall periods would be expected to carry a reasonably large volume of runoff, a characteristic which has been significantly exacerbated by landuse change. The drainage lines in the vicinity of the pipeline and access points are characterised by a single thread channel that is relatively incised, and characterised by accelerated bank erosion along most of the length of the reach. Under reference conditions the drainage lines may have been semi--seasonal in nature, but flows are present only for short durations following flow events. The significant levels of degradation in the drainage lines and their immediate surrounds, especially the occurrence of chronic gully and sheet erosion which has resulted in the removal of topsoil over large areas, along with the ever constant grazing and browsing intensity of livestock, especially goats, has resulted in there being little to no herbaceous vegetation present in the riparian zones of the drainage lines, with woody vegetation consisting of smaller shrubs that have yet to be felled or the woody (indigenous) encroacher species <i>D. cinerea</i> . As a result little to no natural biotic assemblage is likely to be present in these reaches, with a slightly more natural assemblage in areas of slightly less impact away from human settlements. Water quality (when water is present as surface flows in the drainage lines) is expected to be poor and highly turbid, although the filtering effect of the alluvial substrate present in the channel beds may assist in the polishing of water quality to some degree.			
Extent of modification anticipated	The access roads at all three access sites are unlikely to directly (physically) impact the drainage lines, with the accesses at access points 1-08 and 1-10 being located a distance away from the drainage line and the likely track to be used at access point 13 not traversing the riparian zone of the drainage line. However due to the relative proximity of the accesses indirect impacts are possible and mitigation measures stipulated in the report must be adhered to in the construction and development of the accesses.		
Impact Assessment Outcome & Business Case:			
VERY LOW	The application of the ZNJV impact assessment methodology has assessed the level of impact significance posed by the development of the accesses on respective drainage lines to be low before mitigation and very low after implementation of mitigation measures. This is due to the location of the accesses away from the freshwater ecosystems, thus being highly unlikely to result in a direct impact. Nonetheless the importance of ensuring that mitigation measures are implemented and adhered to is not diminished.		

Table 7-23: Summary of the assessment of the non-perennial drainage lines located in the Rapholo (Monametsi) River catchment in the central part of the 2D alignment associated with accesses 1-17, 2-6, 2-8 and 2-9).

Ecological & socio-cultural service provision graph:



Ecoservice provision

All services – Low or Very Low
The drainage lines assessed in the central part of the 2F alignment have been collectively assessed to provision no more than a low degree of ecological goods and service provision, with only two services associated with a low degree of service provision – the others being rated as very low. This is largely due to the highly degraded (seriously modified) state of the drainage lines. As such the ability of the drainage lines to provision services is of such a low level that for most metrics demand significantly exceeds supply. The existing riparian vegetation (habitat) represents a significant deviation from reference conditions, with the natural heterogeneity in terms of structure and species composition having been replaced by a few species. Due to their seriously modified state the drainage lines accordingly act as effective flow conduits in the landscape with very few if any hydrological regulating services provisioned.

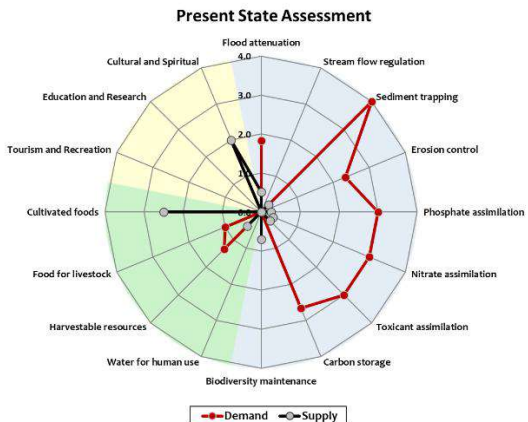


Photograph notes: **Top left:** Channel bed and banks of the drainage line near access point 1-17, showing excessive bank erosion; **Top right:** The same drainage line upstream of the road and access point illustrating very limited residual vegetation cover in the riparian zone; **Bottom left:** The drainage line at access point 2-08 with the only remnant vegetation being herbaceous shrub species which are not browsed by livestock ; **Bottom right:** The reach of the drainage line downstream of the road at access point 2-06 showing limited woody vegetation and housing in the immediate catchment of the reach.

PES/ discussion	Riparian IHI PES Category: E The PES of the drainage line reaches is seriously modified. The removal of riparian vegetation through a variety of factors including removal (felling) of woody vegetation, chronic livestock overgrazing and erosion has resulted in a situation where either no vegetation remains, or the riparian zone is characterised by very limited or no woody vegetation with unpalatable shrubs dominant. In most of the reaches assessed this has left substrate significantly exposed and resulted in the erosion of significant volumes of topsoil. The drainage lines are subject to significant changes in flood peaks from a natural hydrological state which have resulted in significant bank erosion and incision, especially in reaches downstream of the existing district road crossing. The catchments of the drainage lines have been largely modified through extensive peri-urban human settlement and by expansive areas degraded natural habitat, thus contributing to a highly altered hydrology where there is little to no infiltration and the spate flows have been greatly increased in volume over a shorter duration.		
EIS discussion	EIS Category of all drainage lines: Low The EIS of all drainage lines associated with accesses 1-17, 2-06, 2-08 and 2-09 was assessed to be low due to the highly degraded nature of the drainage lines and the effective absence of any areas of intact residual riparian habitat. This level of degradation has resulted in the drainage lines effectively functioning as drainage conduits for stormwater and overland flow and the drainage lines perform very little hydrological functioning. Due to their state of degradation the drainage lines are unable to provide any cultural or social benefits due to the effective absence of any harvestable resources or livestock grazing resources.	REC, RMO & BAS Category	REC Category: D RMO: Improve BAS: E (Maintain) Any PES score of lower than D is considered unacceptable (Categories E and F are considered ecologically unacceptable (Malan and Day, 2012) and therefore, should a freshwater ecosystem fall into one of these PES categories, an REC class D is allocated by default, as the minimum acceptable PES category). The PES category of the drainage line reaches at the access points should theoretically be improved by a class through rehabilitation. However in reality the drainage lines are in such a state of degradation with contributing landuse factors of such a nature that it would be practically impossible to improve the PES class, and the BAS for these systems would be to maintain the PES and prevent further degradation. In the context of the development of the accesses to the pipeline, measures to ensure that no direct impact of riparian / instream habitat or pollution of the downgradient drainage lines must be implemented.
Watercourse drivers and receptors discussion (hydraulic regime, geomorphological processes, water quality and habitat and biota):			
The accesses 1-17, 2-06, 2-08 and 2-09 are located in the upper part of the catchment of the Rapholo (Monametsi) River. Two linear ridges constrain and direct drainage in the Rapholo River catchment in a north-westerly direction, with the culmination of drainage in this relatively small catchment being the Rapholo River that confluences with the Olifants River west of the village of Bogalatladi. The southern part of the upper catchment in which the afore-mentioned accesses are located is comprised of a mix of areas of peri-human settlement and large, degraded vacant areas used for informal agricultural practices, and most of the catchment except for hills and rocky outcrops has been significantly transformed from a natural state. The drainage lines all drain catchments that all extend up to the quaternary catchment divide in the hilly terrain to the south of the pipeline. Under natural circumstances the predominance of rocky terrain and shallow soils are expected to limit infiltration and during rainfall periods would be expected to carry a reasonably large volume of runoff, a characteristic which has been significantly exacerbated by landuse change. The drainage lines in the vicinity of the pipeline and access points are characterised by a single thread channel that is highly incised, and characterised by accelerated bank erosion along most of the length of the reach. Under reference conditions the drainage lines may have been semi--seasonal in nature, but flows are present only for short durations following flow events. The significant levels of degradation in the drainage lines and their immediate surrounds, especially the occurrence of chronic gully and sheet erosion which has resulted in the removal of topsoil over large areas, along with the ever constant grazing and browsing intensity of livestock, especially goats, and the felling of woody vegetation has resulted in there being little to no herbaceous or woody vegetation present in the riparian zone. As a result little to natural biotic assemblage is likely to be present in these reaches, with a slightly more natural assemblage in areas of slightly less impact away from human settlements. Water quality (when water is present as surface flows in the drainage lines) is expected to be poor and highly turbid, although the filtering effect of the alluvial substrate present in the channel beds may assist in the polishing of water quality to some degree.			

Extent of modification anticipated	The access roads at all access sites are either directly off the existing road where the pipeline is aligned parallel to it, or located some distance away from the drainage line and are unlikely to directly (physically) impact the drainage lines. However due to the proximity of the accesses to the drainage lines or being located in their catchment indirect impacts are possible and mitigation measures stipulated in the report must be adhered to in the construction and development of the accesses. The northern re-aligned section is not located close to any freshwater ecosystem and no notable impact of developing a pipeline along this alignment has been identified.
Impact Assessment Outcome & Business Case:	
VERY LOW	The application of the ZNJV impact assessment methodology has assessed the level of impact significance posed by the development of the accesses and the realigned pipeline section on respective drainage lines the drainage line to be low before mitigation and very low after mitigation measures. This is due to the location of the accesses away from the freshwater ecosystems, thus being highly unlikely to result in a direct impact. Nonetheless the importance of ensuring that mitigation measures are implemented and adhered to is not diminished.

Table 7-24: Summary of the assessment of the non-perennial drainage lines located in the Rapholo (Monametsi) River catchment in the north-western central part of the 2F alignment associated with the proposed pipeline deviation and accesses 2-13, and 2-22).

Ecological & socio-cultural service provision graph:	
 Present State Assessment The radar chart compares Demand (red line) and Supply (black line) for 14 ecosystem services. The services are: Flood attenuation, Stream flow regulation, Sediment trapping, Erosion control, Phosphate assimilation, Nitrate assimilation, Toxicant assimilation, Carbon storage, Biodiversity maintenance, Water for human use, Harvestable resources, Food for livestock, Cultivated foods, Tourism and Recreation, Education and Research, and Cultural and Spiritual. The chart shows that Demand significantly exceeds Supply for all services, with the largest gaps in Flood attenuation, Stream flow regulation, and Sediment trapping.	
Ecoservice provision	 
	 
	All services – Low or Very Low The drainage lines assessed in the central part of the 2F alignment have been collectively assessed to provision no more than a low degree of ecological goods and service provision, with only two services associated with a low degree of service provision – the others being rated as very low. This is largely due to the highly degraded (largely modified) state of the drainage lines. As such the ability of the drainage lines to provision services is of such a low level that for most metrics demand significantly exceeds supply. The existing riparian vegetation (habitat) represents a significant deviation from reference conditions, with the natural heterogeneity in terms of structure and species composition having been destroyed, especially with the removal of woody vegetation. Due to their largely modified state the drainage lines accordingly act as effective flow conduits in the landscape with very few if
	Photograph notes: Top left: Channel bed and banks of the drainage line along the deviation and near access point 2-19, showing excessive bank erosion of the extremely limited residual vegetation in the riparian zone; Top right: The same drainage line showing excessive bank erosion that is undercutting the bank on which two <i>Balanites maughamii</i> trees are located; Bottom left: Another drainage line along the deviation showing extreme levels of vegetation denudation; Bottom right: Some residual woody riparian vegetation along a drainage line in the far eastern part of the deviation alignment.

	any hydrological regulating services provisioned.	
PES/ discussion	Riparian IHI PES Category: E The PES of the drainage line reaches is seriously modified. The removal of riparian vegetation through a variety of factors including removal (felling) of woody vegetation, chronic livestock overgrazing and erosion has resulted in a situation where either no vegetation remains, or the riparian zone is characterised by very limited or no woody vegetation. In most of the reaches assessed this has left substrate significantly exposed and the erosion of significant volumes of topsoil, with chronic bank erosion noted at all of the drainage lines along the deviation. The extremely high level of degradation appears to be related to their location, as they are surrounded by peri-urban settlements, thus being easily accessible to livestock and to the community who depend heavily on natural resource utilisation for sustaining livelihoods. The drainage lines are subject to significant changes in flood peaks from a reference condition, which have resulted in significant bank erosion and incision. The catchments of the drainage lines have been largely modified through extensive peri-urban human settlement and by expansive areas degraded natural habitat, thus contributing to a highly altered hydrology where there is little to no infiltration and the spate flows have been greatly increased in volume over a shorter duration.	
EIS discussion	EIS Category of all drainage lines: Low The EIS of all drainage lines crossed by the deviation was assessed to be low due to the highly degraded nature of the drainage lines and the effective absence of any areas of intact residual riparian habitat. This level of degradation has resulted in the drainage lines effectively functioning as drainage conduits for stormwater and overland flow and the drainage lines perform very little hydrological functioning. Due to their state of degradation the drainage lines are unable to provide any cultural or social benefits due to the effective absence of any harvestable resources or livestock grazing resources.	REC, RMO & BAS Category REC Category: D RMO: Improve BAS: E (Maintain) Any PES score of lower than D is considered unacceptable (Categories E and F are considered ecologically unacceptable (Malan and Day, 2012) and therefore, should a freshwater ecosystem fall into one of these PES categories, an REC class D is allocated by default, as the minimum acceptable PES category). The PES category of the drainage line reaches along the deviation and at the access points should theoretically be improved by a class through rehabilitation. However in reality the drainage lines are in such a state of degradation with contributing landuse factors of such a nature that this would be practically impossible to improve the PES class and the BAS for these systems would be to maintain the PES and prevent further degradation. In the context of the development of the accesses to the pipeline, measures to ensure that no direct impact of riparian / instream habitat or pollution of the downgradient drainage lines must be implemented.
Watercourse drivers and receptors discussion (hydraulic regime, geomorphological processes, water quality and habitat and biota): The deviation is located in the lower half part of the catchment of the Rapholo (Monametsi) River. Two linear ridges constrain and direct drainage within the Rapholo River catchment in a north-westerly direction, with the culmination of drainage in this relatively small catchment being the Rapholo River that confluences with the Olifants River west of the village of Bogalatladi. The deviation is located on the southern side of the valley and thus all drainage crossed by the deviation is generally northwards. As detailed above the southern part of the lower catchment in which the deviation is aligned is comprised mostly areas of peri-human settlement and large, degraded vacant areas used for informal agricultural practices, and most of the catchment except for hills and rocky outcrops has been significantly transformed from a natural state. The drainage lines all drain catchments that extend up to the quaternary catchment divide in the hilly terrain to the south and west of the deviation, with the drainage line located to the east of access 2-16 draining a relatively large catchment of >600ha in size. Under natural circumstances the predominance of rocky terrain and shallow soils are expected to limit infiltration and during rainfall periods would be expected to carry a reasonably large volume of runoff, but these natural runoff characteristics have been significantly exacerbated by landuse change. The drainage lines in the vicinity of the deviation crossings are characterised by a single thread channel that is typically highly incised, and characterised by chronic accelerated bank erosion along most of the length of the reach. The larger drainage line located to the east of access point 2-16 is located in a steeply incised valley setting, with steep, unvegetated and unconsolidated slopes sloping down to the drainage line. Under reference conditions the drainage lines may have been semi--seasonal in nature, but flows are present only for short durations following flow events.		

The significant levels of degradation in the drainage lines and their immediate surrounds, especially the occurrence of chronic gully and sheet erosion which has resulted in the removal of topsoil over large areas, along with the ever constant grazing and browsing intensity of livestock, especially goats, and removal of woody vegetation has resulted in there being little to no herbaceous or woody vegetation present in the riparian zone. As a result little to natural biotic assemblage is likely to be present in these reaches, with a slightly more natural assemblage in areas of slightly less impact away from human settlements. Water quality (when water is present as surface flows in the drainage lines) is expected to be poor and highly turbid, although the filtering effect of the alluvial substrate present in the channel beds may assist in the polishing of water quality to some degree.	
Extent of modification anticipated	The access roads and points in the north-western part of the 2F alignment located some distance away from the drainage lines and are unlikely to directly (physically) impact the drainage lines. However due to the proximity of the accesses to the drainage lines or being located in their catchment indirect impacts are possible and mitigation measures stipulated in the report must be adhered to in the construction and development of the accesses. The proposed deviation is proposed to cross four (4) drainage lines. No construction methodology relating to how these drainage lines may be crossed has been provided for assessment, but given the severe incision of the drainage line and steep slopes surrounding the drainage line located east of access point 2-16, open trenching may be difficult. Open trenching could be associated with mobilisation of large volumes of sediment and could potentially be associated with an exacerbating impact on the already highly degraded nature of the drainage lines.
Impact Assessment Outcome & Business Case:	
VERY LOW	The application of the ZNJV impact assessment methodology has assessed the level of impact significance posed by the development of the accesses to be low before mitigation and very low after mitigation measures. This is due to the location of the accesses away from the freshwater ecosystems, thus being highly unlikely to result in a direct impact. Nonetheless the importance of ensuring that mitigation measures are implemented and adhered to is not diminished. The impact assessment has assessed the impact significance of the four pipeline deviation drainage line crossings to be of moderate impact significance prior to mitigation. <i>Provided that a non-invasive method (ideally horizontal directional drilling) is implemented</i> this impact significance can be reduced to an acceptable level.

7.8.4 LEGISLATIVE ZONES OF REGULATION

The applicable Zones of Regulation (ZoR) for the proposed development can be summarised as follows:

- ▶ 32 m ZoR (NEMA EIA Regulations).

The ZoR as stipulated above are depicted in **Figure 7-48** below.

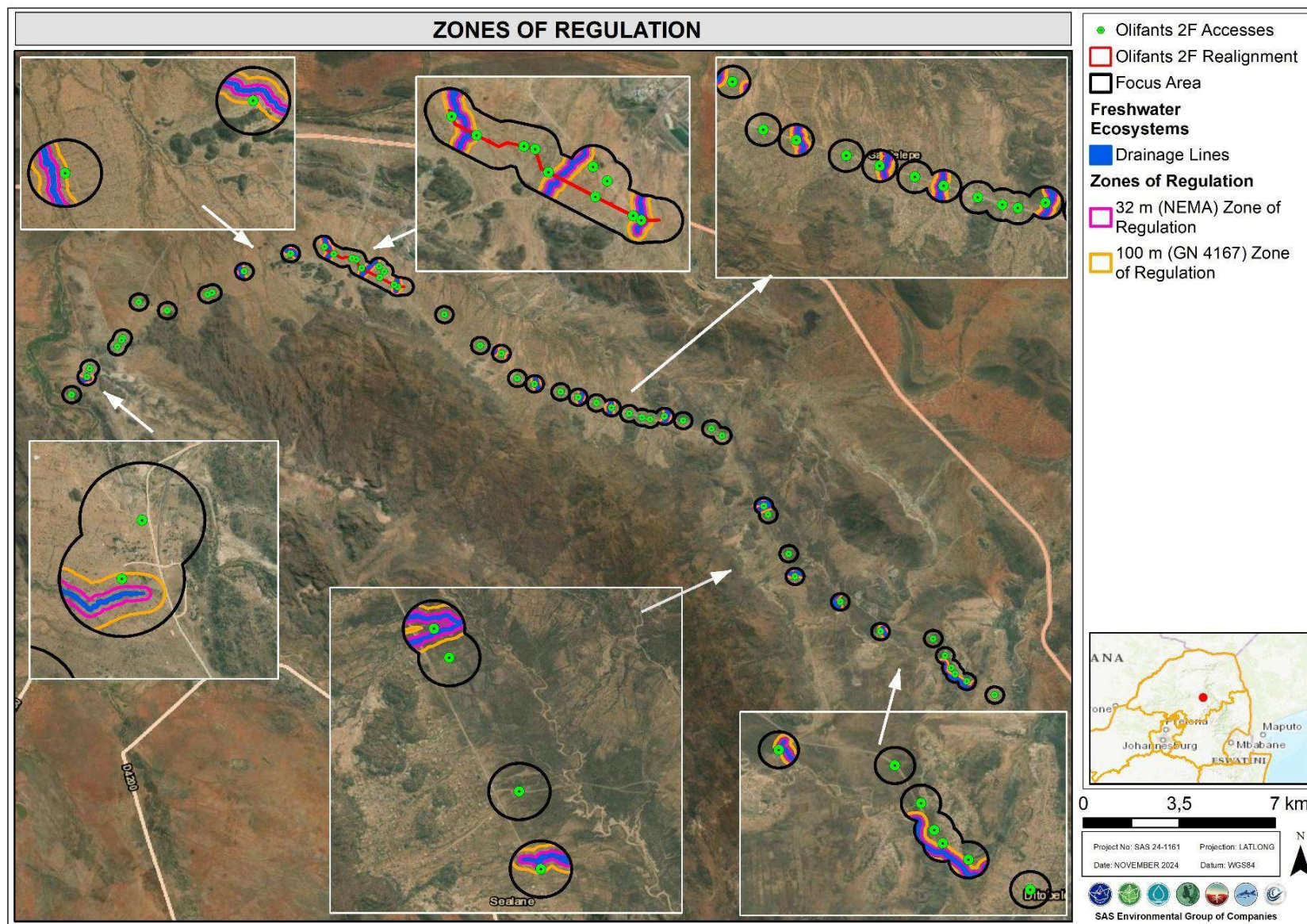


Figure 7-48: GN 4167 Freshwater - related ZoR associated with the focus area.

7.8.5 FRESHWATER SENSITIVITY VERIFICATION

According to the screening tool, the wider alignment is located within an area of low aquatic/freshwater biodiversity significance (**Figure 7-46**).

Based on the site verification undertaken by SAS and the findings thereof presented in the Freshwater Biodiversity Impact Assessment report, the designation of low sensitivity to freshwater features in the wider area by the DFFE Screening Tool has been confirmed in part and disputed in part through the findings of the freshwater assessment:

- ▶ All freshwater ecosystems have been confirmed to be associated with high sensitivity and thus in these areas, the sensitivity designation is disputed; and
- ▶ The designation of low sensitivity to the remainder of the wider area is supported.

Under the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity, (GN320 of March 2020), for areas of very high aquatic biodiversity sensitivity an Aquatic Biodiversity Assessment must be produced. Such a reporting approach has accordingly been compiled (refer to the SSV report contained in Appendix E of the freshwater ecological assessment report).

7.8.6 IMPACT ASSESSMENT

There are four key ecological impacts on freshwater ecosystems that could occur as a result of the proposed development, namely,

- Loss of freshwater ecosystem habitat and ecological structure;
- Changes to the sociocultural and service provision;
- Impacts on the hydrology and sediment balance of the freshwater ecosystems; and
- Impacts on water quality

Various activities and development aspects may lead to these impacts, however, provided that the mitigation hierarchy is followed, some impacts can be avoided or adequately minimised where avoidance is not feasible.

A summary of the Impact Assessment applied to the construction and operation of the Phase 2F infrastructure development, is provided in the table below.

Table 7-25: Summary of the results of the impact assessment matrix applied to the freshwater ecosystems associated with the construction and operation of the proposed project.

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Construction of the pipeline deviation - potential sedimentation of downgradient drainage lines due to site clearing, poor stockpile control related to pipeline excavation and poor stormwater management	Short-term	Local	Moderate negative	Slightly Detrimental	Fairly Likely	Low - negative	- It is imperative that construction occurs during the drier winter months when the lowest chance of rainfall and resultant stormwater will be present; - Vegetation clearing must be limited to the pipeline construction servitude and as much indigenous vegetation as possible must be retained (if applicable); - Implementation of construction-phase stormwater controls - e.g. use of silt curtains, berms etc., as part of a multi-phase Stormwater Management Plan (SWMP) for the development; - Stockpiles may not exceed a 2 m height and must be covered with a suitable geotextile (e.g. Geotextile or hessian sheeting) to prevent contamination by hydrocarbons/fuel and to prevent alien invasive encroachment until the excavation trench can be backfilled.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low - negative

Impact	Pre-mitigation:					Recommended mitigation	Post-mitigation:						
	Duration	Extent	Intensity	Consequence	Probability		Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Construction of the pipeline deviation - potential pollution of downgradient drainage lines due to poor cement mixing / batching practices and poor management of hazardous materials such as paint, hydrocarbons	Short-term	Local	Moderate negative	Slightly Detrimental	Unlikely	Very low - negative	- Mobile Machinery must be equipped with drip trays to prevent pollutant spillage on site; - Contractor laydown areas and equipment/material/vehicular storage are to remain at least 100 m outside of all delineated freshwater ecosystems and the precise location must be informed by an ECO in line with creating the least disturbance; - Storage of hazardous materials in a bunded contained space; - Immediate remediation of hazardous material spills; - Mixing of cement must only be undertaken within the construction camp and may not be mixed on bare soils; - Mixing of cement is also to be strictly undertaken within a lined, bound or bunded portable mixer. Ready mix concrete must preferably be used; - A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing; - Cement bags must be disposed of in the demarcated hazardous waste receptacles; - Liquid cement spillage outside of the demarcated area must be promptly removed and taken to a suitably licenced waste disposal site.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low - negative

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Construction of the pipeline deviation - potential sedimentation of downgradient drainage lines due to poorly executed reinstatement and rehabilitation that could lead to erosion of soils	Short-term	Local	Moderate negative	Slightly Detrimental	Fairly Likely	Low - negative	- The topsoil layer of the soil stockpile must be separated from the lower layers and protected from moisture loss and alien vegetation encroachment, using a geotextile such as hessian sheeting, for use during the rehabilitation phase of the river banks; - Backfilled soil must be suitably loosened on completion of construction activities and revegetated to prevent erosion.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low - negative

Impact	Pre-mitigation:					Recommended mitigation	Post-mitigation:						
	Duration	Extent	Intensity	Consequence	Probability		Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Construction of the pipeline deviation - direct impacts on riparian habitat related to crossings of four drainage lines that would further degrade the drainage lines through substrate disturbance related to open trenching	Short-term	Local	High negative	Moderately Detrimental	Very Likely	Moderate negative	- As the key mitigation measure related to the pipeline crossings of the four drainage lines, it is very strongly recommended that horizontal directional drilling be utilised as the pipeline construction method. This is due to the highly incised nature of certain of the drainage lines and the very steep valley slopes of the areas surrounding certain of the drainage lines, which would render the risk of erosion, slumping of excavated substrate and thus sedimentation of the downgradient riparian area highly likely; - Should horizontal directional drilling not be technically feasible, a detailed pipeline crossing method statement for each of the four drainage line crossings that details mitigation measures and construction techniques must be compiled and be approved by a freshwater specialist; - A construction right of way must be established to which all construction activities (footprint) must be restricted; this construction right of way must be clearly demarcated; - Establish a formal construction waste control system that is properly controlled and enforced; - It is imperative that construction occurs during the drier winter months when the lowest chance of rainfall and resultant stormwater will be present.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low - negative

Impact	Pre-mitigation:					Recommended mitigation	Post-mitigation:						
	Duration	Extent	Intensity	Consequence	Probability		Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Access road construction - potential slumping of / dumping of construction waste and excavated material into downgradient drainage lines	Short-term	Local	Moderate negative	Slightly Detrimental	Fairly Likely	Low - negative	- A construction right of way must be established to which all construction activities (footprint) must be restricted; this construction right of way must be clearly demarcated; - Establish a formal construction waste control system that is properly controlled and enforced; - It is imperative that construction occurs during the drier winter months when the lowest chance of rainfall and resultant stormwater will be present; - Vegetation clearing must be limited to the access road construction servitude and as much indigenous vegetation as possible must be retained (where applicable); - Implementation of construction-phase stormwater controls - e.g. use of silt curtains, berms etc., as part of a multi-phase SWMP for the development; - Stockpiles may not exceed a 2 m height and must be covered with a suitable geotextile (e.g. Geotextile or hessian sheeting) to prevent contamination by hydrocarbons/fuel and to prevent alien invasive encroachment until the excavation trench can be backfilled; - All stockpiling of excavated / construction material must be located on the upgradient side of the road construction right of way and not on the downgradient side.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low - negative

Impact	Pre-mitigation:					Recommended mitigation	Post-mitigation:						
	Duration	Extent	Intensity	Consequence	Probability		Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Access road construction - potential pollution of downgradient drainage lines by sediment and other pollutants such as paint / bitumen and cement	Short-term	Local	Moderate negative	Slightly Detrimental	Fairly Likely	Low - negative	- Mobile Machinery must be equipped with drip trays to prevent pollutant spillage on site; - Contractor laydown areas and equipment/material/vehicular storage are to remain at least 100 m outside of all delineated freshwater ecosystems and the precise location must be informed by an ECO in line with creating the least disturbance; - Storage of hazardous materials in a bunded contained space; - Immediate remediation of hazardous material spills; - Mixing of cement must only be undertaken within the construction camp and may not be mixed on bare soils; - Mixing of cement is also to be strictly undertaken within a lined, bound or bunded portable mixer. Ready mix concrete must preferably be used; - A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing; - A washout area²⁸ must be designated within the part of the development site that is located outside of a 100 m buffer of the delineated riparian zone boundary; - Cement bags must be disposed of in the demarcated hazardous waste receptacles; - Liquid cement spillage outside of the demarcated area must be promptly removed and taken to a suitably licenced waste disposal site.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low – negative

²⁸ Concrete washouts are performed at the end of each workday to prevent concrete from hardening inside the trucks, wheelbarrows, and chutes that handle concrete. The area in which this is done is known as a washout area. Usually, water is injected into chutes and tools to remove the concrete mixture, with the resulting mess being placed inside a special bin for disposal.

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Proliferation of Alien Invasive Plants (AIPs) in the construction footprint that could encroach into adjacent freshwater ecosystems	Long-term	Local	Moderate negative	Slightly detrimental	Fairly Likely	Low negative	All existing and emergent alien invasive vegetation must be removed. All such material must be disposed of at a registered garden refuse site and may not be burned or mulched on site.	Short-term	Site-specific	Low Negative	Negligible	Unlikely	Very low – negative
Operation - potential alteration of hydrology and geomorphology of adjacent / downgradient drainage lines due to poor operational stormwater management and rehabilitation and thus potential development of erosion in the pipeline deviation servitude	Long-term	Local	Moderate negative	Moderately detrimental	Fairly Likely	Low negative	- The use of stone pitching to reduce velocity of stormwater is strongly recommended; - Rehabilitation and revegetation must by timed to occur at the end of the dry season to limit the potential for sediment runoff during rehabilitation activities and to allow newly planted vegetation to be assisted by rainfall; - Revegetation and protection of the soils in the pipeline servitude must occur, especially in sloping areas more prone to erosion. Hydroseeding may be required for this purpose; and - It is strongly recommended that the reinstated areas by fenced or livestock be prevented from accessing these areas off for a period (at least 6 months) following reinstatement to prevent livestock from accessing the rehabilitated areas thereby allowing vegetation to become established.	Long-term	Site Specific	Low negative	Slightly detrimental	Unlikely	Very low – negative

Impact	Pre-mitigation:					Recommended mitigation	Post-mitigation:						
	Duration	Extent	Intensity	Consequence	Probability		Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Operation - potential alteration of the hydrology of downgradient drainage lines due to stormwater discharge from access roads	Long-term	Local	Low negative	Moderately detrimental	Fairly Likely	Low negative	- Design measures such as flow breakers to slow the velocity of stormwater must be included in the design of the road at the drainage line crossing point; - The principles of Sustainable Urban Drainage Systems (SUDs) must be incorporated into stormwater discharge off the access roads; - Any developing erosion at stormwater discharge points must be immediately rehabilitated.	Long-term	Local	Low negative	Moderately detrimental	Unlikely	Low – Negative
Operation - potential pollution of downgradient drainage lines due to spills and other road / pipeline maintenance activities, such as emergency excavations which could result in sediment transport into downgradient areas	Long-term	Local	Low negative	Moderately detrimental	Unlikely	Low negative	- In the event of the need for emergency excavations, all construction-related mitigation measures must be implemented and adhered to; - An operational monitoring programme that checks for development of erosion within the pipeline servitude must be implemented and adhered to; - All vehicles and machinery involved in operational maintenance must be in good working order and must not be leaking; - All spills of potential pollutants on the road surface must be immediately remediated.	Long-term	Site Specific	Low negative	Slightly detrimental	Unlikely	Very Low – negative

Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Proliferation of AIPs and poor operational control of AIPs in the project footprint that could encroach into adjacent freshwater ecosystems	Long-term	Local	Moderate negative	Moderately detrimental	Fairly Likely	Low negative	AIP proliferation is likely to occur within the pipeline servitude and the road reserve of the access roads and as such AIP control must be regularly implemented throughout the operational phase as part of an Alien Plant Control Management Plan.	Long-term	Site Specific	Low negative	Slightly detrimental	Unlikely	Very Low – negative

All activities associated with the construction and operation of the proposed infrastructure have been assessed to be associated with a “low” or “very low” degree of impact significance to the freshwater environment after the application of mitigation measures. Key to this is the use of horizontal directional drilling for the four drainage line crossings related to the 2F alignment deviation. The use of horizontal directional drilling will prevent the need to directly undertake excavations and trenching within the riparian zones of the drainage lines and their immediate surrounds, which in the case of the drainage line located east of access 2-16 is characterised by very steep unconsolidated slopes. Although very limited intact riparian habitat remains to be physically modified, the combination of slope and unconsolidated substrate renders the risk of slumping and erosion of large volumes of substrate down the slope and into the drainage lines very high, which would represent an important impact of high significance on the reach and the downstream drainage system. Accordingly, a construction method that avoids these potential impacts must be utilised in the crossing of the drainage lines.

The low impact significance associated with the construction of the proposed road accesses and the remainder of the pipeline deviation is a result of no proposed infrastructure footprint being located within any freshwater ecosystem that would result in direct impacts on the receiving freshwater environment, with only indirect impacts being likely. Such indirect impacts are able to be mitigated to a very low impact significance provided the suite of mitigation measures specified in this report are implemented and adhered to.

Assuming that strict enforcement of cogent, well-developed mitigation measures takes place, the significance of impacts arising from the development of the infrastructure are able to be minimised, assuming that a high level of mitigation takes place. Additional “good practice” mitigation measures applicable to a project of this nature are provided in Appendix H of the Freshwater Biodiversity Impact Assessment report.

7.8.6.1 Cumulative and Residual Impacts

Cumulative impacts: Freshwater ecosystems within the region are under continued threat due to a variety of factors including urban and mining expansion in the surrounding landscape, as well as due to poor landuse practices. In the context of the wider 2F alignment freshwater ecosystems have been highly degraded where located within areas of peri-urban settlement. If the proposed development were to further impact freshwater ecosystems along the 2F alignment in the focus area, this would result in a cumulative impact. However the risk of such an impact materialising has been assessed to be low, and very low after the application of mitigation measures. In this context no cumulative impact is likely to result as a result of the proposed development.

Residual impacts arise from activities of which the effects persist long after the activity has ceased due to the self-perpetuating nature of such impacts (e.g. erosion). Residual impacts may cease with human remediation or when the trajectory of ecosystem imbalance caused by such an impact is complete. Residual impacts could also result from the change in runoff and interflow characteristics from the catchment of the drainage lines in the case of open excavations and disturbances associated with the pipeline deviation and accesses. However due to the ability to adequately mitigate impacts to acceptable levels such residual impacts are deemed unlikely to occur.

7.8.7 SPECIALIST CONCLUSION AND RECOMMENDATIONS

The assessment was conducted on various non-perennial drainage lines located within the focus area. The results of the detailed assessment of freshwater ecosystems located in the focus area are summarised in the table below:

Table 7-26: Summary of results of the field assessment.

Freshwater Ecosystem Grouping	PES / Ecostatus	Ecoservices	EIS	REC / RMO/ BAS
Drainage Lines associated with the proposed accesses 108,1-10 and 1-13 in the Motse River catchment.	Riparian IHI PES Category: D	Low or Very Low	Low	REC Category: D BAS Category: D RMO: Maintain
Drainage Lines in the Rapholo River catchment in the central part of the 2D alignment associated with accesses 1-17, 2-6, 2-8 and 2-9.	Riparian IHI PES Category: E	Low or Very Low	Low	REC Category: D BAS Category: E RMO: Maintain
Drainage lines located in the Rapholo River catchment in the north-western central part of the 2F alignment associated with the proposed pipeline deviation and accesses 2-13, and 2-22.	Riparian IHI PES Category: E	Low or Very Low	Low	REC Category: D BAS Category: E RMO: Maintain

All activities associated with the construction and operation of the proposed infrastructure have been assessed to be associated with a “low” or “very low” degree of impact significance to the freshwater environment. The low impact significance is a result of no proposed infrastructure footprint being located within any freshwater ecosystem that would result in direct impacts on the receiving freshwater environment, with only indirect impacts being likely. Such indirect impacts are able to be mitigated to a very low impact significance provided the suite of mitigation measures specified in this report are implemented and adhered to.

Based on the proviso that all mitigation measures are implemented, it is the professional opinion of the freshwater ecologist that the proposed development can be granted environmental authorisation.

7.9 TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT (EKOINFO CC ENVIRONMENTAL, 2024)

EkolInfo CC and its associate, Pachnoda Consulting, were appointed to update the terrestrial biodiversity component of the entire Phase 2F alignment. EkolInfo CC and Pachnoda Consulting had previously assisted in the preparation of baseline information in 2016 for Aurecon. This update also takes into account the requirements of IFC PS 6. To assist with IFC PS 6 mapping, the entire alignment for the Phase 2F pipeline was revisited, as IFC PS 6 was not a requirement in the previous studies.

The IFC PS 6 guideline document requires the consideration of the following key elements:

1. Identification of Critical Habitats: Mapping areas that qualify as critical habitats, including those with high biodiversity value or that support rare, threatened, or endangered species. The developer must ensure that these areas are clearly identified, and conservation efforts are integrated into project planning.
2. Habitat Assessment and Baseline Surveys: The project should map natural and modified habitats within its area of influence. Baseline biodiversity surveys and habitat assessments are essential to understand the pre-project conditions.

A field investigation to ground-truth the desktop findings was conducted during the week of the 4th of November 2024.

7.9.1 STUDY AREA

The Phase 2F pipeline, along with its permanent and temporary servitudes, represents the disturbance footprint of the project and is located within the landscape presented by quaternary catchments B52J, B52G, B71E and B52E (**Figure 7-49**).

The current alignment mainly follows the original alignment, except in the north where a deviation occurs (**Figure 7-50**). Only results for this deviation area was provided in the screening report supplied with regards to flora (**Figure 7-51**), fauna (**Figure 7-52**) and terrestrial biodiversity (**Figure 7-53**). According to the screening tool, the deviation is in an area of medium sensitivity for plant species, medium - high sensitivity for animal species, and very high sensitivity for terrestrial biodiversity. The relevance of these sensitivity classes was verified during the site visit.

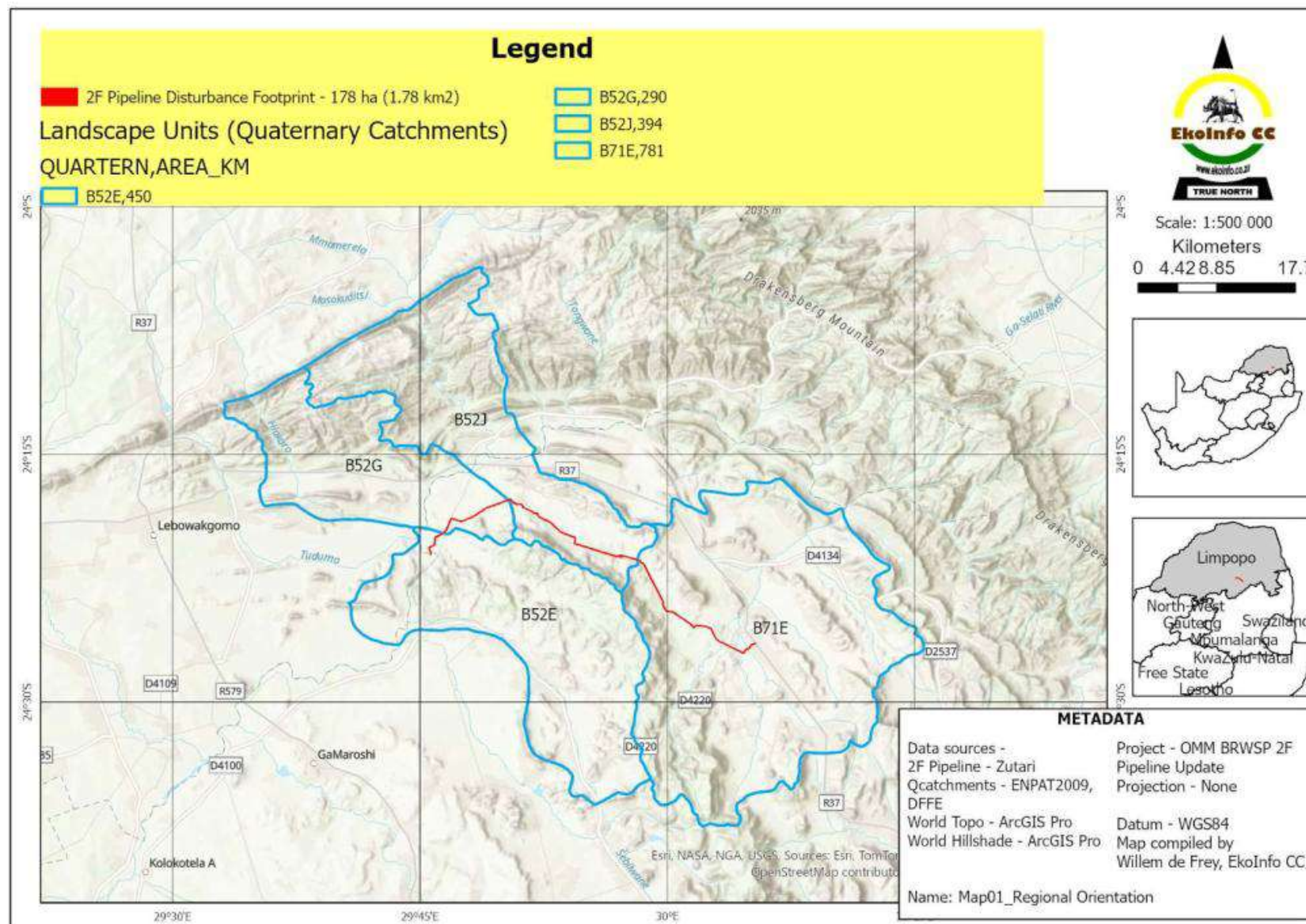


Figure 7-49: Regional orientation of the study area consisting of the 2F pipeline disturbance footprint, Limpopo Province (EkoInfo CC, 2024).

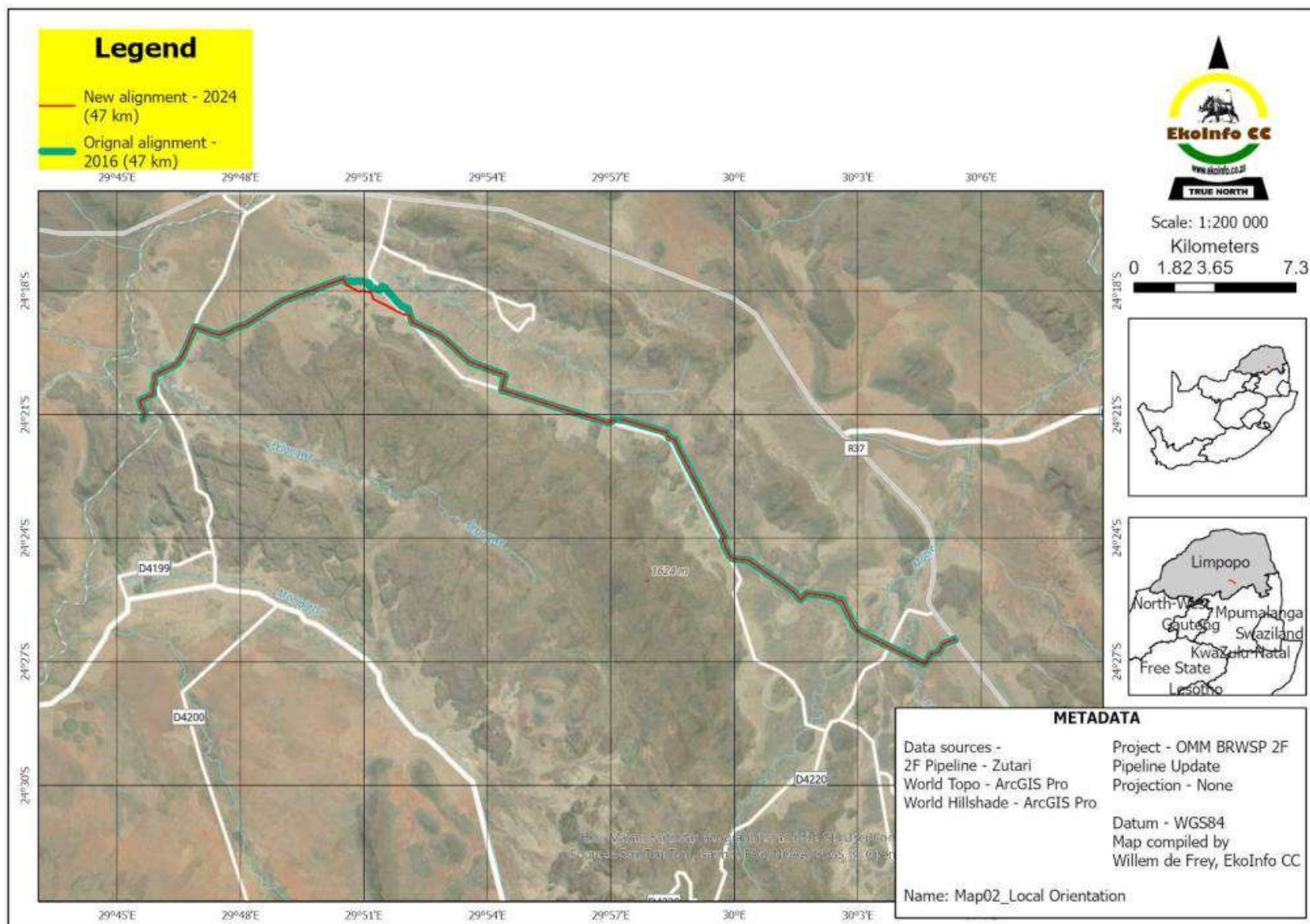
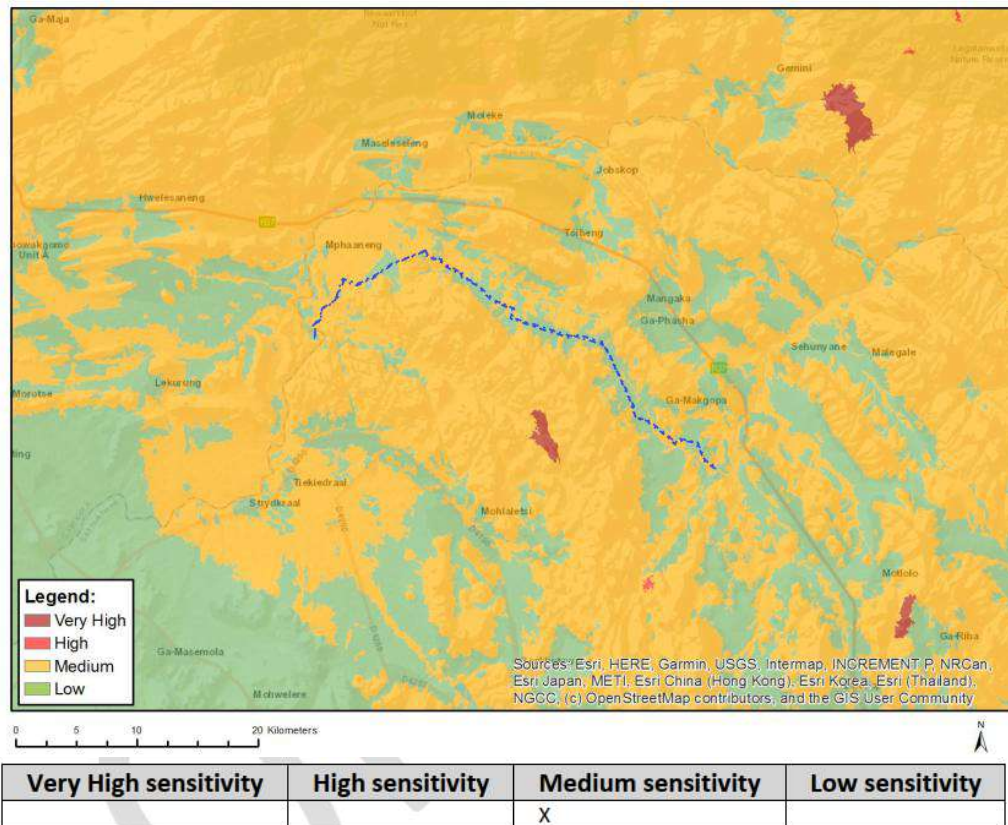


Figure 7-50: Local orientation of the 2F pipeline with the current deviation in the north (EkoInfo CC, 2024).

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

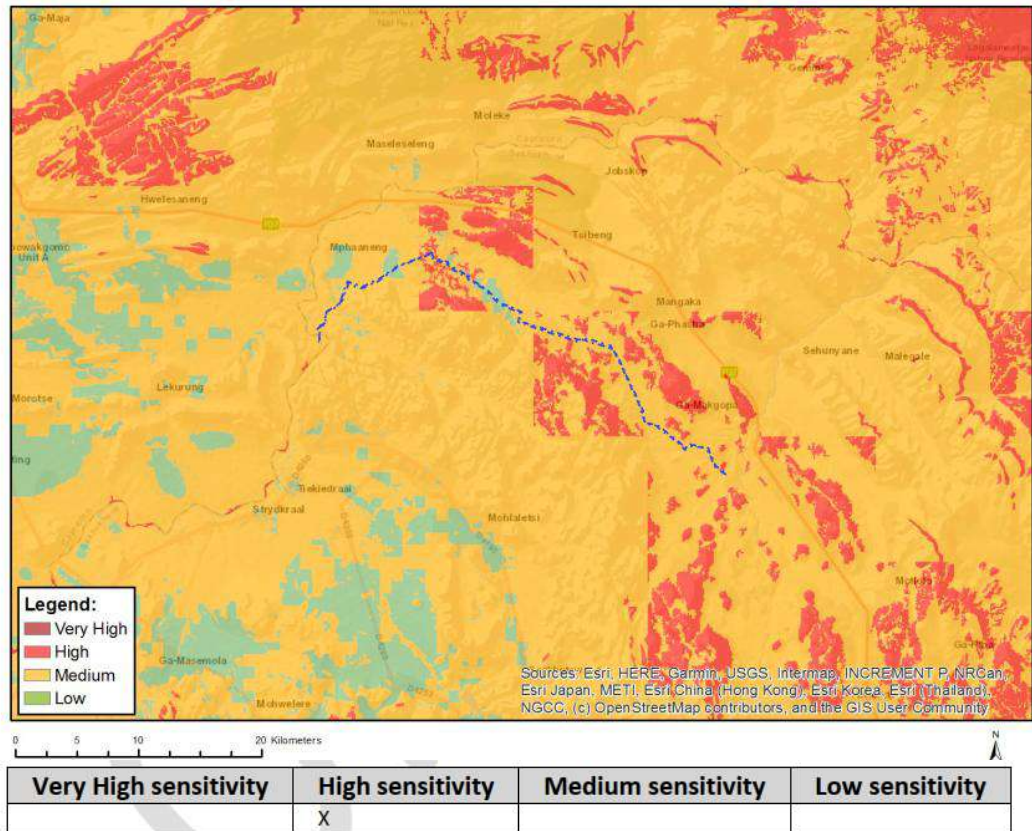


Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 1252
Medium	Sensitive species 1033
Medium	Sensitive species 587
Medium	Asparagus fouriei
Medium	Asparagus sekukuniensis
Medium	Asparagus hirsutus
Medium	Sensitive species 303
Medium	Plectranthus venteri
Medium	Sensitive species 485
Medium	Polygala sekhukhuniensis
Medium	Searsia batophylla
Medium	Combretum petrophilum

Figure 7-51: Screening tool results for deviation area - plant species theme.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

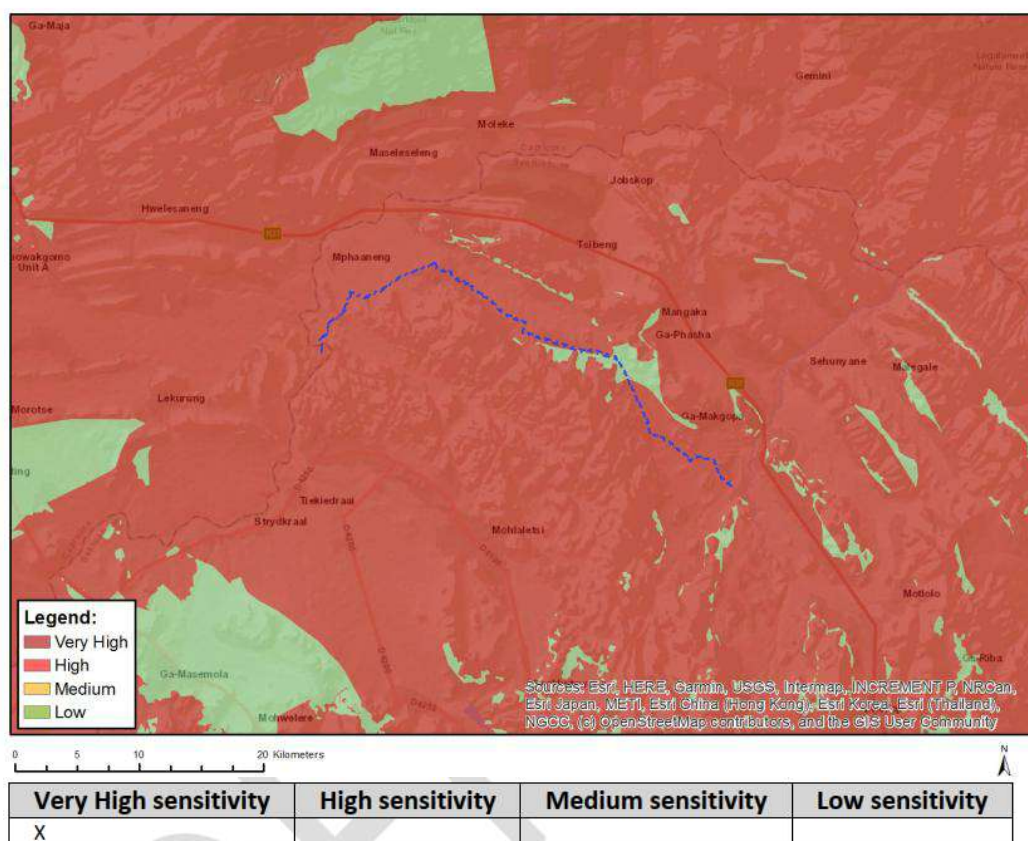


Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Falco biarmicus
Low	Subject to confirmation
Medium	Aves-Sagittarius serpentarius
Medium	Aves-Aquila rapax
Medium	Aves-Podica senegalensis
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Dasymys robertsii
Medium	Reptilia-Kinixys lobatsiana
Medium	Invertebrate-Aroegas fuscus

Figure 7-52: Screening tool results for deviation area - animal species theme.

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	CBA 1
Very High	CBA 2
Very High	ESA 1
Very High	ESA 2
Very High	EN_Sekhukhune Plains Bushveld

Figure 7-53: Screening tool results for deviation area – terrestrial biodiversity theme.

7.9.2 RESULTS: FLORA COMPONENT

7.9.2.1 Persistence Analysis

7.9.2.1.1 Natural Vegetation/Biodiversity Habitat

Using Idrisi Selva's land change modeller, changes in the landscape from 2016 to 2024 were assessed using national land cover datasets from 1995, 2000, 2009, 2014, and 2020 (**Figure 7-54**). The analysis revealed that between 2014 and 2020, significant loss of natural areas occurred, primarily due to cultivation and transformation (human settlements) (**Figure 7-55**). Since 2014, 53 ha (30%) of natural vegetation have persisted within the proposed pipeline servitude (**Table 7-27**), while 46 ha (26%) experienced transformation, likely due to human settlement or cultivation.

Figure 7-56 shows the distribution of natural vegetation (biodiversity habitat) changes within the proposed servitude between 2014 and 2020, showing a loss of 32 ha (18%) of natural vegetation and a gain of approximately 13.13 ha (12%) of secondary vegetation (**Table 7-28**). This indicates that the remaining natural vegetation (biodiversity habitat) in the landscape, across four quaternary catchments,

is not under significant pressure, with limited habitat fragmentation on a regional scale, which does not pose a risk to species populations (Turner et al., 2001; Wiens et al., 2006). **Figure 7-57** and **Table 7-29** support this statement, with 29% of the landscape associated with the study area representing transformed areas, while 69% (132,706 ha) represents persistent primary or climax vegetation, mainly associated with the high-lying and steep areas in the landscape in which the pipeline is planned (**Figure 7-58**). The temporary disturbance from pipeline construction, if well rehabilitated, is expected to impact less than 1% of the remaining persistent natural vegetation (climax biodiversity habitat) in the landscape (**Table 7-29**).

7.9.2.1.2 Limpopo Province Sector Plan 2014/2018

Since the 2016 assessment, the Limpopo Province Biodiversity Sector Plan has been updated. This update resulted in a decrease in the CBA 2 class (**Figure 7-59**), and a substantial increase in the CBA 1 class. In 2018, 32% (61,178 ha) of the area was classified as CBAs (**Table 7-30**), while 54% (103,414 ha) was considered transformed.

The temporary disturbance caused by pipeline construction, if well rehabilitated, is expected to impact less than 1% of the remaining persistent areas of conservation concern (CBAs and ESAs) within the landscape (**Table 7-30**).

7.9.2.1.3 Core Climax Habitat

Core climax habitat areas are natural vegetation areas that, based on five land cover classifications from 1995 to 2020, have never been transformed, and have consistently been classified as representing natural vegetation with 100% confidence (**Figure 7-61**).

The proposed temporary disturbance from the pipeline construction will affect less than 1% of these high-confidence persistent land cover classes, specifically the climax natural areas (**Table 7-31**), provided that rehabilitation and restoration are effectively carried out.

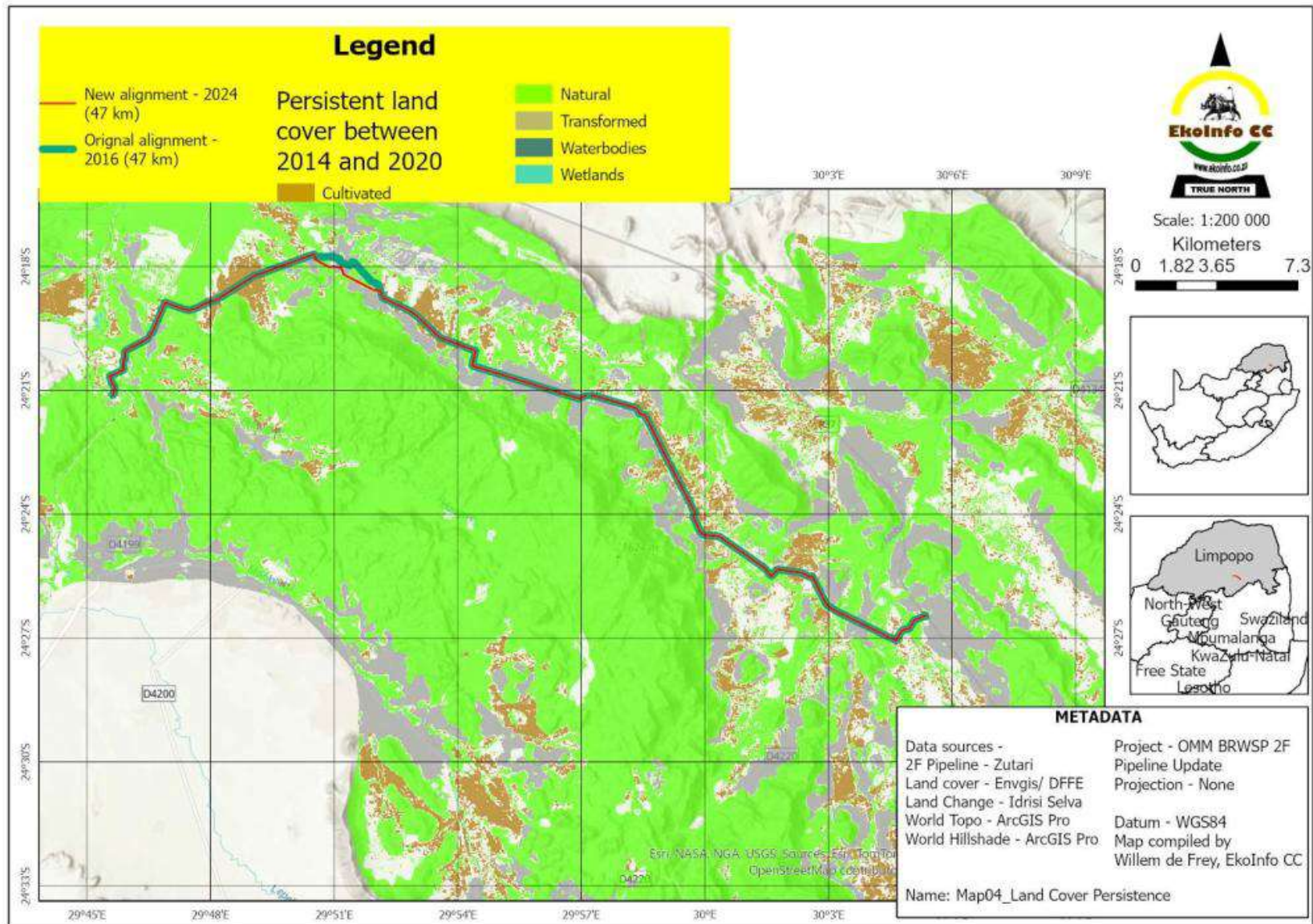


Figure 7-54: Distribution and extent of persistent land cover classes between 2014 and 2020 (EkoInfo CC, 2024).

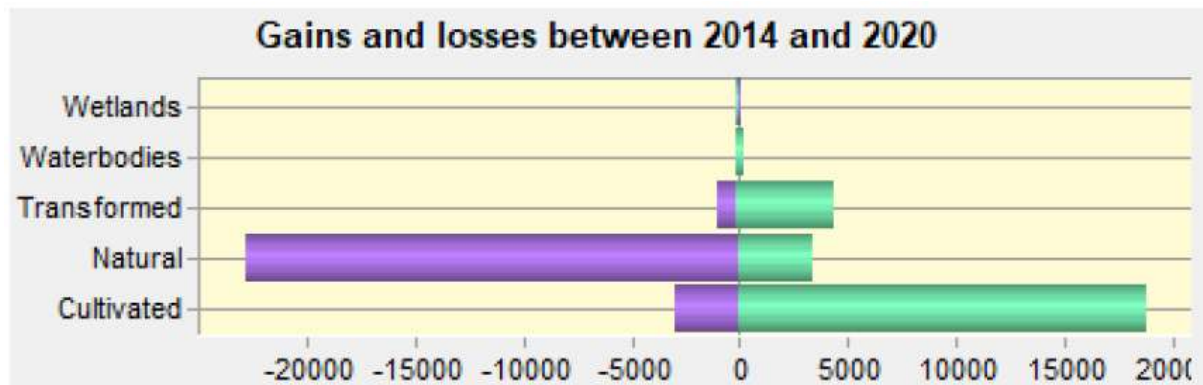


Figure 7-55: Histogram showing the gains and losses in land cover classes between 2014 and 2020 in hectares (EkoInfo CC, 2024)

Table 7-27: Overview of the surface area and percentage cover of persistent land cover classes within the currently proposed pipeline's permanent and temporary servitude.

Broad Land Cover Classes Derived from the 2014 and 2020 Land Cover Classes	Hectares	% cover
Cultivated fields	56.9822	32%
Natural vegetation areas	52.7113	30%
Transformed areas	22.9549	13%
Changed areas	45.5998	26%
Total permanent and temporary servitude footprint	178.2482	100%

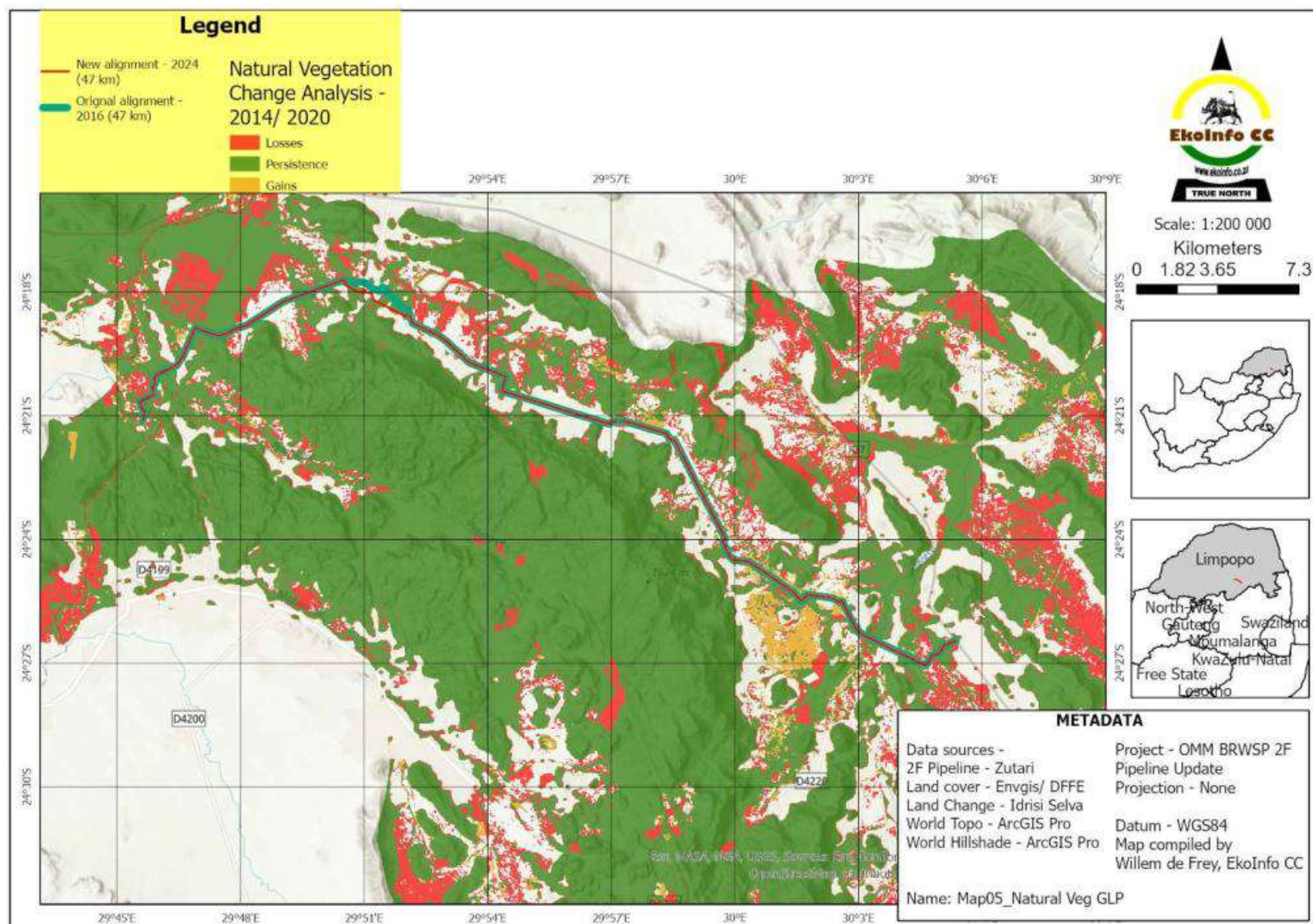


Figure 7-56 : Distribution and extent of areas of gains, losses and persistence with regards to natural vegetation (biodiversity habitat) along the proposed current Phase 2F pipeline (EkoInfo CC, 2024).

Table 7-28: Overview of the surface area and percentage cover of natural vegetation change analysis categories within the proposed temporary servitude footprint.

Natural Vegetation Change Category	Hectares	% Cover
Losses	31.5768	18%
Persistence	52.7113	30%
Gains	13.1328	7%
Other land cover classes (Cultivation, Transformation)	80.8273	45%
Total permanent and temporary servitude footprint	178.2482	100%

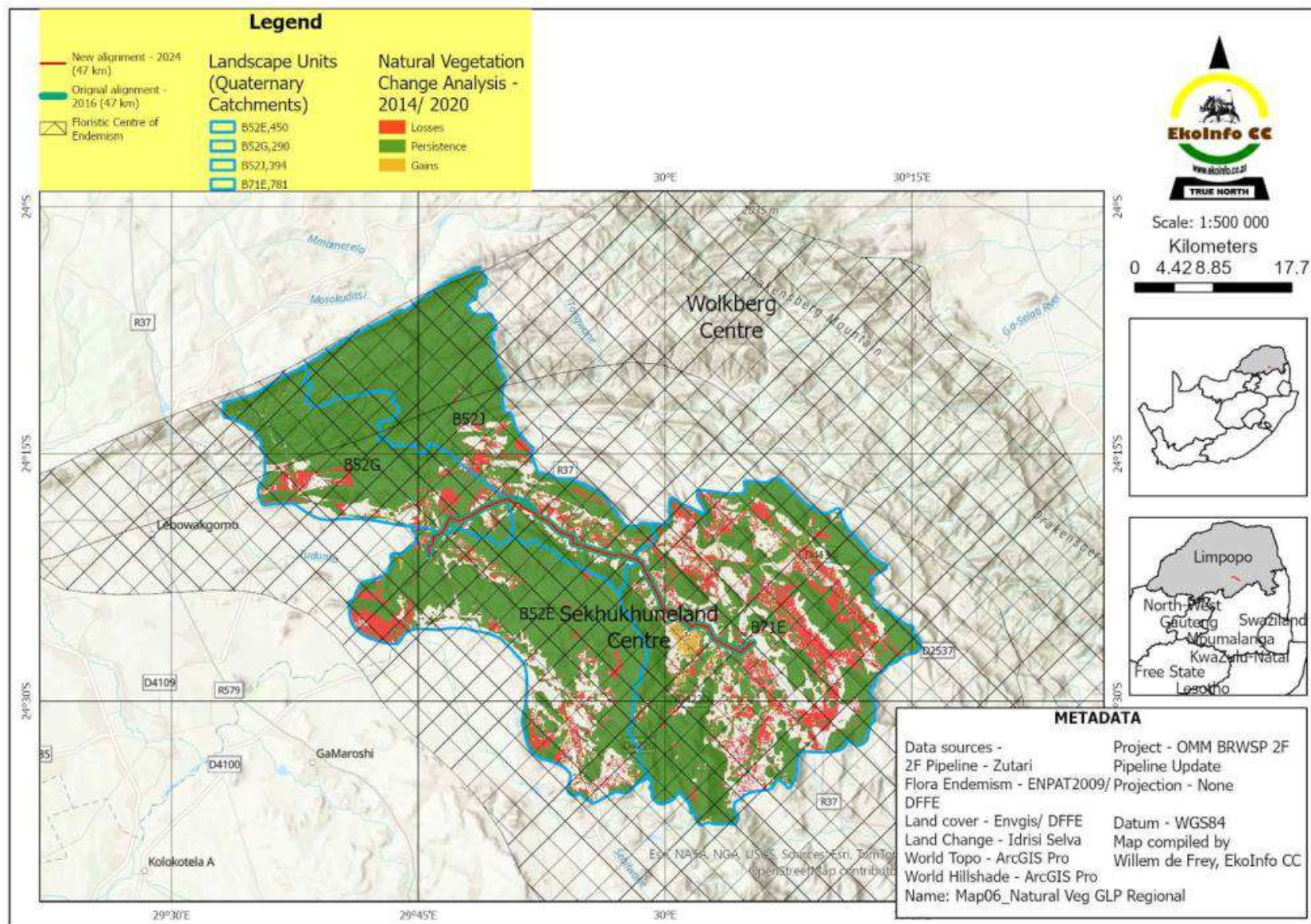


Figure 7-57: Overview of the level of biodiversity habitat loss within the landscape associated with the study area (EkoInfo CC, 2024).

Table 7-29: Overview of the surface area and percentage cover of natural vegetation (biodiversity habitat) within the landscape associated with the study area (Regional context).

Regional Context (Landscape Level)							
Natural Vegetation Change Analysis - Regional	Hectares	% Cover	Transformed (Habitat Loss)	Derived Ecological Status Natural Vegetation (Biodiversity Habitat)		Temporary Pipeline Disturbance	
				Persistent/Primary	Secondary	Hectares	% of Landscape
Other land cover classes	32,666	17%	32,666			80.8273	0.25%
Losses	22,807	12%	22,807			31.5768	0.14%
Persistence	132,706	69%		132,706		52.7113	0.04%
Gains	3,321	2%			3,321	13.1328	0.40%
Landscape Level Total – Quaternary Catchment: B52E, B52G, B52J & B71E	191,500	100%	55,473	132,706	3,321	178.2482	
			29%	69%	2%		

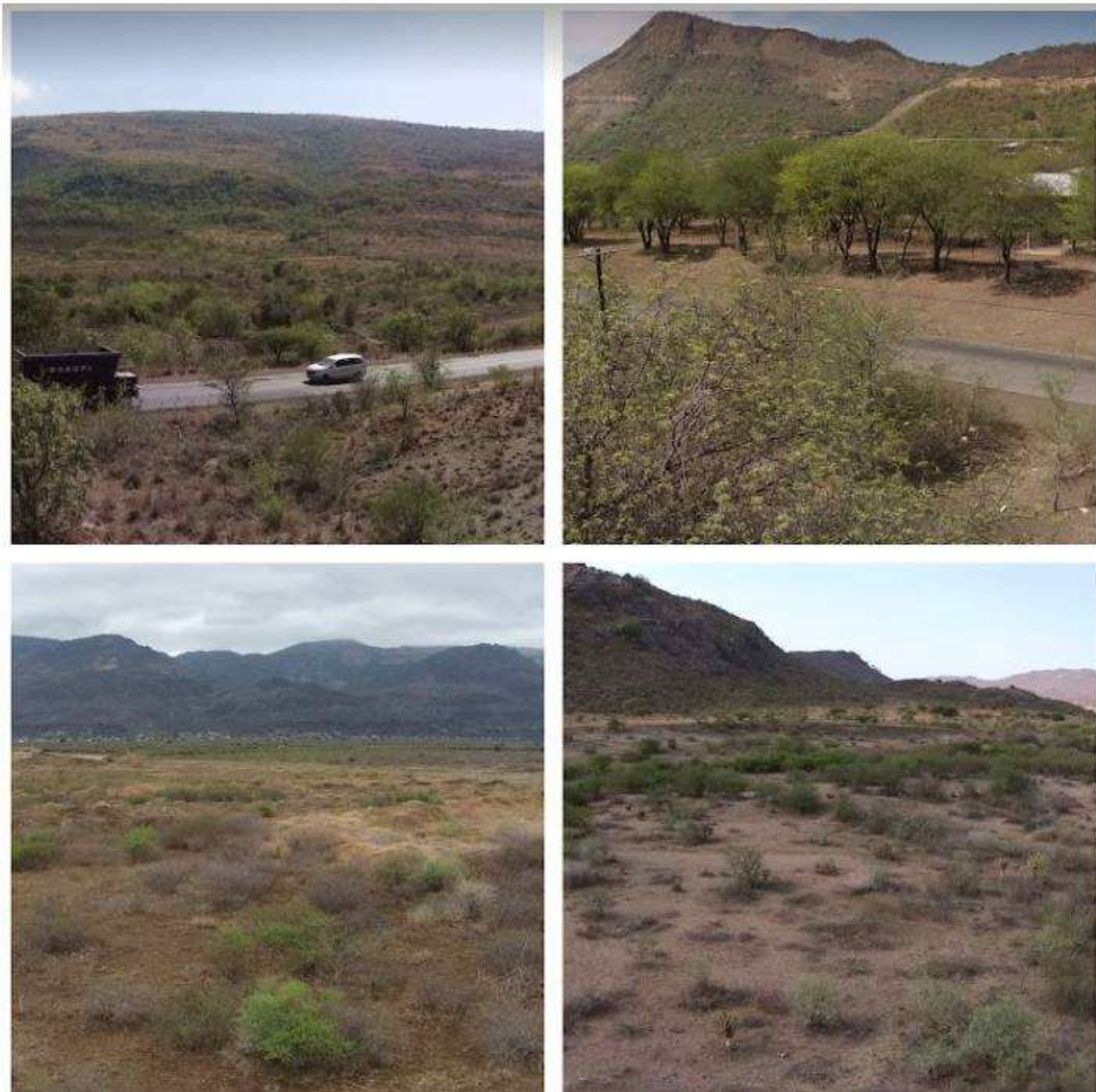


Figure 7-58: Photo plate 3: Photographic evidence of the remaining persistent natural vegetation mainly on the high lying steep areas of the landscape (EkoInfo CC, 2024).

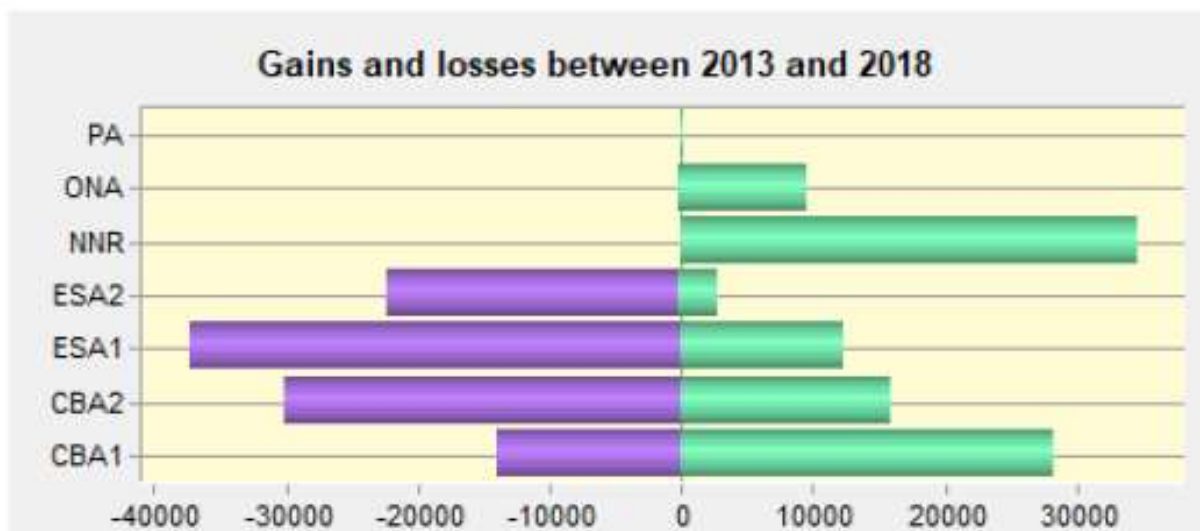


Figure 7-59: Histogram showing the gains and losses in Limpopo Province Biodiversity Spatial classes between 2013 and 2018 in hectares within the landscape in which the pipeline is planned (EkoInfo CC, 2024).

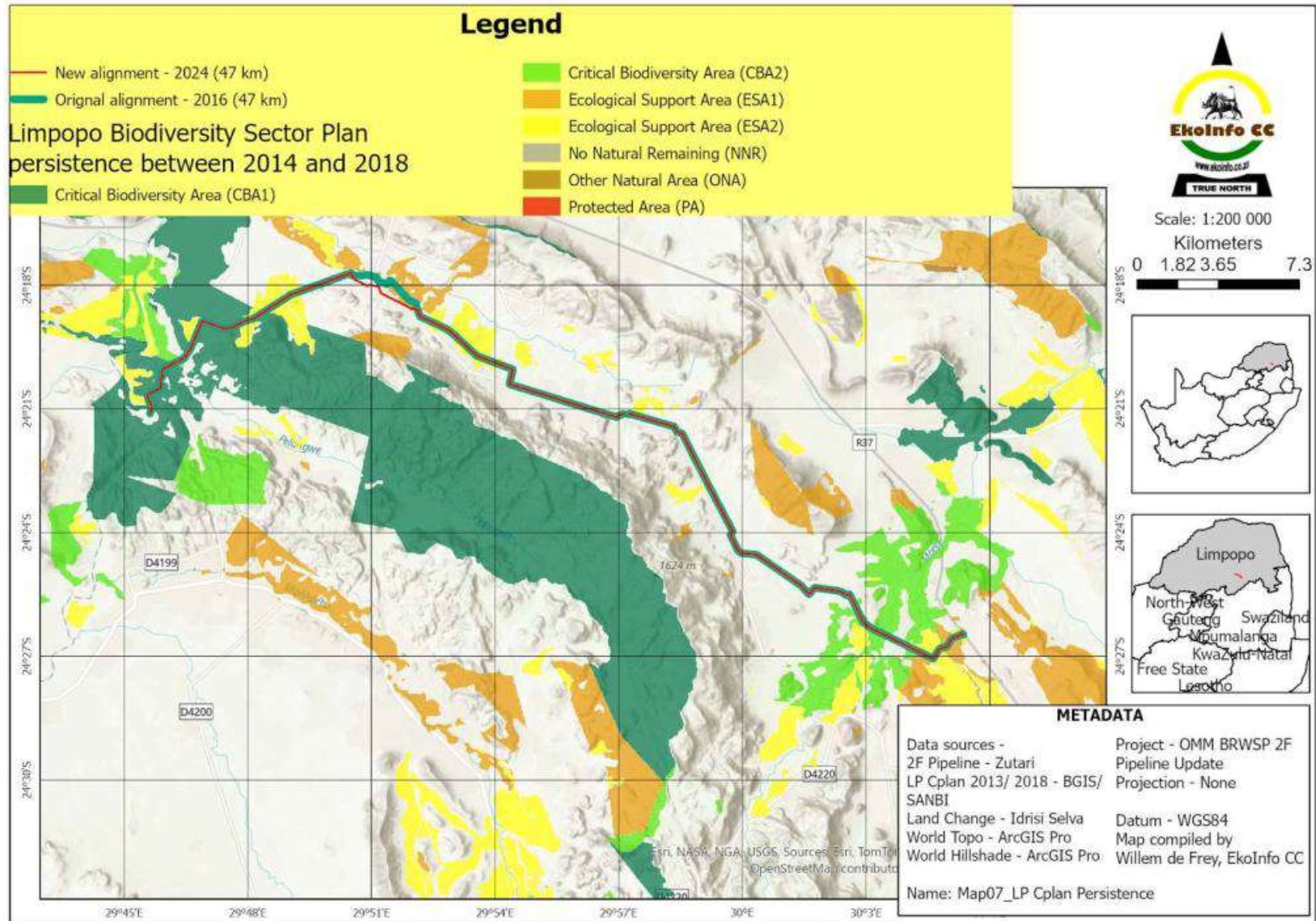


Figure 7-60: Distribution and extent of persistent Limpopo Province Spatial Biodiversity classes between 2013 and 2018 (EkoInfo CC, 2024).

Table 7-30: Overview of the surface area and percentage cover of areas of conservation concern (CBAs, ESAs) within the landscape associated with the study area (Regional context).

Regional Context (Landscape level)								
Limpopo Province Biodiversity Spatial Classes	Hectares	% Cover	Natural Vegetation/Biodiversity Habitat			Transformed Areas	Temporary Pipeline Disturbance	
			Critical Biodiversity Areas	Ecological Support Areas	Other Natural Areas	No Natural Remaining	Hectares	% of Landscape
CBA 1	38,505	20%	38,505				22.6549	0.06%
CBA 2	7,749	4%	7,749				7.0515	0.09%
ESA 1	12,565	7%		12,565			3.6808	0.03%
ESA 2	14 295	7%		14,295			31.7068	0.22%
ONA	47	0%			47			
NNR	20	0%				20		
PA	14,924	8%	14,924					
Areas that experienced change	103,394	54%				103,394	113.1543	0.11%
Total Landscape Area	191,500	100%	61,178	26,861	47	103,414	178.2482	
			32%	14%	0%	54%		

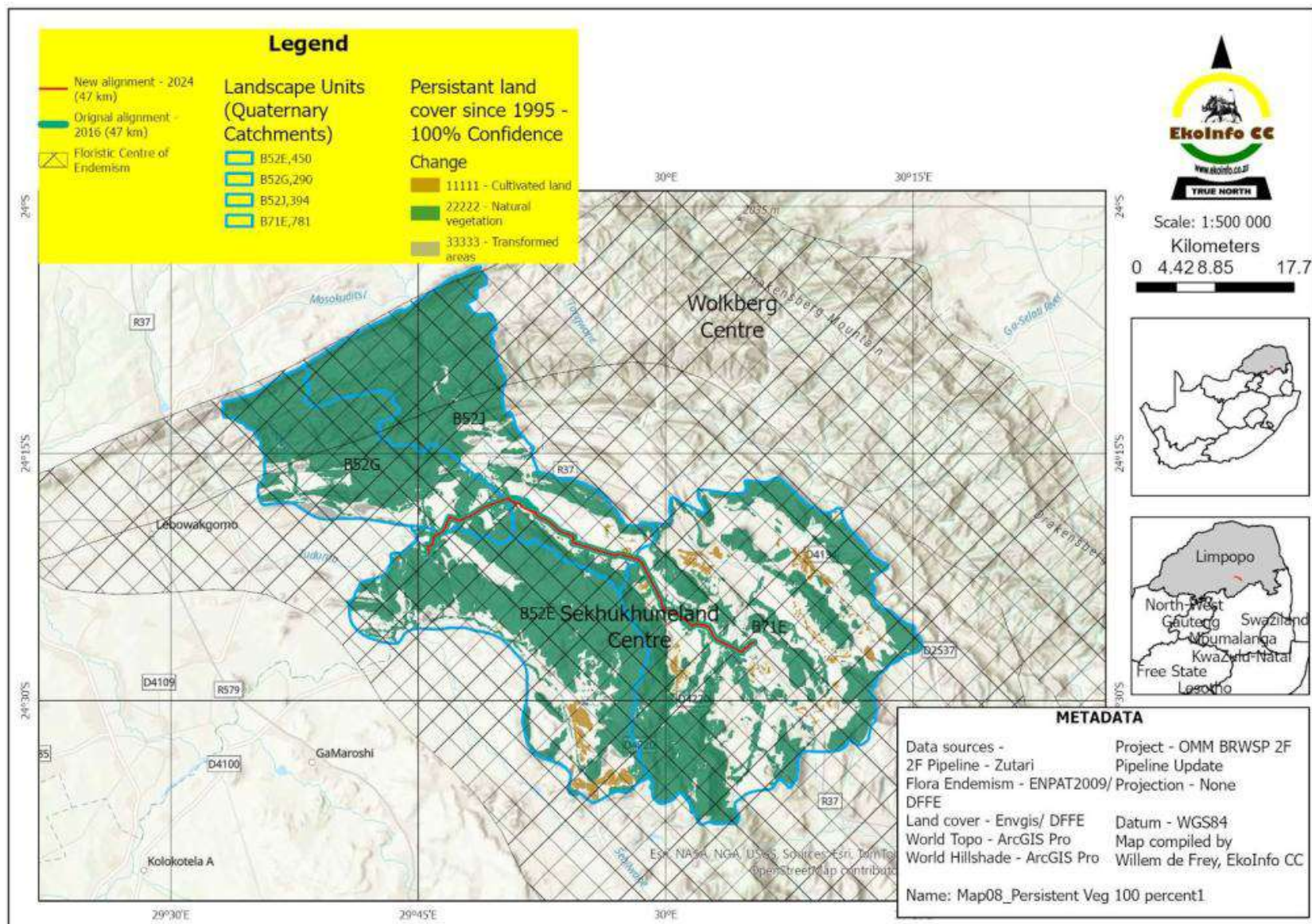


Figure 7-61: Distribution and extent of land cover classes which were persistent since 1995 with 100% confidence (EkoInfo CC, 2024).

Table 7-31: Overview of the surface area and percentage cover of national land cover classes which had been 100% persistent since 1995.

Regional Context (Landscape Level)					Temporary Pipeline Disturbance	
Land cover classes with 100% confidence since 1995	Hectares	% Cover	Derived Ecological Status Transformed areas	Climax Natural Vegetation	Hectares	% of Landscape
11111 - Cultivated land	2,302	1%	2,302		6.3916	0.28%
22222 - Natural vegetation	114,948	60%		114,948	20.3077	0.02%
33333 - Transformed areas	995	1%	995			
Areas who experienced change	73,255	38%	73,255		151.5489	0.21%
Total landscape area	191,500	100%	76,552	114,948	178.2482	
			40%	60%		

7.9.2.2 Species of Conservation Concern

7.9.2.2.1 Screening Report – Species of Conservation Concern

The DFFE screening tool report lists 12 plant SCC whose presence or suitable habitat had to be verified during the site visit. The identity of four of the 12 species cannot be disclosed due to potential threat to them. The one species is an herbaceous climber with a rootstock, two are succulent shrubs and the fourth is a herbaceous perennial (geophyte). The other eight species are *Asparagus fouriei*, *Asparagus hirsutus*, *Asparagus sekukuniensis*, *Combretum petrophilum*, *Plectranthus venterii*, *Polygala sekukuniensis*, *Raphionacme villicorona* and *Seersia batophylla*. Only one of the 12 species listed is not endemic to Sekhukhuneland (**Table 7-32**), while 11 of the species are classified as being threatened Red Data plants, specifically Vulnerable (VU) (10) and Critically Endangered (CR) (1).

During the site visit, only one of the 12 species was verified, specifically the shrub *Seersia batophylla*. It was recorded in three of the plots surveyed (**Figure 7-62**), but not specifically along the proposed Phase 2F servitude. Based on Sentinel 2A data and the unsupervised iso-cluster analysis, it is evident that this species, along with other Sekhukhuneland endemics, has a very localised distribution. **Figure 7-63** provides context for the habitat associated with this species, indicating that it occurs primarily in erosion gullies or drainage lines.

Due to the timing of the surveys (November 2024, prior to the commencement of the rainy season), it was not possible to verify the presence or absence of the 11 species, with the exception of the two succulent shrubs. However, these 11 species typically prefer steep, rocky areas and dense vegetation cover (**Figure 7-64**), habitat characteristics that are not prevalent along the proposed Phase 2F pipeline servitude.

7.9.2.2.2 National Protected Trees

The following National Protected Trees in terms of the National Forest Act were observed within the proposed temporary disturbance servitude and surrounding landscape:

1. *Sclerocarya birrea subsp. caffra* (Marula tree) (**Figure 7-65**)
2. *Balanites maughamii subsp. maughamii* (Torchwood) (**Figure 7-66**)
3. *Boscia albitrunca* (Shepard's Tree) (**Figure 7-67**)
4. *Combretum imberbe* (Leadwood) (**Figure 7-68**)

Both of these species have a wide potential distribution in the landscape, which explains their Least Concern conservation status in terms of the International Union for Conservation of Nature (IUCN) Red Data²⁹ list on national level (**Table 7-33**).

A permit is required for the destruction, removal or trimming of these species.

²⁹ <http://redlist.sanbi.org/>

Table 7-32: Overview of the five SCC listed in the screening report whose presence or suitable habitat had to be verified during the site visit.

Species	Family	Endemic Status	Threat Status	Habitat Preference	Growth Form
<i>Asparagus fouriei</i>	<i>Asparagaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky bushveld and grasslands	Herbaceous, spiny shrub
<i>Asparagus hirsutus</i>	<i>Asparagaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky outcrops and grasslands	Shrub-like, spiny
<i>Asparagus sekukuniensis</i>	<i>Asparagaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky bushveld and grasslands	Scrambling, spiny shrub
<i>Combretum petrophilum</i>	<i>Combretaceae</i>	Endemic to Sekhukhuneland	Near Threatened (NT)	Rocky outcrops, scrubby bushveld	Shrub or small tree
Sensitive species 1252	<i>Dioscoreaceae</i>	Not endemic (Southern Africa)	Least Concern (LC)	Forests, shaded woodlands	Climbing herb (twining vine)
Sensitive species 1033	<i>Euphorbiaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky slopes and outcrops	Succulent shrub
Sensitive species 587	<i>Euphorbiaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky or stony areas, bushveld	Succulent shrub
Sensitive species 303	<i>Iridaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky hillsides, grasslands	Herbaceous perennial
<i>Plectranthus venterii</i>	<i>Lamiaceae</i>	Endemic to Sekhukhuneland	Critically Endangered (CR)	Rocky hillsides, scrubland	Shrub, herbaceous
<i>Polygala sekukhuniensis</i>	<i>Polygalaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Iron-rich soils in savanna	Herbaceous perennial
<i>Raphionacme villicorona</i>	<i>Apocynaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Rocky outcrops, bushveld	Herbaceous or scrambling shrub
<i>Searsia batophylla</i>	<i>Anacardiaceae</i>	Endemic to Sekhukhuneland	Vulnerable (VU)	Dry, rocky hills and plains	Small tree or shrub

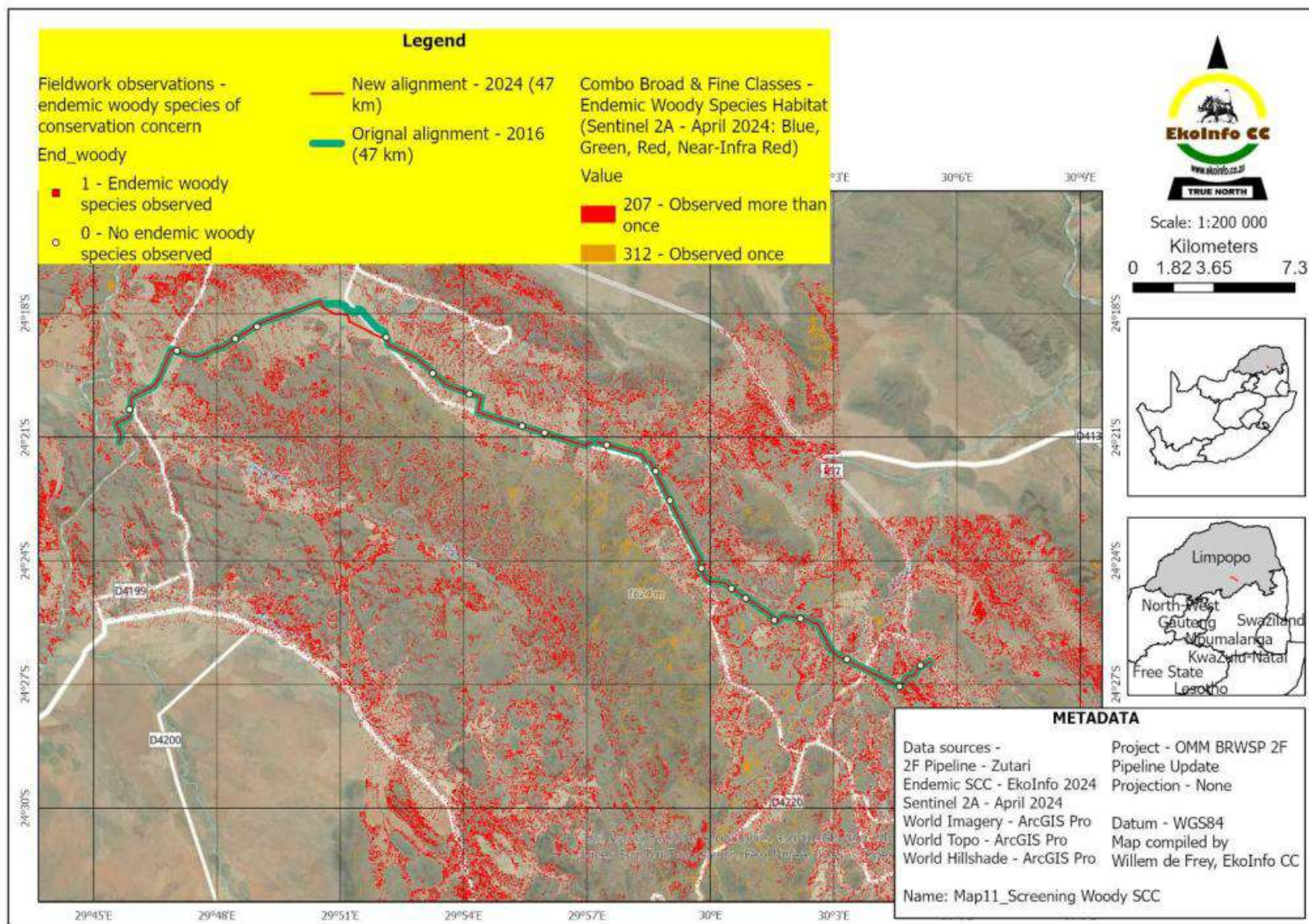


Figure 7-62: Distribution and extent of potential habitat for the observed Vulnerable endemic shrub *Seersia batophylla* (EkoInfo CC, 2024).



Figure 7-63: Aerial based oblique images taken at the three plots where *Seersia batophylla* were observed (EkoInfo CC, 2024).

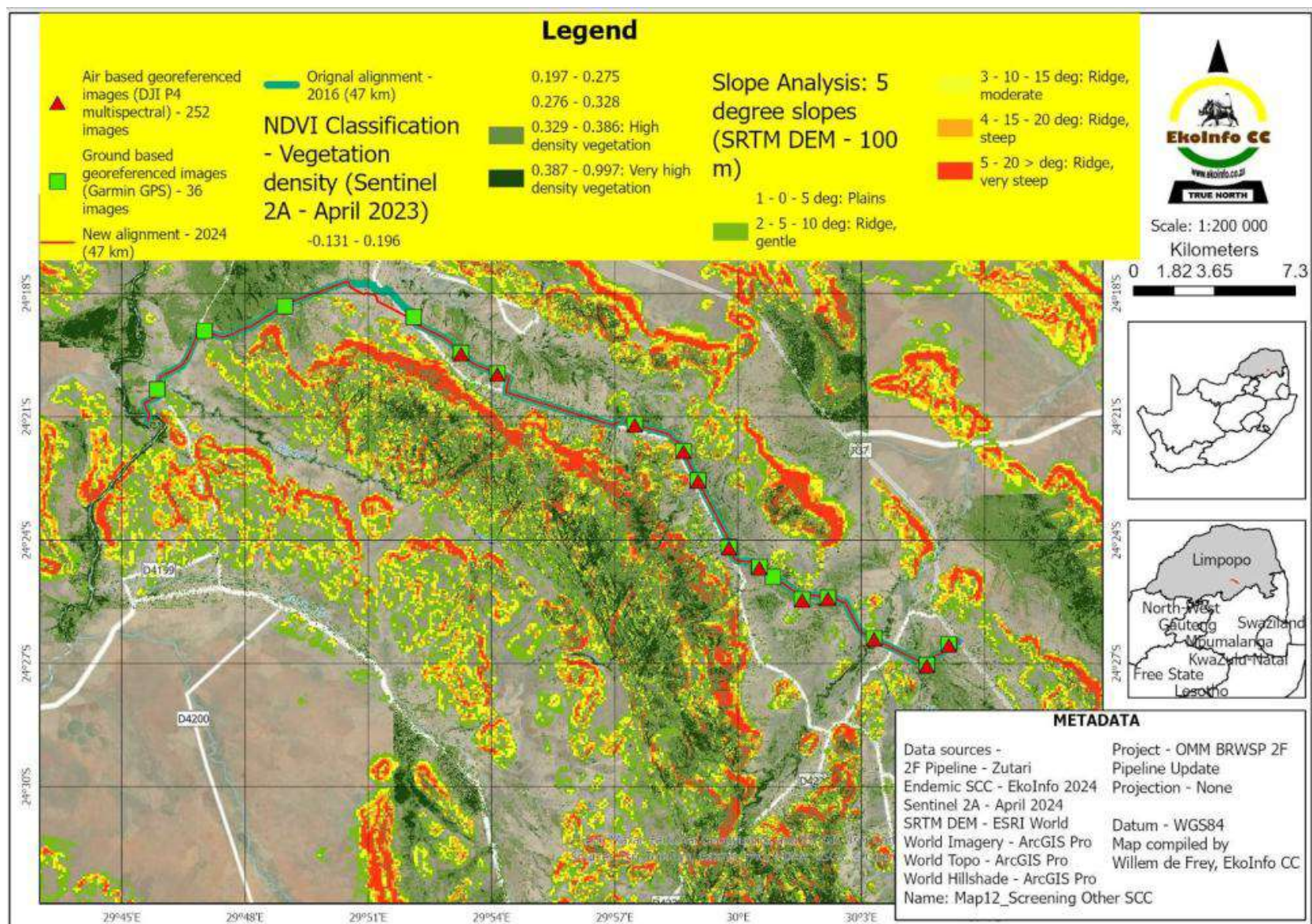


Figure 7-64: Distribution and extent of potential habitat for the remaining 11 plant SCC (EkoInfo CC, 2024).

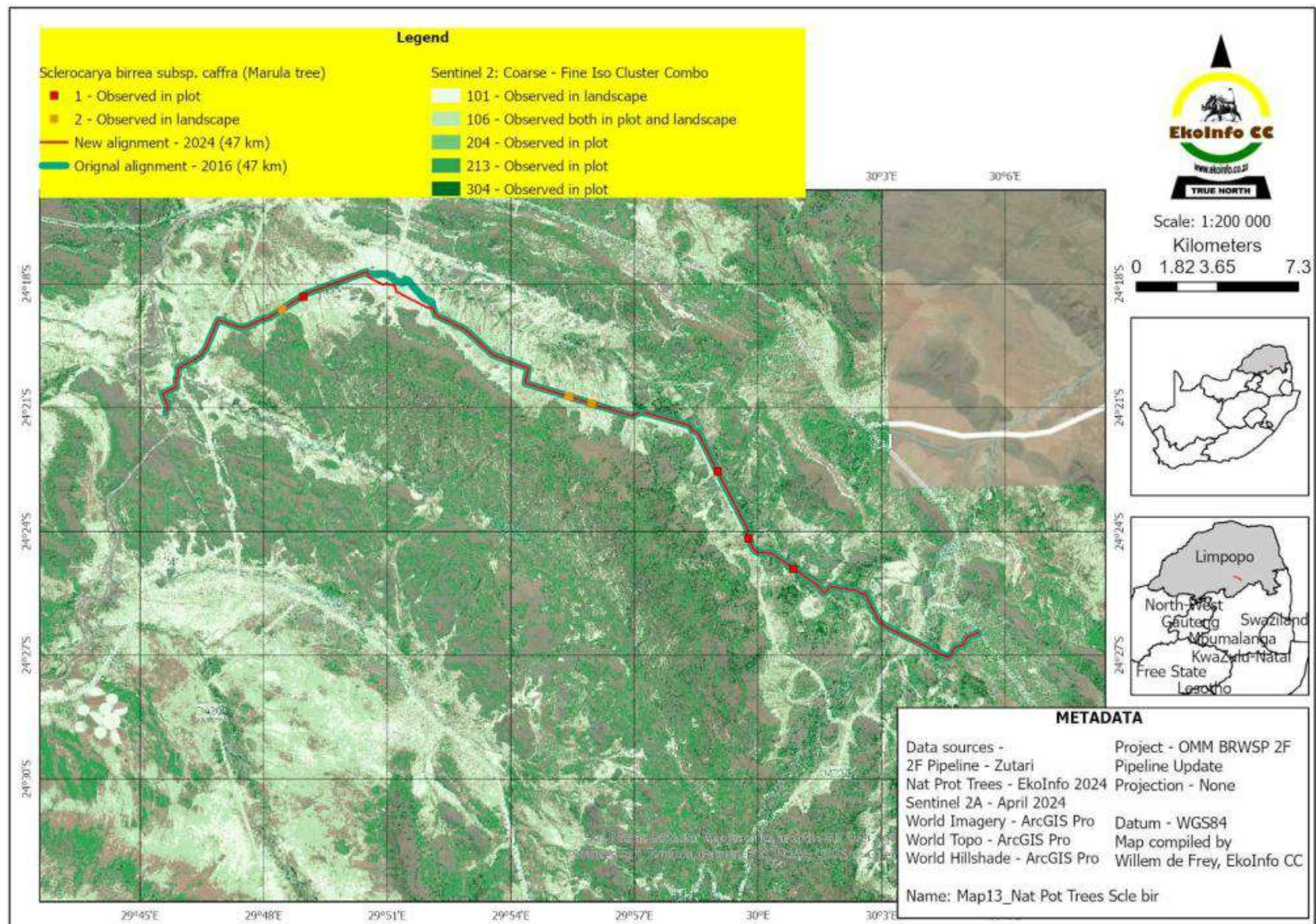


Figure 7-65: Sentinel 2 derived iso clusters associated with the occurrence of the National Protected Tree: *Sclerocarya birrea* subsp. *caffra* (EkoInfo CC, 2024).

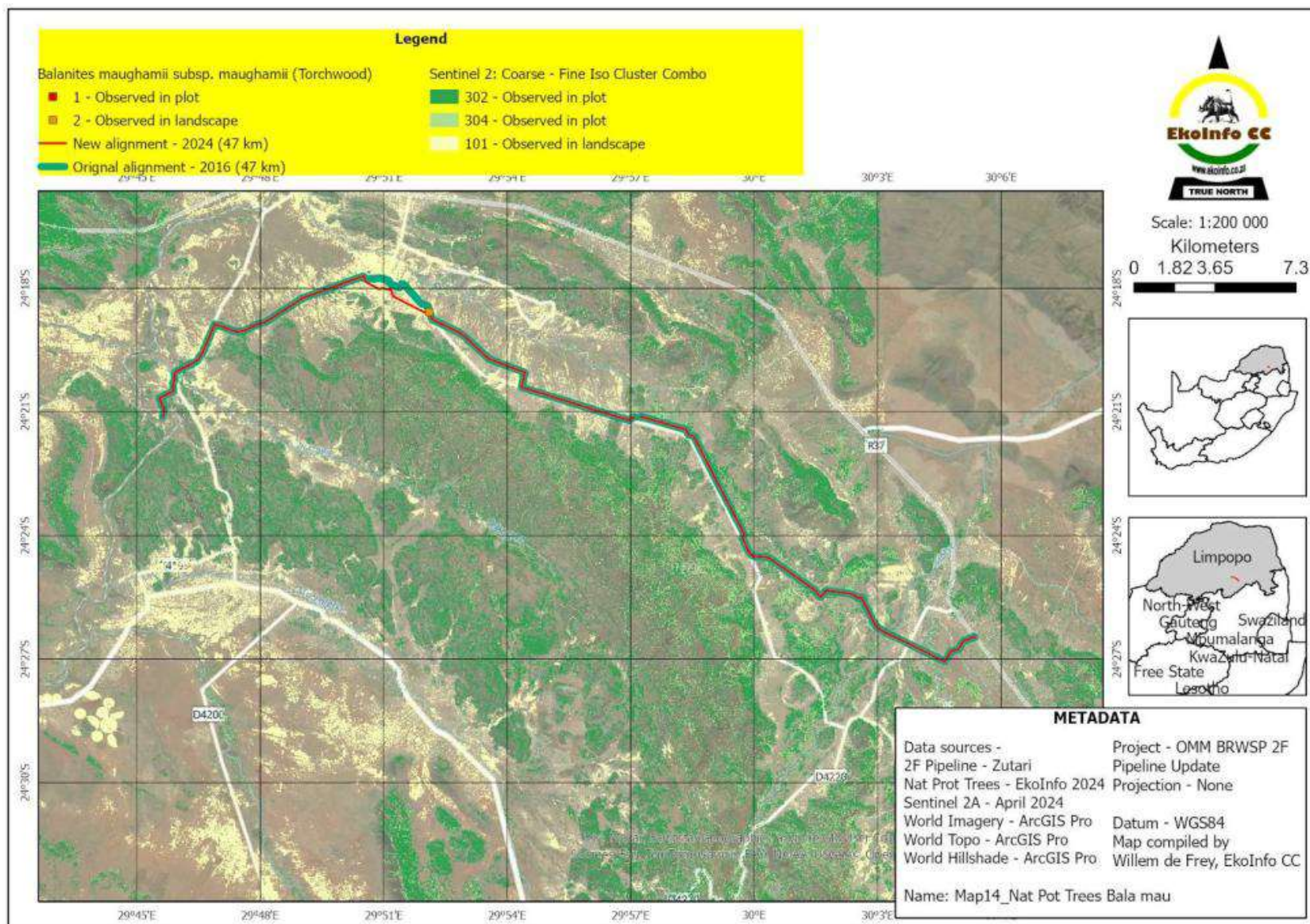


Figure 7-66: Sentinel 2 derived iso clusters associated with the occurrence of the National Protected Tree: *Balanites maughamii* subsp. *Maughamii* (EkoInfo CC, 2024).

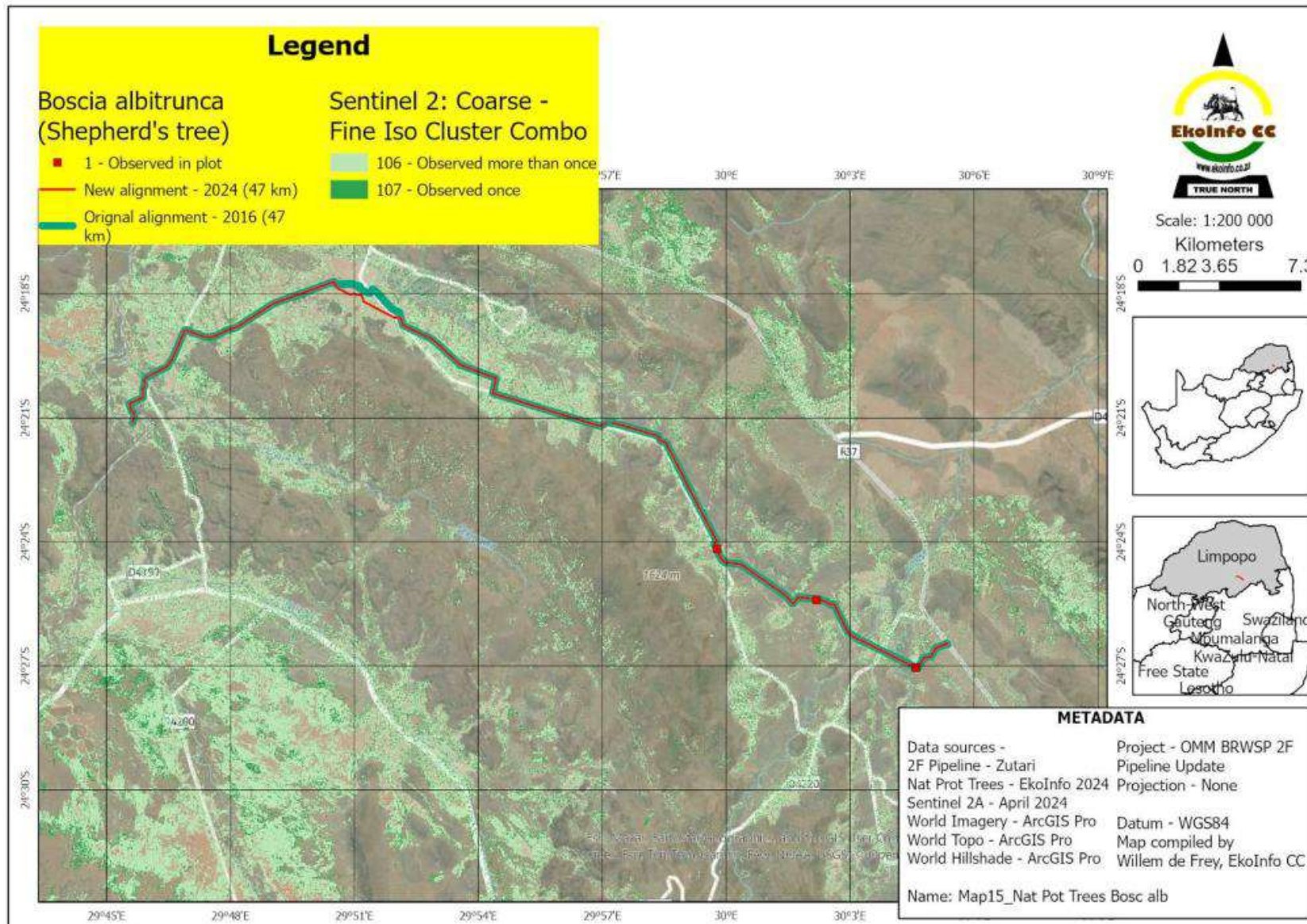


Figure 7-67: Sentinel 2 derived iso clusters associated with the occurrence of the National Protected Tree: *Boscia albitrunca* (EkoInfo CC, 2024).

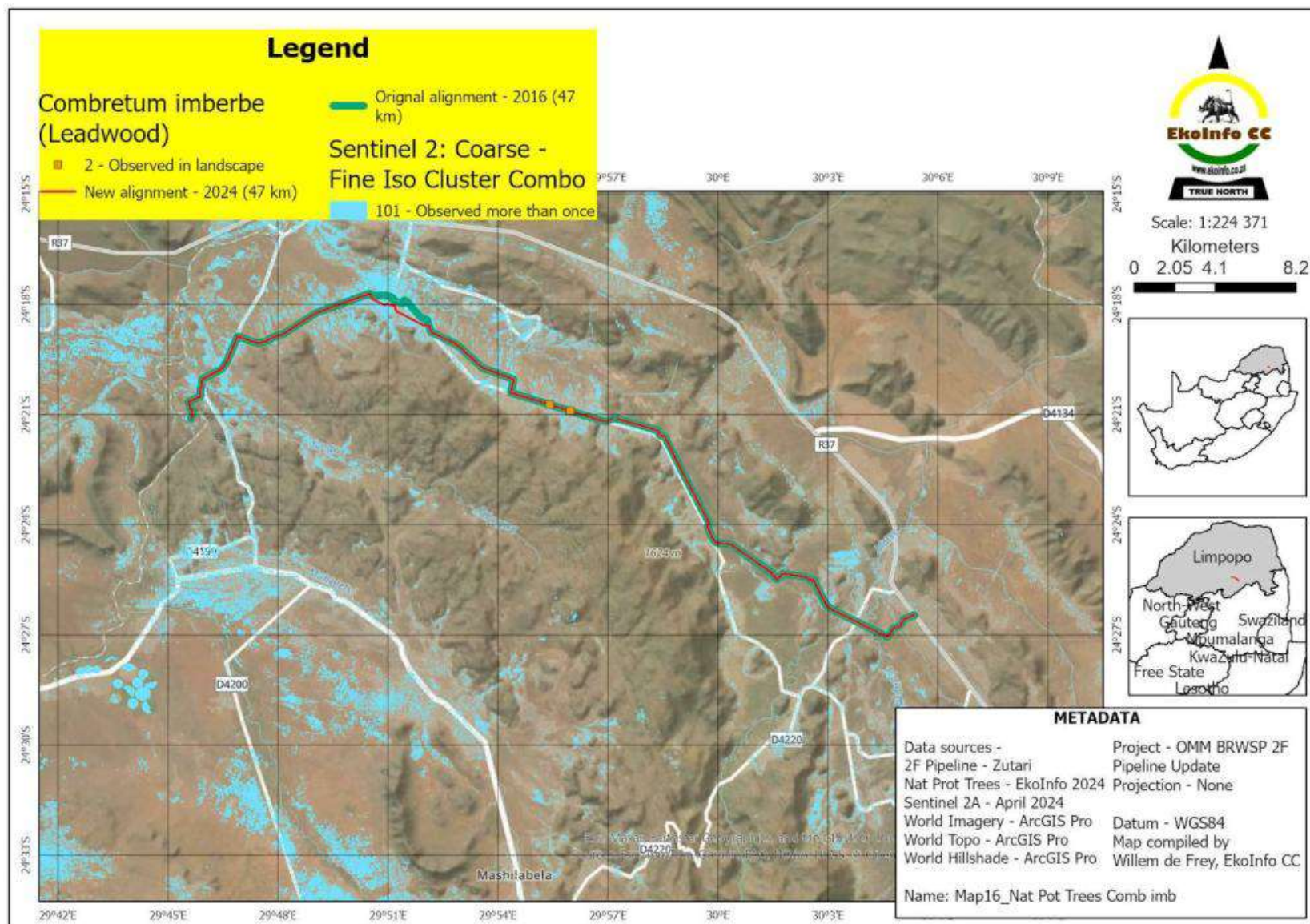


Figure 7-68: Sentinel 2 derived iso clusters associated with the occurrence of the National Protected Tree: *Combretum imberbe* (EkoInfo CC, 2024).

Table 7-33: Overview of the four National Protected Trees that occur within the proposed temporary servitude of the 2F pipeline and surrounding landscape.

Species	Threatened Status	Protected Status (National)	Habitat
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Least Concern [South African National Biodiversity Institute (SANBI)]	Protected under the NFA	Prefers savanna and woodland areas, often found in sandy or loamy soils. Widely distributed in lowveld regions.
<i>Balanites maughamii</i> subsp. <i>maughamii</i>	Least Concern (SANBI)	Protected under the NFA (Tree #251)	Found in low-altitude woodlands and savannas, often in association with calcareous or sandy soils.
<i>Boscia albitrunca</i>	Least Concern (SANBI)	Protected under the NFA	Grows in arid to semi arid savanna and bushveld, often in sandy or stony soils, including areas with shallow soil over rock.
<i>Combretum imberbe</i>	Least Concern (SANBI)	Protected under the NFA	Common in riverine areas and dry savannas, often near watercourses or on alluvial soils. Known for its drought and termite resistance.

7.9.3 RESULTS: FAUNA COMPONENT

7.9.3.1 Screening Report – Species of Conservation Concern

The screening report lists eight animal SCC whose presence or suitable habitat had to be verified during the site visit. These include two vulnerable mammal species (Makwassie Musk Shrew *Crocidura maquassiensis* and Robert's Marsh Rat *Dasymys robertsii*), one vulnerable reptile species (Lobatse Hinged Tortoise *Kinixys lobatsiana*), the endangered Brown False Shieldback (*Aroegas fuscus*) and four threatened bird species (Lanner Falcon *Falco biarmicus*, Secretarybird *Sagittarius serpentarius*, Tawny Eagle *Aquila rapax* and African Finfoot *Podica senegalensis*).

7.9.3.2 Makwassie Musk Shrew (*Crocidura maquassiensis*)

The taxonomic status of *Crocidura maquassiensis* remains uncertain, with suggestions that it may be a variant of *C. cyanea* or *C. suaveolens* or part of a species complex due to ecological divergence between subpopulations in Maputaland's Sand Forests and the highland grasslands along the Drakensberg Escarpment. It has also been linked to *C. pitmani* from Zambia, although its phylogenetic relationship remains unresolved. First described in 1928 from Klipkuil at Makwassie, this rare species is small, difficult to distinguish from similar species, and requires multivariate morphometric analysis for reliable identification. While globally classified as Least Concern, it is considered Vulnerable (VU) in South Africa due to its rare and patchy distribution, and threats such as habitat loss from urban expansion and overgrazing. *C. maquassiensis* is known from a few localities in South Africa, eSwatini, and Zimbabwe (**Figure 7-69**) primarily in rocky, montane, and grassland habitats at higher altitudes. Though it has been found in urban and coastal areas, it predominantly occurs in mountainous regions above 1,500 m, suggesting it may tolerate a range of habitats.

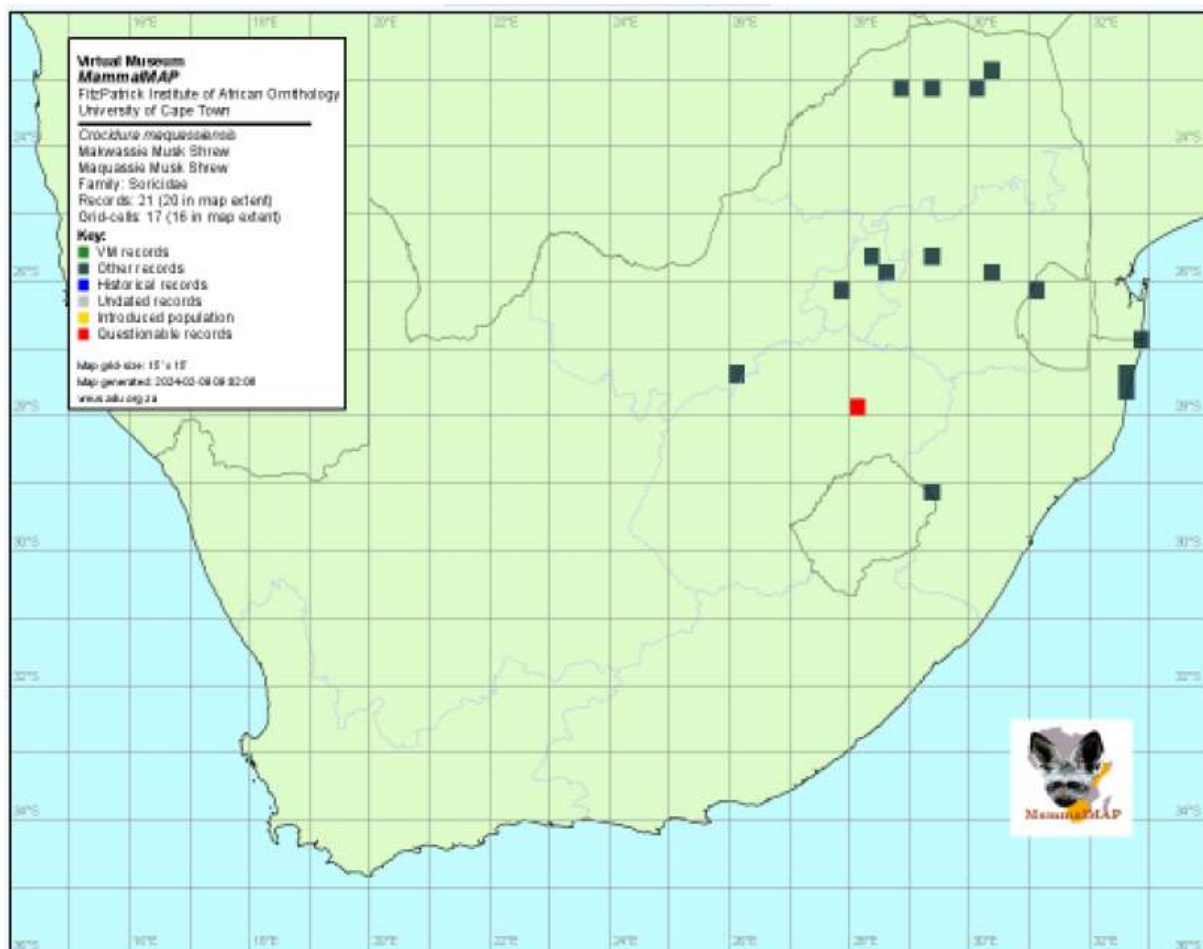


Figure 7-69: The distribution range of *Crocidura maquassiensis* according to substantiated (confirmed) and museum records (map courtesy and copyright of the ADU and MammalMap) (EkoInfo CC, 2024).

Based on current knowledge regarding this species' habitat preferences, it has a low probability of occurring along the pipeline due to the absence of suitable habitat. While many sections of the pipeline alignment are located adjacent to mountain bushveld and outcrops, these areas are generally ephemeral and "arid", making them unsuitable for the species. Furthermore, it has neither been observed nor collected from the study area (*sensu* MammalMap).

7.9.3.3 Robert's Marsh Rat (*Dasymys robertsi*)

There are currently no recent observations of the vulnerable Robert's Marsh Rat (*Dasymys robertsii*) from the study area and immediate surroundings (*sensu* MammalMap), which suggest that this species could be uncommon along the pipeline alignment owing to the general absence of suitable habitat. The Robert's Marsh Rat (*Dasymys robertsii*) is listed as regionally vulnerable (*sensu* Child et al., 2016), although Taylor (1998) stated that it is probably not as rare as previously thought, at least within KwaZulu-Natal (KZN) where the KZN population forms part of the genetically distinct species *D. cf incommutis*. Marsh rats have been recorded in a wide variety of habitat types, although it prefers well-vegetated wetland habitat. Skinner and Chimimba (2005) also reported that they also utilise reedbeds along rivers and streams. It is therefore possible that this species is easily overlooked based on its shy and elusive habits and life history traits which explains its ominous absence from many parts of South Africa.

Most of the drainage lines corresponding to the pipeline are non-perennial whereby a well-defined marginal zone consisting of reedbeds and facultative wetland plant species was absent, thereby suggesting a general low probability of occurrence for this species to be present. However, the only suitable habitat was observed at the pipeline segment crossing the perennial Olifants River. This part of the Olifants River contained reedbeds along its margin which could potentially be suitable for *D. robertsii* to occur.

7.9.3.4 Lobatse Hinged Tortoise (*Kinixys lobatsiana*)

Kinixys lobatsiana is Vulnerable (VU) and near endemic to South Africa and Botswana where it mainly occurs in bushveld areas in the Limpopo, Gauteng, and marginally also northern Mpumalanga Provinces. It also occurs in the extreme south-eastern Botswana (e.g. the type locality). In South Africa, its distribution range includes three primary clusters, of which the largest is located in the bushveld regions of the Waterberg and associated mountain ranges, the Bankenveld areas of Gauteng from Midrand and Centurion to Pretoria including the Bronberg Ridge, the Magaliesberg Mountain, and eastern Mpumalanga, as well as bushveld areas near Zeerust. It occurs primarily in rocky hills consisting of mixed thornveld (*Vachellia* and *Senegalia* Bushveld) and *Combretum* woodland. The presence of surface rock is a critical habitat feature for this species to survive fires and to "hibernate" during the austral winter. In addition, it is invariably collected as food and for cultural purposes, which may result in local extinctions.

Although this species was not observed during the site visit (owing to individuals being dormant during the dry conditions preceding the spring rains), its distribution range is sympatric to the extreme northwestern and southeastern parts of the study site (c, 2429BC, and 2430AC) corresponding to the many outcrops and rocky mountain bushveld located adjacent to the pipeline routes. Therefore, it is highly possible that dispersing individuals from these parts of the study site could be present along the pipeline during construction. Therefore, its occurrence is regarded as high along the southeastern and northwestern sections of the pipeline route (**Figure 7-70**).

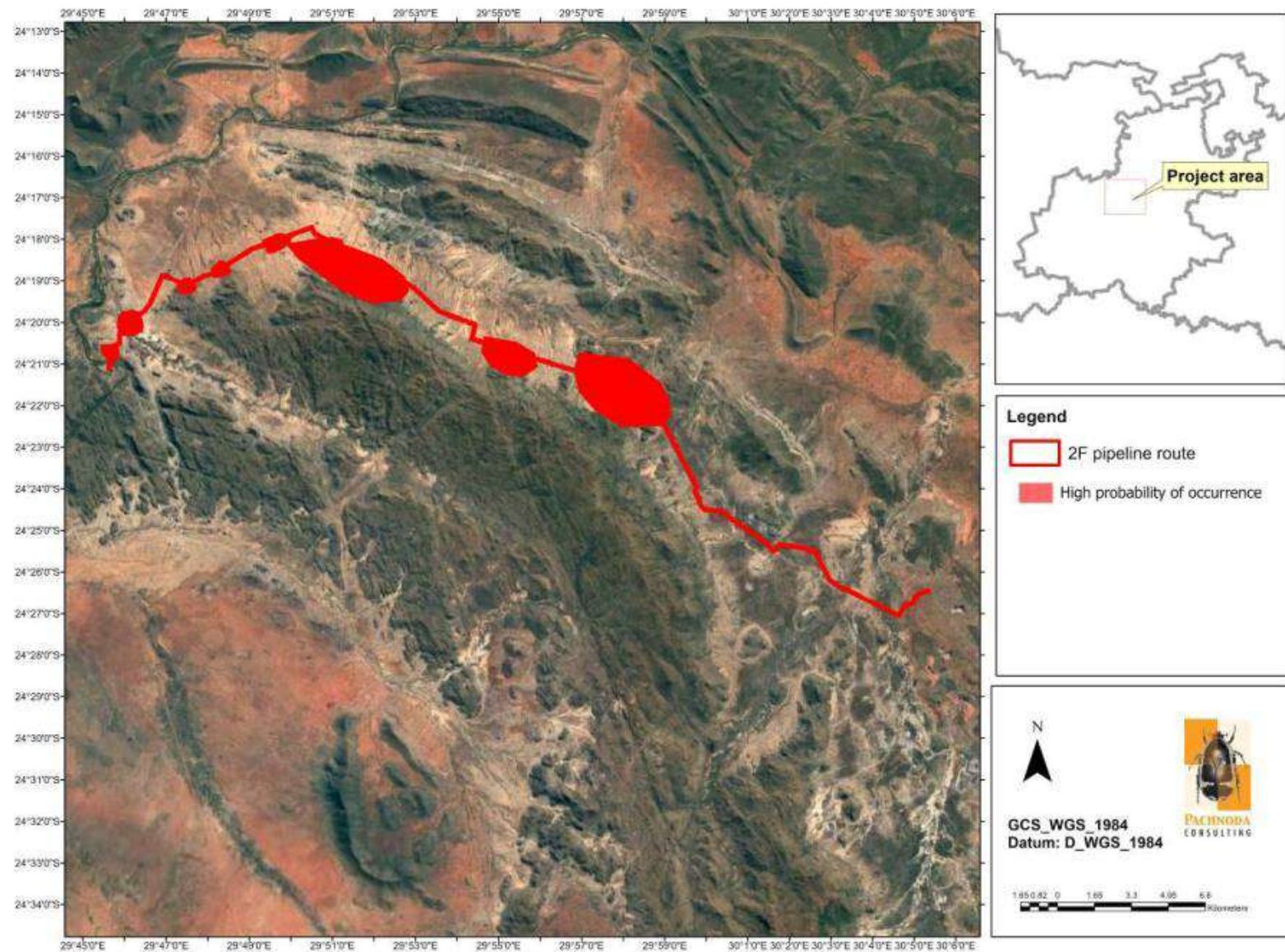


Figure 7-70: Potential suitable habitat for the occurrence of *Kinixys lobatsiana* along the 2F pipeline route (EkoInfo CC, 2024).

7.9.3.5 Brown False Shieldbug (*Aroegas fucus*)

The Brown False Shieldbug is Endangered with an area of occurrence estimated to be 10 km². It is only known from two locations, and the number of locations is expected to be in decline. This species only occurs in Mesic Highveld Grasslands at an elevation above 1,200 m. These areas are also suitable for cultivation with timber plantations and human development, so its distribution is likely to decrease in the future. The most likely threats to the species are increased grazing by livestock, cultivation with timber plantations or non-perennial crops, or human development. Due to its small body size, low motility, and current distribution at high elevations, this species cannot be expected to shift its range in response to changes in its habitat.

Based on the above, the probability that this species could occur along the pipeline route is regarded as low (owing to the absence of high-altitude mesic grassland habitat). In addition, most of the pipeline occurs at elevations below 1,000 m as opposed to 1,200 m and higher.

7.9.3.6 Lanner Falcon (*Falco biarmicus*)

Falco biarmicus is a fairly common species within its global distribution range, where it occurs from south-eastern Europe to the Middle East, southwest Asia, and across most of Africa (Jenkins, 2005). The global population consists of more than 30,000 breeding pairs with approximately 1,400 pairs confined to the eastern parts of South Africa (Tarboton & Allen, 1984). The national conservation status of this species was upgraded from Near Threatened (NT) to Vulnerable (VU) due to the persistent transformation of suitable foraging habitats (e.g. open areas) to make way for agricultural land and disturbances at nesting sites (Taylor, 2015).

This species is often associated with hills, ridges, and mountain ranges where it prefers to nest on steep and inaccessible cliffs. It prefers to forage over open terrain and will hunt indiscriminately over almost any open area with suitable prey (mainly terrestrial birds such as francolins and lapwings as well as doves and pigeons).

It was confirmed during the site visit that the species is a regular foraging visitor to the study site (**Figure 7-71**) and may hunt indiscriminately on all of the habitat units on the site depending on the availability of prey. However, suitable breeding habitats occur in the surrounding mountains, and it is unlikely that the construction of the pipeline will impact the breeding success of this species.

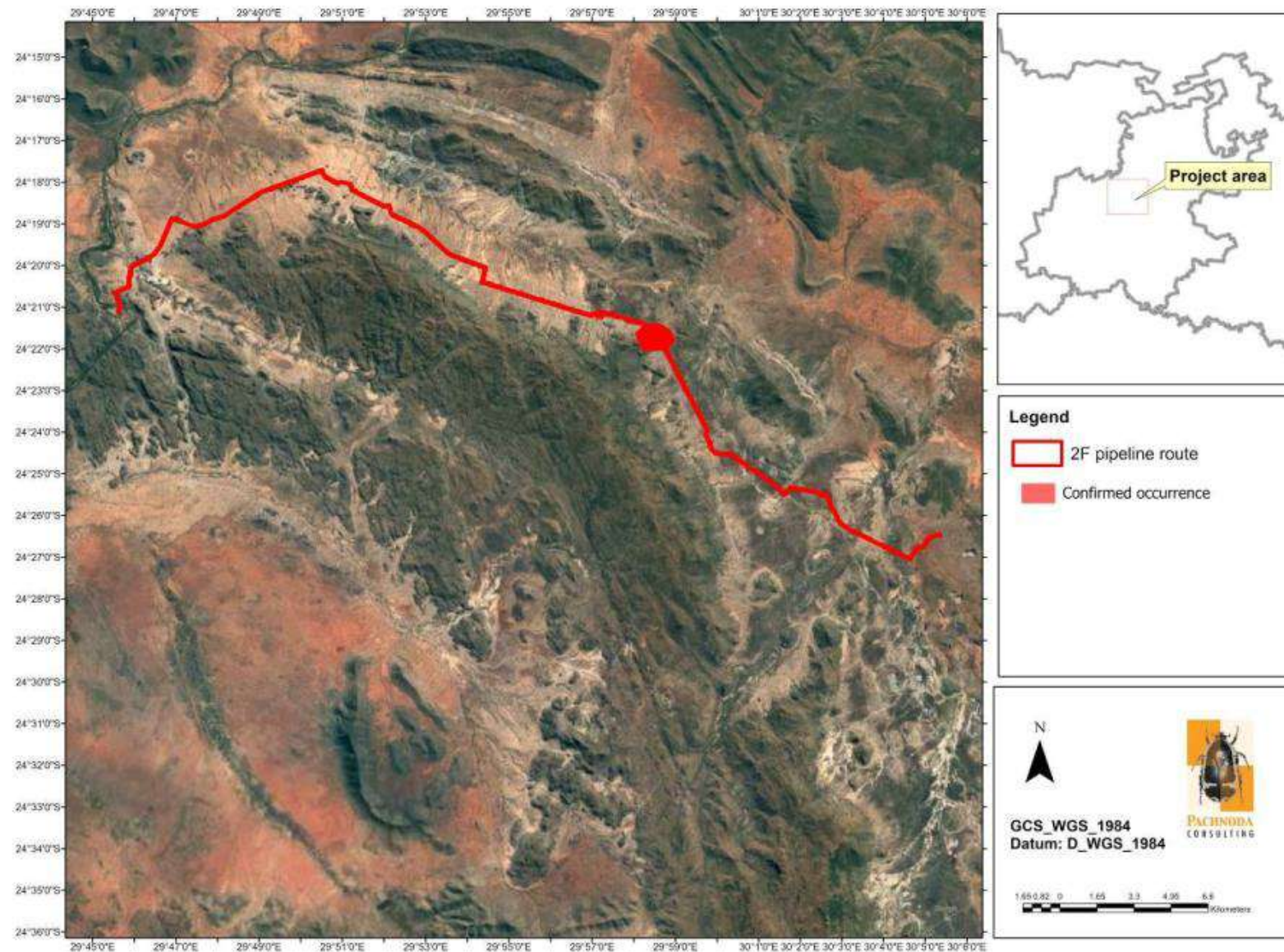


Figure 7-71: An example of a confirmed observation of a foraging Lanner Falcon (*Falco biarmicus*) individual along the 2F pipeline route (EkoInfo CC, 2024).

7.9.3.7 Secretarybird (*Sagittarius serpentarius*)

The regional conservation status of the Secretarybird has been upgraded to Vulnerable (VU) due to rapid declines across its range, driven by habitat loss, anthropogenic disturbances, and intensive grazing (Taylor, 2015). Globally, its status was recently uplisted from Vulnerable (VU) to Endangered, as significant population declines have been reported in Botswana, Eswatini, and South Africa (BirdLife International, 2020). While Secretarybirds are widespread in sub-Saharan Africa, they have declined across much of their range, particularly outside large conservation and rural areas, where reporting rates are low. Preferring open savannas and grasslands, they avoid dense bush and rocky areas. Many large terrestrial bird species, including Secretarybirds, face widespread declines, primarily due to habitat loss, especially the reduction of grasslands. As suitable habitats decline, Secretarybirds have been forced into sub-optimal areas, often near human settlements, where they face increased human-related threats. Although Secretarybirds are irregular foraging visitors to the study site, which consists of open woodland and regenerating agricultural fields, the high frequency of human activities likely displaces them from many areas along the pipeline alignment. Consequently, the probability of their occurrence along the 2F pipeline route is considered medium to low.

7.9.3.8 Tawny Eagle (*Aquila rapax*)

The Tawny Eagle is a threatened species listed as Endangered in South Africa, while its global conservation status is listed as Vulnerable (VU) (BirdLife International, 2021). It is mainly threatened by the poisoning of mammalian carcasses and due to collisions with powerlines. It has a wide distribution range which is centered on the arid parts of the country as well as lowveld where it favours open woodland and wooded savanna. However, most of its breeding range is confined to large, protected areas where the prevalence of carrion is high. Its diet includes a wide variety of prey species, but it favours carrion and is therefore often found near or at mammalian carcasses. Therefore, its occurrence is largely dependent on the availability of carrion.

It is regarded as a highly irregular foraging visitor to the pipeline route, and its probability of occurrence is regarded as low.

7.9.3.9 African Finfoot (*Podica senegalensis*)

The African Finfoot is listed as Vulnerable (VU) and is a shy and elusive sedentary species. It is restricted to quiet, wooded perennial rivers and streams with dense overhanging vegetation and dense trees. However, it avoids stagnant and very fast flowing waterways with a preference for clear rather than silted water.

The only suitable habitat for this species along the pipeline route is the perennial Olifants River (**Figure 7-72**), as all other drainage lines are non-perennial and seasonal, making them unsuitable. It is highly recommended that the pipeline be designed to bridge the Olifants River, and that damming or the creation of weirs at the river crossing during construction be avoided to ensure the continued dispersal of the species along the river.

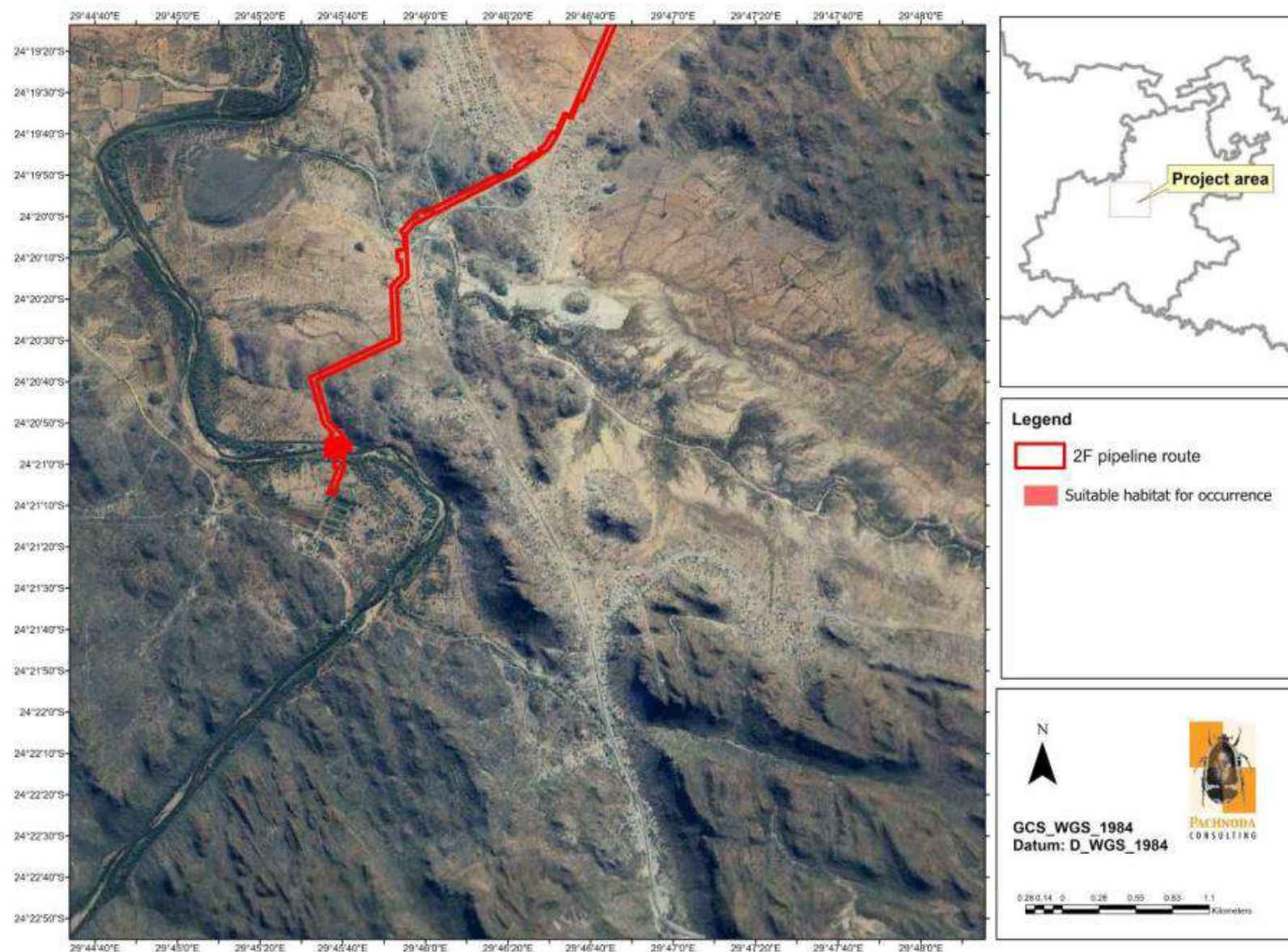


Figure 7-72: Potential suitable habitat for the occurrence of African Finfoot (*Podica senegalensis*) along the 2F pipeline route (EkoInfo CC, 2024).

7.9.4 IFC PS 6 MAPPING UNITS

7.9.4.1 Identification of Critical Habitats

Figure 7-73 shows the distribution and extent of IFC PS 6 critical habitats along the proposed pipeline alignment. The temporary disturbance of the pipeline servitude during the construction will affect less than 1% of the critical habitat within the landscape (**Table 7-34**).

7.9.4.2 Habitat Assessment and Baseline Surveys

Figure 7-74 shows the distribution and extent of IFC PS 6 natural and modified areas along the proposed pipeline alignment. The temporary disturbance of the pipeline servitude during construction will affect less than 1% of the remaining natural areas within the landscape (**Table 7-35**).

This latest land cover classification from the DFFE reveals that the proposed pipeline cuts mainly through a landscape that experienced 52% modification, with the pipeline servitude temporarily affecting 27% of natural areas. Therefore, the temporary disturbance of the pipeline servitude, if effectively rehabilitated, will influence less than 1% of the landscape, which is clearly not a significant impact.

This analysis also reveals that cultivation is the primary driver of habitat loss in the landscape, with 39% of the area modified due to agricultural activities (**Table 7-35**).

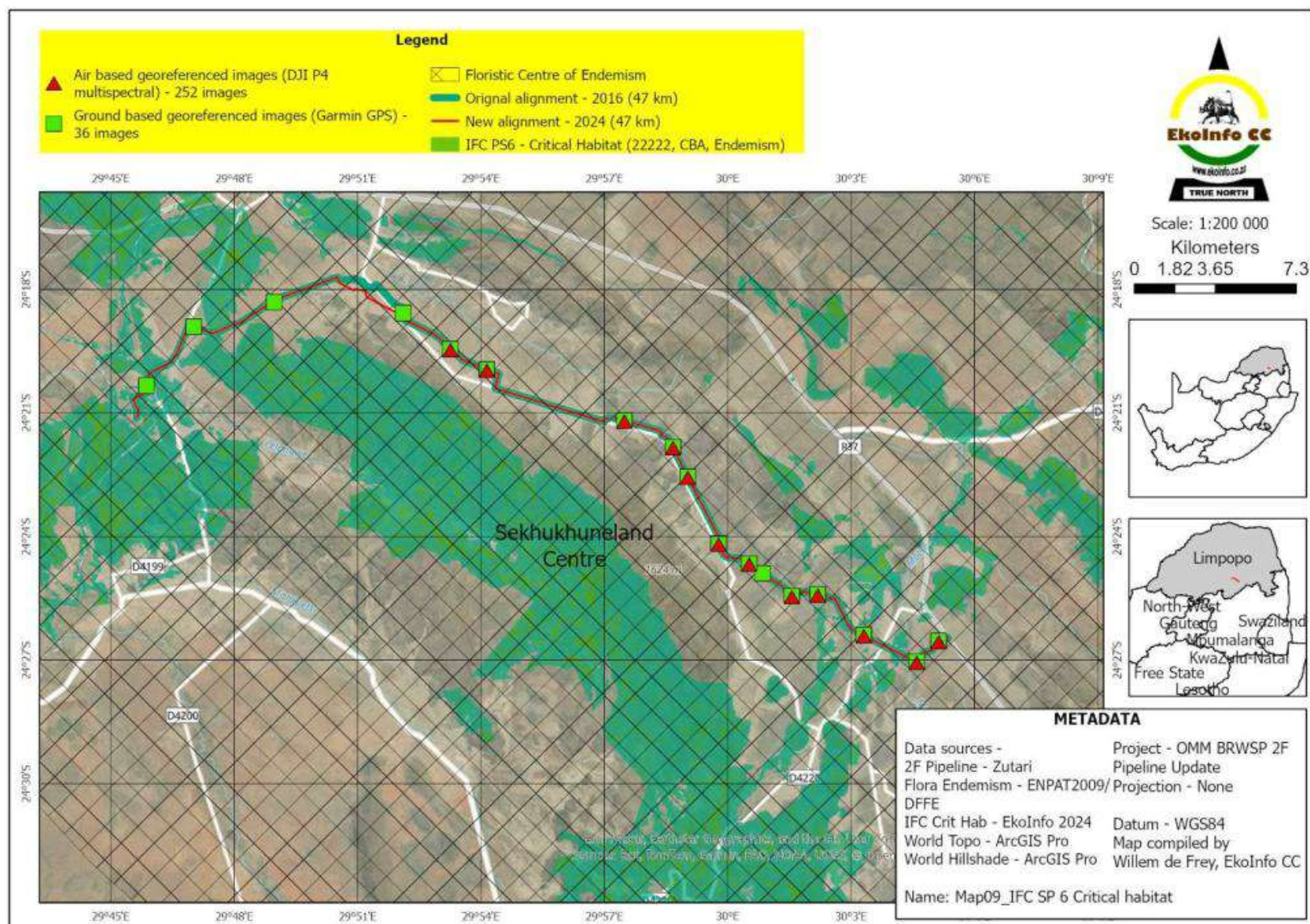


Figure 7-73: Distribution and extent of IFC PS 6 Critical Habitat along the proposed current alignment (EkoInfo CC, 2024).

Table 7-34: Overview of the surface area and percentage cover of IFC PS 6 based critical habitat within the landscape associated with the study area.

Regional Context (Landscape Level)			Temporary Pipeline Disturbance	
IFC PS 6 Habitat Units	Hectares	% Cover	Hectares	% of Landscape
Critical Habitat (22222, CBA, Endemism)	69,481	36%	10.0314	0.01%
Non-critical habitat	122,019	64%	168.2168	0.14%
Total landscape area	191,500	100%	178.2482	

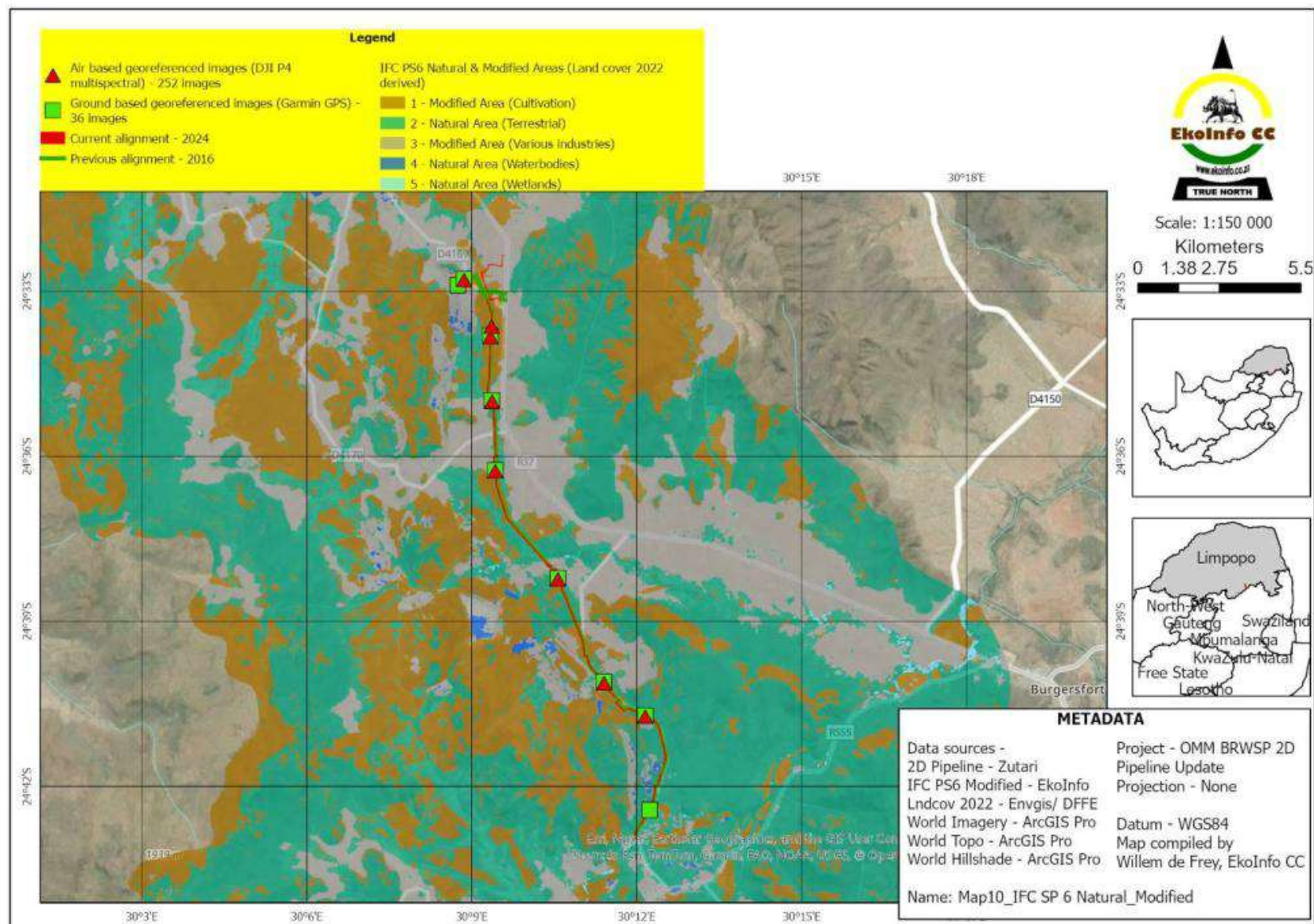


Figure 7-74: Distribution and extent of IFC PS 6 natural and modified areas along the proposed current alignment (EkoInfo CC, 2024).

Table 7-35: Overview of the surface area and percentage cover of IFC PS 6 based natural and modified areas within the landscape associated with the study area.

Regional Context (Landscape Level)							
IFC PS 6 Natural and Modified Areas (Land Cover 2022 derived)	Hectares		IFC PS 6 Mapping Units		Temporary Pipeline Disturbance		
		% Cover	Modified Area	Natural Area	Hectares	% Cover	% of Landscape
1 - Modified Area (Cultivation)	74,714	39%	74,714		102.7394	58%	0.14%
2 - Natural Area (Terrestrial)	92,182	48%		92,182	47.6440	27%	0.05%
3 - Modified Area (Human settlement)	24,257	13%	24,257		27.5115	15%	0.11%
4 - Natural Area (Waterbodies)	184	0%		184		0%	
5 - Natural Area (Wetlands)	495	0%		495	0.0895	0%	
Total Landscape Area	191,500	100%	98,970	92,861	178.2482	100%	
			52%	48%			

7.9.5 ENVIRONMENTAL IMPACT ASSESSMENT

7.9.5.1 Flora Component

The impacts associated with the bulk water supply line construction are localised and temporary and will influence less than 1% of the remaining natural vegetation within the landscape, whether critical habitat or not.

If the topsoil is effectively managed, this impact will be even less as the above ground disturbance will be restored through natural succession. It is critical that the topsoil should be stored separately from the subsoils and placed on top of the subsoils. The removed topsoil should be replaced in the same vicinity from which it had been removed.

Once the topsoil has been replaced within the same area, the servitude can be maintained with local labour and soft water infiltration techniques. If effective and disciplined topsoil management can be implemented, then the system should effectively restore over time because of the seedbank and soil micro-organisms present in the system. Use of non-regionally indigenous species and fertiliser should be limited, as it results in local livestock concentrating on these areas. In the absence of fertiliser, the domestic animals utilise the areas as normal and move on once they have removed the above ground biomass.

Effective topsoil management is critical to the success of rehabilitation and restoration in natural areas, providing a foundation for the recovery of native vegetation and soil stability. However, the introduction of pasture species and fertilisers can attract livestock, leading to overgrazing, soil compaction, and ecological imbalance. By prioritising natural processes, minimising fertiliser use, and controlling grazing, rehabilitation efforts can achieve long-term ecological and economic sustainability.

7.9.5.1.1 Impact Assessment

The following expected impacts have been evaluated:

1. Loss of flora diversity in natural areas.
2. Loss of endemic plant species in natural areas.
3. Loss of threatened plant species in natural areas.
4. Alien invasive plant encroachment.
5. Removal of regionally indigenous woody species.
6. Removal of National Protected Trees with the servitude footprint.
7. Loss of floristic microhabitat associated with outcrops.

Only the construction phase is evaluated, as the disturbance is temporary for most of the pipeline servitude. If topsoil is properly managed and effectively returned to the disturbed footprint, the need for maintenance and monitoring during the operational phase will be minimal.

It is important to note that the pipeline is located within the Savanna Biome of South Africa, where the dominant growth form is woody species. Therefore, aiming for a post-construction servitude resembling grassland or pasture would not accurately reflect the natural system that existed before the pipeline's construction.

Figure 7-75 provides an overview of the impact risk associated with the flora component due to the bulk water supply pipeline construction without any mitigation, showing that most impacts are certain to occur, with consequences ranging from slight to high. **Figure 7-76** shows that, with the implementation of required mitigation, the consequences would likely be reduced to slight to moderate.

The main areas where high impacts or negative consequences may occur are associated with outcrops (boulders or sheets) and existing eroded areas with a high presence of endemic plants. Alternative construction methods, as highlighted in Appendix D of the terrestrial biodiversity impact assessment report, should be considered to minimise these impacts.

Pre-mitigation																	
Probability	Certain			5. 7.	4. 6.		1. 2. 3.										
	Very likely																
	Fairly likely																
	Unlikely																
	Very unlikely																
		Extreme	High	Moderate	Slight	Negligible					Slight	Moderate	High	Extreme			
		Detrimental				Consequence										Beneficial	

Figure 7-75: Overview of the impact risks associated with the flora component prior to mitigation.

		Post-mitigation															
Probability	Certain																
	Very likely			7.	5.	6.	4.	1. 2. 3.									
	Fairly likely																
	Unlikely																
	Very unlikely																
		Extreme	High	Moderate	Slight	Negligible					Slight	Moderate	High	Extreme			
		Detrimental				Consequence										Beneficial	

Figure 7-76: Overview of the impact risks associated with the flora component post mitigation

7.9.5.2 Fauna Component

The impacts associated with the bulk water supply line construction is localised and temporary and will influence less than 1% of the remaining natural habitat units within the landscape, whether critical habitat or not.

It is especially small and less mobile species that depend on specific habitats for food, shelter, and breeding. Such species are particularly vulnerable to habitat destruction, fragmentation, and direct disturbances caused by construction activities.

7.9.5.2.1 Loss of habitat and displacement of fauna taxa

The proposed construction of the pipe will result in the loss and clearing of natural vegetation.

The only option within the mitigation hierarchy that could reduce the impact significance on habitats of high importance (e.g. donga structures and wetland features) would be avoidance, which would reduce the impact significance.

Recommended Mitigation measures

No plausible mitigation is possible to prevent the direct loss of habitat and subsequent loss and displacement of faunal SCC. The only viable option within the Mitigation Hierarchy is Avoidance and or by placing the pipeline above ground on sensitive areas.

Mitigation of residual impacts persisting after Avoidance:

- Implement a rehabilitation management plan with the objective of managing rehabilitated sections after construction through conservative grazing, fire management and continual eradication of alien plant species. Sustainable grazing at conservative stocking rates (by domestic livestock or game) is an essential environmental factor in maintaining veld condition and floristic diversity. Overgrazing can however be detrimental to the vegetation, and the carrying capacity of such areas of the rehabilitated areas should be estimated to ensure that overgrazing is prevented.
- Landscaping should make use of indigenous plant species, and preferably of species native to the project area and immediate surroundings. The plant species selected should strive to represent habitat types typical of the ecological landscape prior to construction.
- If any faunal SCC (especially *Kinixys lobatsiana*) are exposed during the construction phase, a natural scientific professional registered in the field of zoological science and/ or ecological science who specialises in the species of concern should be appointed to assist with its capture, translocation and safe release to nearby suitable habitat with the relevant permits obtained from the authority.
- Screen sections of pipeline prior to construction for individuals of *Kinixys lobatsiana* - if found these should be released into suitable habitat adjacent to the pipeline property.
- All domestic waste generated (if present) during construction should be removed from the project area as soon as possible and be disposed at an authorised landfill to reduce the risk of colonisation by feral mammals, scavengers or competitively superior bird species (e.g. Pied Crows *Corvus albus*).
- Personnel and staff should be advised by means of environmental awareness training on the biodiversity importance of the area. The intentional killing of any faunal species (in particular invertebrates, reptiles and snakes) should be avoided by means of awareness programmes presented to the labour force. The labour force should be made aware of conservation issues pertaining to the taxa occurring in the project area.

7.9.5.2.2 Disruption of ecological connectivity and faunal dispersal

Construction activities could aggravate fragmentation and the disruption of natural ecological corridors in the area, thereby impeding the dispersal of faunal species as well as the potential for re-colonisation and recruitment of fauna species to the project area during rehabilitation. It is especially sub-populations

of large-bodied mammal species that are at risk of becoming fragmented if natural connectivity is disrupted and when the surface area of natural corridors is reduced to the point that these animals can no longer disperse across the project area.

Recommended Mitigation measures

- Ensure that construction activities do not overspill onto adjacent natural habitats in order to provide displaced fauna with the opportunity to disperse into suitable habitats (although potential dispersal by small animals is highly limited).
- The construction area should be barricaded with permeable fencing to allow for the free movement of animal species.
- It is recommended before the commencement of barricading, to ensure that no animal species are trapped within any fenced area.

7.9.5.2.3 Illegal utilisation of faunal resources

The presence of a labour within the project area will increase the risk of illegal utilisation of fauna resources, such as hunting of small antelope and trapping of small mammals and birds. It is assumed that labour will be accommodated in nearby towns/villages and not on site, which would lower this risk of hunting and poaching considerably.

In addition, the project may also result in increased utilisation of natural resources due to potential human encroachment and accessibility to the project area owing to people seeking jobs. This could result in the establishment of illegal settlements on areas consisting of natural habitat on the project area where active construction is absent.

Recommended Mitigation measures

- Contractors and labour should be accommodated off-site (in other words not on the project area), reducing the risk of illegal harvesting of natural resources.
- Labour supervisors and Health and Safety Representative officials should monitor the activities of labourers when working away from infrastructure in natural habitat.
- Personnel and staff should be advised by means of environmental awareness training on the biodiversity importance of the area. The intentional killing of any faunal species (in particular invertebrates, reptiles and snakes) should be avoided by means of awareness programmes presented to the labour force. The labour force should be made aware of conservation issues pertaining to the taxa occurring in the project area.
- Regular monitoring of the project area, especially areas of natural habitat where active construction/rehabilitation activities are absent, is advised to identify areas where illegal settlement may occur. If any illegal erecting of housing occurs, the developer's or contractor's public liaising officer should immediately advise on a resolution, which may involve a relocation strategy.

7.9.5.2.4 Direct faunal mortalities

Construction of the pipeline will result in the creation of deep trenches that could result in "death" traps for smaller less mobile animals (e.g. reptiles and frogs). Any animal that may have fallen into the pipeline trench could perish over time if not rescued.

Recommended Mitigation measures

- Implement daily (preferably in the morning) checks of exposed trenches for animals' species that may have fallen into the trench. If so, such animals should be captured and safely released into suitable adjacent habitat by the ECO.
- If any venomous snake species are trapped within the pipeline trench, then the services of a certified snake handler should be sought for the safe capture and release of the snake.

- Personnel and staff should be advised by means of environmental awareness training on the biodiversity importance of the area. The intentional killing of any faunal species (in particular invertebrates, reptiles and snakes) should be avoided by means of awareness programmes presented to the labour force. The labour force should be made aware of conservation issues pertaining to the taxa occurring in the project area.
- Regular monitoring of the project area, especially areas of natural habitat where active construction/rehabilitation activities are absent, is advised to identify areas where illegal settlement may occur. If any illegal erecting of housing occurs, the developer's or contractor's public liaising officer should immediately advise on a resolution, which may involve a relocation strategy.

Figure 7-77 provides an overview of the impact risk associated with the fauna component due to the bulk water supply pipeline construction without any mitigation, showing that most of the impacts are certain to occur, with consequences ranging from slight to high. **Figure 7-78** shows that, with the implementation of required mitigation, the consequences would likely result in slight to moderate to low consequences.

The main areas where high impacts or negative consequences can occur are associated with outcrops (boulders or sheets) and existing eroded areas with a high presence of SCC. Alternative construction methods, as highlighted in Appendix D of the terrestrial biodiversity impact assessment report, should be considered to minimise these impacts.

									Pre-mitigation									
Probability	Certain					1.												
	Very likely		3.			2.	4.											
	Fairly likely																	
	Unlikely																	
	Very unlikely																	
		Extreme	High		Moderate		Slight		Negligible		Slight		Moderate		High		Extreme	
		Detrimental							Consequence								Beneficial	

Figure 7-77: Overview of the impact risks associated with the fauna component prior to mitigation.

		Post-mitigation															
Probability	Certain																
	Very likely						1.										
	Fairly likely						3.	2.	4.								
	Unlikely																
	Very unlikely																
		Extreme	High	Moderate	Slight	Negligible					Slight	Moderate	High	Extreme			
		Detrimental					Consequence					Beneficial					

Figure 7-78: Overview of the impact risks associated with the fauna component post mitigation.

7.9.6 SPECIALIST RECOMMENDATIONS

7.9.6.1 Flora Component

The following recommendations are made:

1. A detailed rehabilitation plan should be compiled, showing areas where topsoil management is critical and non-negotiable, such as natural areas, potential critical habitats (e.g., eroded areas), and outcrops (boulders and sheet). The plan should be compiled by a registered scientific professional in botanical science and/ or ecological sciences, with at least 10 years of experience in botany and plant rehabilitation/ restoration. This will require detail mapping at a scale of 1:10,000 or larger along the approved pipeline servitude.
 - a. The mapping should form part of the pre-construction baseline, and the following areas within the natural areas should be highlighted:
 - i. Eroded areas
 - ii. Stream/ river crossing
 - iii. Wetlands
 - iv. Steep areas – more than 8% or 5° slopes v. Outcrops – boulders and sheets
 - b. The mapping should be done during the optimal flowering time from January to March.
 - c. The rehabilitation plan should incorporate the results of the soil assessment with regards to soil form, soil texture and soil depth.
2. To apply for the removal of nationally protected trees, a registered scientific professional in ecological science with a minimum of 5 years' experience should conduct surveys along the approved pipeline servitude using plotless methods. These surveys should document the height of the individual trees in the following height classes, up to a distance of 50 m along the centre of the permanent servitude:
 - Seedlings: 0 – 0.5 m
 - Juveniles: 0.5 – 1 m
 - Young adults: 1 – 3 m
 - Mature adults: 3 – 6 m (Fire tolerant)
 - Reproductive adults: 6 m > (Fire tolerant)

The survey should be done during the optimal flowering time from January to March. The survey plots should be at least 250 m apart within natural areas or at least one plot per 2 ha of remaining natural vegetation (**Table 7-30**) within the approved temporary and permanent servitude

3. Areas with permanent footprints (valve chambers, scour chambers) exceeding 1 ha **within natural areas** should be surveyed in detail for species of concern as indicated in the screening report during the optimal flowering time from January to March.

7.9.6.2 Fauna Component

The following recommendations are made:

1. Implement a rehabilitation management plan with the objective of managing rehabilitated sections after construction through conservative grazing, fire management, and continual eradication of alien plant species. Sustainable grazing at conservative stocking rates (by domestic livestock or game) is an essential environmental factor in maintaining veld condition and floristic diversity. Overgrazing can however be detrimental to the vegetation, and the carrying capacity of such areas of the rehabilitated areas should be estimated to ensure that overgrazing is prevented.
2. Landscaping should make use of indigenous plant species, preferably of species native to the project area and immediate surroundings. The plant species selected should strive to represent habitat types typical of the ecological landscape prior to construction.
3. If any faunal species of conservation concern (especially *Kinixys lobatsiana*) are exposed during the

construction phase, a natural scientific professional registered in the field of zoological science and/or ecological science who specialise in the species of concern should be appointed to assist with its capture, translocation and safe release to nearby suitable habitat with the relevant permits obtained from the authority.

7.10 SOCIAL IMPACT ASSESSMENT (ZUTARI, 2024)

Zutari (Pty) Ltd compiled the SIA report. A site visit was conducted on the 31st of October and on the 1st of November 2024.

7.10.1 GEOGRAPHICAL DESCRIPTION OF THE PROJECT AREA

The proposed realignments, along with the internal and access roads for the entire Phase 2F authorised pipeline, are situated in the FTLM and the LNLN, which fall within the SDM and the CDM in Limpopo Province. Limpopo is South Africa's northernmost province, covering an area of 125,754 km². It shares international borders with Mozambique, Zimbabwe, and Botswana and also borders the Gauteng, Mpumalanga, and North West Provinces.

FTLM was established in 2016 following the amalgamation of the Greater Tubatse Local Municipality and the Fetakgomo Local Municipality. FTLM is classified as a category C municipality, with a jurisdictional area of approximately 4,550 km². The municipality is largely rural, with only six proclaimed townships and 342 villages. It faces challenges such as inadequate infrastructure, significant service backlogs, a weak economic base, dispersed human settlements, and high levels of poverty (The Final IDP/Budget – 2024/2025 FTLM). The region is also characterised by a strong presence of TAs, which are responsible for the day-to-day management of these areas.

According to the FTLM IDP (2024/2025), the municipal region hosts substantial mining activities along the R37 and R555 roads. In particular, the mining sector is concentrated in Burgersfort, where approximately 60% of the mines are operational within the municipality.

The LNLN, as described in its IDP (2024/2025), is located in the southern part of the CDM and is one of four local municipalities in the district. LNLN is predominantly rural, with 95% of the municipality's land under the jurisdiction of TAs. The municipality spans 3,464 ha, which represents 16% of the district's total land area and includes 94 settlements, divided into 30 wards. Zebediela has been identified as an intervention area for rural development and potential rural tourism, as the municipality lacks a strong tourism destination area (LNLN IDP 2024/2025).

According to the LNLN IDP (2024/2025), the municipality is strategically located along several provincial roads, including the Dilokong Provincial Corridor between Polokwane and Burgersfort. The R37 and R519 provide residents with access to neighbouring African countries to the north and Gauteng to the south.

7.10.2 ANTICIPATED SOCIAL IMPACTS: PRE-CONSTRUCTION AND CONSTRUCTION

7.10.2.1 Land Acquisition

Certain sections of the pipeline requiring realignment, as well as the access and internal roads for the entire Phase 2F authorised alignment, affect several farm portions, as detailed in **Table 1-4** above. Some of these affected farm portions are privately owned, while others are owned or controlled by TAs on behalf of the National Government of the Republic of South Africa. Consequently, it is anticipated that the developer will need to secure land access prior to the construction of the proposed development.

Land access will be negotiated and obtained through consultation with the affected parties. This process is currently underway.

Table 7-36 outlines the impact rating and mitigation measures related to land acquisition, both before and after mitigation.

Table 7-36: Land Acquisition pre-construction and construction impact.

IMPACT DESCRIPTION: Land Acquisition				
Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Land acquisition will be required prior to the construction of the pipeline and the associated consultations and negotiations will be conducted over a short-term period.	Consequence: Slightly beneficial	Significance: Moderate - negative
Extent	Local	The impact will prevail at a local level with all the affected landowners.		
Intensity	Moderate - negative	Limited dependency on the land is assumed, hence the moderate rating		
Probability	Certain	Land acquisition is certain as the developer doesn't own the affected land portions.		
MITIGATION:				
As per IFC PS5, Land should always be accessed or acquired in consultation and negotiation with the affected people. LWUA has already initiated the process with the TA and private landowners.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Land acquisition will be required prior to the construction of the pipeline and the associated consultations and negotiations will be conducted over a short-term period.	Consequence: Slightly beneficial	Significance: Low - negative
Extent	Local	Impact will prevail at a local level with all the affected landowners.		
Intensity	Low - negative	The on-going engagements and the presence of compensation schemes mitigates the intensity of the loss.		
Probability	Certain	Land acquisition is certain as the developer doesn't own the affected land portions.		

7.10.2.2 Temporal Disturbance to Grazing Land

During the site visit, it was observed that livestock, including cattle and goats, were grazing along the project area. As such, during the construction phase of the underground water pipeline, grazing land may be temporarily disturbed due to excavation activities, movement of machinery, and restricted access. These disruptions may affect livestock grazing patterns and the availability of forage. However, upon completion of construction, the affected land can be rehabilitated and restored to its original use, thereby ensuring minimal long-term impact on livestock farming.

Table 7-37 outlines the impact rating and mitigation measures related to temporal disturbance to grazing land, both before and after mitigation.

Table 7-37: Temporal disturbance to grazing land.

IMPACT DESCRIPTION: Temporal disturbance to grazing land				
Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact is anticipated to happen during the construction phase.	Consequence: Slightly detrimental	Significance: Low - negative
Extent	Site-specific	Disturbance anticipated to happen on site.		
Intensity	Moderate - negative	The anticipated project phase activities will result in temporal disturbance for grazing.		
Probability	Certain	Temporal disturbance is certain.		
MITIGATION:				
It is recommended that the contractor take the following measures; Engage with livestock owners in advance to communicate construction timelines and potential disruptions; Implement a phased construction schedule to minimise the extent of land disturbance at any time; Maintain access routes to grazing areas where feasible and implement controlled crossing points for livestock. Should grazing be deemed as not feasible during construction phase, alternative grazing arrangements should be in place, such as identifying and providing temporary alternative grazing areas for affected livestock owners; and Restoring disturbed land after construction by regrading, reseeding with native grass species, and ensuring soil stabilisation to promote regrowth of forage.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact is anticipated to be short-term.	Consequence: Negligible	Significance: Low - negative
Extent	Site-specific	Impact likely to be site-specific.		
Intensity	Low - negative	Impact likely to be low following the recommended mitigation measures.		
Probability	Certain	Temporal disturbance is certain.		

7.10.2.3 Resettlement of Households

In 2018, the construction of the pipeline initially required the resettlement of approximately 40 households along the proposed route. However, following a realignment of the pipeline to minimise displacement, the number of affected households has been significantly reduced to nine (9), based on aerial imagery and specialist observations conducted during site visits. While the revised route has successfully mitigated large-scale displacement, the resettlement of these nine households will still result in social and economic impacts. Affected families may face disruptions to their livelihoods, access to services, social networks, and cultural ties to the land.

As the affected structures are located on tribal land, it is assumed that PTO certificates have been issued to land rights holders—residential PTOs for homestead occupants and business PTOs for business owners. These arrangements suggest the presence of informal land rights. The developer will be

required to engage with the affected TA, in collaboration with the Limpopo Department of Agriculture and Rural Development³⁰, to identify suitable alternative land for the resettlement of the affected households.

Table 7-38 presents the impact rating and mitigation measures for the resettlement and displacement of residential and non-residential structures, both pre- and post-mitigation.

Table 7-38: Resettlement of displaced residential and non-residential structures pre-construction and construction impact.

IMPACT DESCRIPTION: Resettlement of Households				
Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Medium-term	It is anticipated that the resettlement process will be undertaken over a medium-term period.	Consequence: Highly detrimental	Significance: High - negative
Extent	Local	It is anticipated that the extent of the impact will be local.		
Intensity	Very high - negative	Anticipated resettlement is likely to be high negative if not managed.		
Probability	Very likely	The proposed pipeline passes through residential and non-residential structures.		
MITIGATION:				
It is recommended that resettlement be guided by international best practices and accompanied by a comprehensive Resettlement Action Plan (RAP). This approach goes beyond simply meeting legislative compensation requirements. According to best practices, the IFC PS 5 encourages project sponsors to plan and implement involuntary resettlement as a development initiative, ensuring that the livelihoods and living standards of affected people are improved.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Medium-term	It is anticipated that the resettlement process will be undertaken over a medium-term period.	Consequence: Moderately detrimental	Significance: Moderate - negative
Extent	Local	It is anticipated that the extent of the impact will be local.		
Intensity	Moderate – negative	Resettlement is likely to be moderate if managed.		
Probability	Very likely	The proposed pipeline passes through residential and non-residential structures.		

7.10.2.4 Employment Opportunities

It is anticipated that employment opportunities will arise for skilled, semi-skilled, and unskilled workers during the construction phase. This is expected to have a positive socio-economic impact, particularly for the local population, by providing income-generating opportunities and promoting skill development. The number of locally employed individuals during the construction phase will depend on the developer's project activities and recruitment policy. It is further anticipated that certain skilled and specialised

³⁰ The developer's land acquisition process involves engagement with the Limpopo Department of Agriculture and Rural Development. As part of identifying suitable land for the relocation of households—particularly those with livestock or agricultural activities—it is essential to ensure that the land selected enables affected households to re-establish their livelihoods. This includes securing land of sufficient quality to support continued agricultural use and sustainable living.

positions will be sourced nationally. **Table 7-39** presents the impact rating and mitigation measures related to employment opportunities, both pre- and post-mitigation.

Table 7-39: Employment opportunities pre-construction and construction impact.

IMPACT DESCRIPTION: Employment opportunities				
Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Moderately beneficial	Significance: Moderate - positive
Extent	Regional	Impact likely to extend regionally.		
Intensity	Moderate - positive	The benefit is likely to be moderate should a clear & sound policy be not in place.		
Probability	Certain	Employment opportunities are certain during the construction of any development project.		
MITIGATION:				
It is recommended that the contractor should carry out the recruitment process in accordance with South African laws that regulate labour rights, working conditions, and employer responsibilities. Additionally, to maximise local employment benefits, the IFC PS 2 recommends that: • Preference should be granted to qualified local workers. • Local sourcing should be prioritised. • Skills development, such as training, should be planned and facilitated for selected people who will be employed during the construction phase. • Equal opportunities should be granted to both males and females. • Compensation should be competitive, and a safe working environment should be ensured. • Establish a system of addressing labour concerns.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Moderately beneficial	Significance: High - positive
Extent	Regional	Recruitment likely to extend regionally.		
Intensity	High - positive	Benefit is likely to be very high should a clear and sound policy be in place.		
Probability	Certain	Employment opportunities are certain during construction of any development project.		

7.10.2.5 Procurement of Goods and Services

During the construction phase, development projects typically require the procurement of various goods and services. It is anticipated that this project will similarly require the procurement of goods and services, including equipment and building supplies. This requirement is expected to create economic opportunities for existing and new Small, Medium and Micro Enterprises (SMMEs) in the area. The proposed development may lead to the establishment of new SMMEs. However, certain goods and services may need to be sourced from outside the project area, which could result in the developer procuring goods and services from SMMEs beyond the local area.

Table 7-40 presents the impact rating and mitigation measures related to the procurement of goods and services, both pre- and post-mitigation.

Table 7-40: Procurement of goods and services pre-construction and construction impact.

IMPACT DESCRIPTION: Procurement of goods and services				
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Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Moderately beneficial	Significance: Moderate - positive
Extent	Regional	Procurement is likely to extend regionally.		
Intensity	Moderate - positive	Benefit is likely to be moderate should a clear & sound policy be not in place.		
Probability	Certain	Procurement of goods and services is certain during construction of any development project.		
MITIGATION:				
Procurement of goods and services will be done as per the existing OMM Procurement Policy, which aims to support and develop local communities, suppliers, and previously disadvantaged groups for economic upliftment. Furthermore, the procurement of goods and services will be guided by the Preferential Procurement Policy Framework Act, No. 5 of 2000.				
The contractor will need to implement quality control measures, to ensure that all goods and services are of required quality It is essential that the contractor notes that The IFC Performance Standards require responsible procurement by ensuring fair, transparent, and competitive sourcing, prioritising local suppliers, and managing social and environmental risks in supply chains. Companies must prevent forced labour, child labour, and unsafe working conditions, promote ethical labour practices, and ensure contractor compliance with environmental and social standards while supporting sustainable local economic development.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Moderately beneficial	Significance: High - positive
Extent	Local	Procurement is likely to extend regionally.		
Intensity	Very high - positive	Benefit is likely to be very high should a clear and sound policy be in place.		
Probability	Certain	Procurement of goods and services is certain during the construction of any development project.		

7.10.2.6 Community Expectations

Development projects often raise high expectations within local communities, particularly regarding employment opportunities during the construction phase. It is anticipated that nearby communities will have heightened expectations related to both employment and business opportunities. If these expectations are not met, there is a risk that individuals or community groups may mobilise against the project, or in some cases, hold the project office accountable if employment demands are not satisfied.

Table 7-41 presents the impact rating and mitigation measures related to community expectations, both pre- and post-mitigation.

Table 7-41: Community expectations pre-construction and construction impact.

IMPACT DESCRIPTION: Community expectations		
Predicted for project phase:	Pre-construction and Construction	
PRE-MITIGATION		
Dimension	Rating	Motivation

Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Moderately detrimental	Significance: High - negative
Extent	Local	Local communities are likely to have expectations.		
Intensity	Very high - negative	Expectations are likely to be very high if not managed.		
Probability	Certain	Expectations are certain during the construction of any development project.		
MITIGATION:				
To manage community expectations, project information should be made readily available to the community. This information should include detailed requirements for employment, procurement, and other project-related opportunities. An information centre should be strategically placed to house project-related information and provide space where community members can log their project-related grievances through a grievance mechanism.				
The contractor should also seek information on wages paid to the locals on previous projects in the area and clearly communicate the proposed wages and benefits to the community. This communication should take place before the recruitment process commences, to better manage community expectations regarding wages and benefits associated with the project.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Slightly detrimental	Significance: Low - negative
Extent	Local	Local communities are likely to have expectations.		
Intensity	Low - negative	Expectations are likely to be low-negative to minor if managed.		
Probability	Certain	Expectations are certain during the construction of any development project.		

7.10.2.7 Damage to Local and Key Intersections

During this phase, the transportation of machinery, construction materials, and construction workers will take place via the existing road network. As a result, an increase in traffic is anticipated, which may subject the road infrastructure and key intersections to wear and potential reduction in capacity. Heavy-duty trucks and construction vehicles are likely to contribute to road surface deterioration, increased dust levels, and traffic congestion. During peak hours, it is expected that social receptors located along Intersection 2 will be affected by the movement of construction materials. This intersection passes through a residential area and is in proximity to a primary school, a secondary school, and the access route leading to the Twickenham Substation.

Table 7-42 presents the impact rating and mitigation measures related to damage to local roads and access roads, both pre- and post-mitigation.

Table 7-42: Development or widening of local and access roads pre-construction and construction impact.

IMPACT DESCRIPTION: Damage to Local and Key Intersections				
Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation	Consequence: Moderately detrimental	Significance: Moderate - negative
Duration	Short-term	Impact will prevail during the construction phase.		
Extent	Local	Impact likely to affect local social receptors along the intersections and frequent users of the key road network.		
Intensity	Very high - negative	Impact likely to be very high if not managed, resulting in		

		roads remaining in poor condition.		
Probability	Very likely	Damage to local access road very likely if not managed.		
MITIGATION:				
The contractor is required to conduct a condition assessment of the road both prior to the commencement of construction and upon completion of the works. Additionally, the contractor shall design and construct the access roads in accordance with the <i>Standard Specifications for Roads and Bridge Works for State Road Authorities</i> (1998), as prepared by the Committee of Land Transportation Officials (COLTO). It is recommended that the mitigation measures outlined in the Traffic Impact Assessment (TIA) report be implemented by the contractor throughout the construction phase.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, as it is anticipated to be short-term.	Consequence: Slightly detrimental	Significance: Low - negative
Extent	Local	Impact likely to affect the local social receptors along the intersections and frequent users of the key road network.		
Intensity	Moderate - negative	Impact likely to be moderate if managed.		
Probability	Fairly likely	Damage to local access road fairly likely if not managed.		

7.10.2.8 Health, Safety and Security

Construction projects are generally known to have negative impacts on the health and safety of both communities and employees, and it is anticipated that similar impacts will arise from the proposed development. During the construction phase, nearby communities and workers may be exposed to increased dust, noise, visual disturbances, and other nuisances, as well as risks related to construction vehicles and man-machine interfaces. Dust will likely be generated by activities such as excavation, cement mixing, and the transportation of materials or waste, potentially affecting the respiratory health of those exposed. Construction noise, generated by machinery and transport vehicles, is unlikely to damage hearing but will likely reach nuisance levels.

Additionally, an influx of job seekers and opportunity seekers, particularly if the influx is male-dominated, can result in higher health risks, including an increased burden of disease and a rise in HIV/AIDS rates (Daniel Owens, et al.).

Furthermore, construction activities may attract criminal elements to the area, thereby compromising the security of nearby farms, communities, and employees. It is anticipated that criminal activities, including trespassing, will increase during the construction phase.

Table 7-43 shows the health, safety, and security impact ratings and mitigation measures, both pre- and post-mitigation.

Table 7-43: Health, safety, and security pre-construction and construction impact.

IMPACT DESCRIPTION: Healthy, safety, and security				
Predicted for project phase:	Pre-construction and Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.	Consequence: Moderately detrimental	Significance: Moderate - negative

Extent	Local	Impact likely to extend to local communities.		
Intensity	High - negative	Impact likely to be high if not managed, as the roads are currently being used by heavy duty trucks.		
Probability	Very likely	Health, safety, and security impacts are likely during the construction phase.		
MITIGATION:				
Impact related to health and safety will be managed as per the recommendations made in other specialist studies such as the defence compliance statement and TIA, and as per the duties as defined in the Construction Regulations (Occupational Health and Safety Act). It is recommended that the contractor should: • Implement safety measures such as having appropriate signage and fencing/barricades on site to keep local community members and livestock away from falling into the dugout ditches. • Use flaggers and barriers to separate work zones from public areas • Implement dust and noise control measures • Implement traffic management plans to prevent accidents with construction vehicles Plan and facilitate a community health and safety workshop, including a similar workshop for employees • Develops an Emergency Prevention and Response Plan for potential fire, flooding, cave-ins and hazardous material spills • Appoint a Health & Safety Officer to oversee compliance, including conducting regular inspections and audits to identify and correct hazards • Deploys Security personnel stationed at the project site to avoid vandalism/ site specific criminal activities, protecting the broader community will remain the responsibility of the South African Police Service (SAPS). • Engage with the Provincial commissioner to assist with handling potential construction mafia.³¹.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase, which is anticipated to be short-term.		
Extent	Local	Impact likely to extend to local communities.		
Intensity	Moderate - negative	Impact likely to be moderately high if not managed.		
Probability	Fairly likely	Health and safety impacts are fairly likely if managed during the construction phase.		
			Consequence: Slightly detrimental	Significance: Low - negative

7.10.2.9 Modification of the Sense of Place

During the construction phase, potential displacement is likely to trigger a modification of the "sense of place" impact. This impact is closely linked to social networks, community structures, social cohesion, and household ties to family groups. The loss of these connections, as described above, can have a significant effect on households, particularly for the head of the household, especially those who fall within vulnerable groups.

The dismantling of these social ties due to displacement is expected to have a greater impact on women compared to men. Women are particularly dependent on social networks, as these networks provide essential forms of support.

³¹ Construction mafias, also known as business forums, are networks that employ violence and other illegal means to control access to public sector procurement opportunities. These groups invade construction sites, demanding money or a stake in development projects. They are often involved in systemic extortion.

Table 7-44 outlines the modification of the sense of place impact rating and associated mitigation measures, both pre- and post-mitigation.

Table 7-44: Modification of the sense of place pre-construction and construction impact.

IMPACT DESCRIPTION: Modification of the sense of place				
Predicted for project phase:	Pre-Construction & Construction			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase. It is short-term as the disruption will be temporary.	Consequence: Slightly detrimental	Significance: Low - negative
Extent	Site-specific	Impact is likely to be site specific.		
Intensity	High - negative	Impact is likely to be high if not managed.		
Probability	Very likely	The project will likely have an impact on the affected households and the temporary disruption of familiar landscape.		
MITIGATION:				
The contractor should aim at minimising disruption during construction by involving the community in the planning process and ensuring that the landscape is restored to its original state after construction to preserve the community's sense of place. The households which are likely to experience resettlement should be supported during livelihood restoration to help preserve their connection to the land.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	Impact will prevail during the construction phase. It is short-term as the disruption will be temporary.	Consequence: Slightly detrimental	Significance: Low -negative
Extent	Site-specific	Impact is likely to be site specific.		
Intensity	Low - negative	Impact likely to be moderate if managed.		
Probability	Very likely	The project will likely have an impact on the affected households and the temporary disruption of familiar landscape.		

7.10.3 ANTICIPATED SOCIAL IMPACTS: OPERATION

7.10.3.1 Access to Potable Water for Defined Communities

LNLN is one of the three local municipalities that are water service providers and are responsible for revenue collection. Serious water shortages may lead to chronic illnesses, putting pressure on local healthcare facilities. A reliable water supply helps reduce health-related costs within a society. In many developing countries, people spend a significant portion of their income—often a third—on medical expenses, with water-related diseases such as malaria and diarrhea being the primary contributors. Furthermore, access to clean water is essential for everyday activities, including drinking, cooking, bathing, and cleaning.

Table 7-45 shows the impact rating and mitigation measures, pre and post mitigation, for access to potable water for defined communities.

Table 7-45: Access to potable water for defined communities operation impact.

IMPACT DESCRIPTION: Access to potable water for defined communities				
Predicted for project phase:	Operational			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	Impact will prevail during the operation phase, which is anticipated to be long-term.	Consequence: Moderately beneficial	Significance: Moderate - positive
Extent	Local	Local defined communities are likely to benefit from potable water.		
Intensity	Moderate - positive	Benefit is likely to be moderate prior to the implementation of a Water Master plan and Water Sector Plan.		
Probability	Very likely	The defined communities will likely have access to potable water.		
MITIGATION:				
An experienced and qualified service provider should be appointed to construct the pipeline. The SDM Water Master Plan and Water Sector Plan to be updated with defined communities which will benefit from the OMM Programme to receive potable water.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	Impact will prevail during the operation phase, which is anticipated to be long-term.	Consequence: Highly beneficial	Significance: High - positive
Extent	Regional	Local defined communities are likely to benefit from potable water.		
Intensity	High - positive	Benefit is likely to be high following the implementation of a Water Master Pan and Water Sector Plan.		
Probability	Very likely	The defined communities will likely have access to potable water.		

7.10.3.2 Access to Bulk Raw Water for Mine Members

During the operational phase, it is anticipated that mine³² personnel will have access to a reliable supply of bulk raw water, which is essential for maintaining efficient operations. A consistent water supply enables mines to optimise production, minimise potential financial losses, and mitigate environmental impacts. However, water for industrial use is becoming increasingly scarce in Southern Africa (Mining Industry Association of Southern Africa, 2022). While the mining industry has faced criticism for perceived water wastage, mines contend with a range of water management challenges. These challenges may arise from environmental, climatic, and geopolitical factors encountered throughout the mine's life cycle. As a result, effective water management has evolved from being merely an operational necessity to a strategic imperative.

³² The OMM Programme Mine members include; African Rainbow Minerals, Anglo American Platinum, Assore (Dwars River), Bushveld Minerals, Cheetah Chrome, Corridor Resources, Glencore-Merafe, Implats (Marula), Ivanplats, Modkiwa Platinum Mine, Northam Platinum, Sibanye-Stillwater, Sylvania Platinum, Tameng Mining & Exploration, Two Rivers Platinum, Vanadium Resources and Zijin Platinum.

Table 7-46 presents the impact rating for access to bulk raw water for mine members and the corresponding mitigation measures, both pre- and post-mitigation.

Table 7-46: Access to bulk raw water for mine members.

IMPACT DESCRIPTION: Access to bulk raw water for mine members				
Predicted for project phase:	Operation			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	The impact is likely to be long term.	Consequence: Highly beneficial	Significance: High - positive
Extent	Regional	Impact will prevail at regional level.		
Intensity	Low - positive	Benefit likely to be low if pipeline not constructed accordingly.		
Probability	certain	It is certain that the mine members in the affected project phase will receive bulk raw water during operations.		
MITIGATION:				
An experienced and qualified service provider should be appointed to construct the pipeline. The SDM Water Master Plan and Water Sector Plan to be updated and include the mine members of the OMM Programme to receive bulk raw water supply for their mine operations.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	The impact is likely to be long term.	Consequence: Highly beneficial	Significance: Very High - positive
Extent	Regional	Impact will prevail at regional level.		
Intensity	High positive -	Benefit likely to be high provided that the pipeline is constructed accordingly.		
Probability	Certain	It is certain that the mine members in the affected project phase will receive bulk raw water during operations.		

7.10.3.3 Employment Opportunities

During the operational phase, employment opportunities will be limited, as the project will require only a small workforce to carry out routine inspections, maintenance, and repairs. In contrast to the construction phase, which demands a larger labour force, the operational phase will primarily involve specialised roles such as pipeline monitoring, technical maintenance, and occasional rehabilitation work. Consequently, the project is not expected to generate substantial long-term employment for local communities. However, where feasible, priority should be given to local workers for available maintenance activities. Additionally, implementing skills development programmes during the construction phase could help equip local labourers with the necessary competencies to qualify for these operational roles.

Table 7-47 presents the impact rating for employment opportunities and the corresponding mitigation measures, both pre- and post-mitigation.

Table 7-47: Employment opportunities operation impact.

IMPACT DESCRIPTION: Employment opportunities
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Predicted for project phase:	Operation			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	Maintenance is anticipated to happen throughout the operation phase.	Consequence: Moderately beneficial	Significance: High - positive
Extent	Regional	Impact is likely to extend regionally to source specialised skills.		
Intensity	Moderate - positive	intensity anticipated to be low, opportunities will be limited to maintenance activities.		
Probability	Fairly likely	It is likely that maintenance will be required.		
MITIGATION:				
Employment opportunities for locals during this phase can be enhanced by prioritising local workers for maintenance roles and engaging local businesses for pipeline maintenance contracts, ensuring that the community benefits from long-term employment opportunities.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	Maintenance is anticipated to happen throughout the operation phase.	Consequence: Highly beneficial	Significance: High - positive
Extent	Regional	Impact is likely to extend regionally to source specialised skills.		
Intensity	High-positive	Impact to be high when the local community are considered for the opportunities in this phase.		
Probability	Very likely	It is likely that maintenance will be required.		

7.10.3.4 Health and Safety

During the operational phase, some activities associated with the maintenance of the pipeline will rely on human labour, which may expose the workforce to health and safety risks. It is anticipated that injuries could occur due to improper handling of equipment and materials.

Table 7-48 presents the impact rating for health and safety and the corresponding mitigation measures, both pre- and post-mitigation.

Table 7-48: Health and safety operation impact.

IMPACT DESCRIPTION: Health and safety				
Predicted for project phase:	Operation			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	It's anticipated that the impact will prevail for a medium-term during the operation of the development.	Consequence: Moderately detrimental	Significance: Low - negative

Extent	Local	Impact is likely to be site-specific.		
Intensity	Moderate negative	- If not managed through maintenance safety procedures, the impact will be moderate.		
Probability	Certain	The probability of incidents and injuries is almost certain if not managed.		
MITIGATION:				
It is recommended that the developer develop a health and safety plan that outlines the safety measures and procedures implemented when undertaking maintenance at the project's infrastructure.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Long-term	During the full operation phase of the assets, it is anticipated that the impact will remain.	Consequence: Moderately detrimental	Significance: Low - negative
Extent	Local	Impact is likely to extend locally.		
Intensity	Low - negative	If managed the impact will be low.		
Probability	Fairly likely	Probability for incidents and injuries are fairly likely as operational risks will always be present.		

7.10.4 ANTICIPATED SOCIAL IMPACTS: DECOMMISSIONING

The decommissioning of an underground water pipeline is a complex process that requires careful planning to mitigate potential environmental and social impacts. While decommissioning is technically feasible, it is generally not the preferred option unless unavoidable due to factors such as structural failure, regulatory requirements, or redundancy. However, for the purpose of this assessment, decommissioning is assumed to evaluate its potential impacts and necessary mitigation measures. Despite this assumption, the specialist recommends exploring alternative solutions such as rehabilitation, maintenance, or repurposing to minimise negative effects on communities

7.10.4.1 No Access to Potable Water

Social water users will not have access to potable water should the proposed development be decommissioned. Specifically, the selected defined communities. This could likely have severe consequences for households, schools, healthcare facilities, businesses, and agricultural activities that depend on the pipeline as their primary or sole water source. The decommissioning could lead to increased water insecurity, forcing affected communities to seek alternative and potentially less reliable or unsafe water sources, which may result in health risks, higher costs, and social strain.

Table 7-49 outlines the impact rating for no access to potable water and the associated mitigation measures, both pre- and post-mitigation.

Table 7-49: No access to water decommissioning impact.

IMPACT DESCRIPTION: No access to potable water				
Predicted for project phase:		Decommissioning		
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	short-term	It is anticipated that the impact will prevail during the		Significance: High - negative

		decommissioning phase, provision alternative water source is assumed following decommissioning.	Consequence: Moderately detrimental	
Extent	Local	It is anticipated that the lack of water will extend to the local beneficiaries.		
Intensity	Very high-negative	It is anticipated to be very high if not managed.		
Probability	Certain	Impact is certain should the development is decommissioned.		
MITIGATION:				
Prior to the decommissioning of the potable water supply, beneficiaries should be notified. Additionally, the municipality should ensure that an alternative source of potable water is available to the affected communities.				
POST-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short-term	It is anticipated that the impact will prevail during the decommissioning phase, provision alternative water source is assumed following decommissioning .	Consequence: Moderately detrimental	Significance: Moderate - negative
Extent	Local	It is anticipated that the lack of water will extend to the local beneficiaries.		
Intensity	Moderate-negative	If managed, the impact is anticipated to be moderate.		
Probability	Certain	Impact is certain should the development decommission.		

7.10.4.2 No Access to Bulk Raw Water

Mine members will no longer have access to bulk raw water should the proposed development be decommissioned. This could likely have severe consequences for the operations of the mine members and could lead to significant financial losses which include a loss on the return of investment.

Table 7-50 outlines the impact rating for no access to bulk raw water and the associated mitigation measures, both pre- and post-mitigation.

Table 7-50: No access to bulk raw water.

IMPACT DESCRIPTION: No access to bulk raw water				
Predicted for project phase:	Decommissioning			
PRE-MITIGATION				
Dimension	Rating	Motivation		
Duration	Short term	It is anticipated that the impact will prevail during the decommissioning phase	Consequence: Highly detrimental	Significance: High - negative
Extent	Regional	It is anticipated that the lack of water will extend to the region's mine member		
Intensity	Very high - negative	It is anticipated to be very high if not managed		

Probability	Certain	Impact certain should the development decommission	
MITIGATION:			
Prior to the decommissioning of the bulk raw water the mine members should be notified. The district municipality should have an alternative source of bulk raw water.			
POST-MITIGATION			
Dimension	Rating	Motivation	
Duration	Short term	It is anticipated that the impact will prevail during the decommissioning phase	Consequence: Moderately detrimental Significance: High - negative
Extent	Regional	It is anticipated that the lack of water will extend to the mine members of the OMM Programme	
Intensity	Moderate - negative	The mine members will rely on the district municipality for alternative arrangements	
Probability	Certain	Impact certain should the development decommission	

7.10.5 ASSESSMENT OF NO-GO ALTERNATIVE AND CUMULATIVE IMPACTS

As per the requirements of the NEMA, the alternative of not proceeding with the proposed project must be assessed as an alternative. The no-go alternative implies that the Phase 2F pipeline and the development or widening of the access or internal roads do not proceed, hence the current status quo remains the same. This section defines a situation which would result should the proposed project not proceed.

The Minister of Human Settlement and Water and Sanitation published the National Water and Sanitation Master Plan for South Africa which specifically indicated that South Africa as a country is experiencing a water crisis by insufficient water infrastructure maintenance and investment, recurrent droughts driven by climatic variation, inequities in access to water and sanitation, deteriorating water quality, and a lack of skilled water engineers.

The proposed development is part of the OMM programme. The OMM Programme intends to build, operate, and maintain bulk and potable water infrastructure in the Eastern and Northern Limb of the Limpopo Province. Additionally, to comply with government instructions that every person living in South Africa has a constitutional right of access to at least basic water. The OMM Programme aims to provide quality water. As such, this would address the water crisis caused by insufficient water infrastructure maintenance and investment identified in the Water Master Plan.

It is also essential to note that the OMM programme is aligned with the National Infrastructure Plan (NIP), 2050 (Phase I), and the goals of the NDP 2011. The NDP anticipates, amongst others, universal and reliable access to water of acceptable quality and quantity in support of a strong, inclusive economy and a healthy environment by the year 2030.

The overall impact associated with not proceeding with the proposed development would entail the failure of the OMM programme to fully align with the country's plan for infrastructure development, especially the provision of potable water to social users.

Table 7-51 below, presents the no-go assessment associated with the proposed Phase 2F re-alignment and associated development.

Table 7-51: No-go assessment associated with the proposed re-alignment and associated developments.

Code	Impact	Pre-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance
1	No-go alternative	Long-term	Regional	Very high - negative	Extremely detrimental	Certain	Very high - negative

7.10.6 POTENTIAL CUMULATIVE IMPACTS

The potential cumulative impacts for the proposed realignment of the proposed pipeline and associated development include:

► Impacts related to multiplier effects on the local economy:

The proposed development promotes diversifying employment opportunities in the dominant mining region. This will result in several economic benefits for local communities through direct and multiplier effects. These effects are usually stimulated by wage bills, local and regional procurement spending, and investment into Local Economic Development (LED) and skills development.

► Impacts related to community health:

The impacts could be permanent duration due to the nature of HIV/AIDS and other sexually transmitted infections (STIs) that are incurable. The spatial scale is local but infected persons from the community, as well as construction teams who are mobile, could infect more people in other parts of the country.

► Impacts related to population influx:

The proposed development will attract opportunity seekers to the project area as the municipality has a high unemployment rate.

Applying pressure on local resources, infrastructure, and services: The capacity of social service delivery is generally under threat in the proposed project areas. Any additional influx of job and business seekers into the area, combined with the construction and operational workforce, will place great pressure on local social services and infrastructure such as roads, clinics, schools, sanitation and water access, and housing.

Increased informal settlements: An influx of temporary opportunity seekers into the area also has the potential to increase the formation of informal settlements, those who cannot afford rental property or experience an inability of bonds on tribal land will likely resort to residing in informal dwellings. This consequently lowers the property value of formal houses which are located in proximity to the informal settlements.

7.10.7 SPECIALIST CONCLUDING REMARKS

The proposed re-alignment and associated developments are strategic infrastructure development projects which are aligned with the NIP and the overall goals of the NDP. The findings of the SIA indicate that the recommended mitigation measures are expected to reduce the significance of the identified negative impacts to acceptable levels, while positive impacts will on average be significantly enhanced to maximise benefits to surrounding communities. It is finally recommended that the developer should respectively consider the proposed mitigation and maximisation measures included in the report to decrease the effect of negative impacts on communities and maximise the effect of positive impacts. Additionally, the specialist recommends that the proposed development should be authorised since the no-go alternative would hinder the execution of the national strategic plans aimed at providing potable water to communities for social use.

7.11 VISUAL AND LANDSCAPE IMPACT ASSESSMENT (CREATE LANDSCAPE, 2024)

A Landscape and Visual Impact Assessment (LVIA) was prepared by Create Landscape Architecture & Consulting. The field assessment was conducted on 1 November 2024. According to the Site Sensitivity Verification (SSV) Report, a Level 2 assessment was the required approach for this evaluation. This included a description of the receiving environment and the proposed project, the establishment of the view catchment area and receptors, a brief indication of potential visual impacts, and possible mitigation measures.

7.11.1 LANDSCAPE BASELINE

Table 7-52: Summary of the landscape baseline.

Landscape character ³³	
Climate	The climate of the study area can be described as semi-arid, lying in the rain shadow of the escarpment which have an annual rainfall of 400 mm and mean temperature of 22°C.
Topography and Geology	Undulating norite and pyroxenite hills is characteristic of the Sekhukhuneland landscape. Rocky outcrops are common and widespread throughout the region. High concentrations of metals such as chromium, platinum, titanium and vanadium are contained within the rocks of the region. This gave rise to surface mining operations. The Steelpoort and Olifants Rivers have eroded deep broad valleys. These valleys traverse the Leolo Mountains and many sequences of undulating hills that are mostly orientated north - south. This section forms part of the middle of the Olifants sub catchment and contains a variety of geological features. Soils vary from moderate to deep sandy loam to erodible duplex soils. The vertical scale of the landscape is defined by irregular undulation flat valleys and mountain foothills. The horizontal scale is interrupted by the rising landform to the east and west.
Vegetation cover	Woody natural vegetation is mostly evident southwest of the proposed pipeline servitude, along the foothills of the Leolo Mountains where larger trees are more abundant. Within the valley the vegetation is largely modified. The riverine habitat is in a poor state. The vegetation falls within the Mixed Bushveld of the Savanna Biome (Low and Rebelo, 1996.) The natural vegetation varies from a dense, short Bushveld to open Savanna. Much of the vegetation is overgrazed and mainly de - bushed and thus open and sparse with large scale erosion across the study area. The average vegetation height is not more than 5 m and provides little screening ability. Taller trees within valleys are sparsely scattered and is mostly associated with private residences.
Land use	This study area is characterised by a mix of land uses. Industrial activities are mainly linked to several mines lying to the north of the pipeline servitude, the area also includes dry land, villages and subsistence agriculture associated with scattered settlements. Informal stock grazing occurs throughout the section. Both the D4190 and the R37 are busy roads, often with slow moving trucks, minibus taxis, pedestrians, cattle and goats. Uncontrolled mining, agricultural and residential development of the area has resulted in the irreplaceable loss of Sekhukhuneland's unique landscape, however sections of these natural areas are still evident along sections of the foothills of the Leolo Mountains, approximately 1 – 1.5 km west of the proposed project area.
Landcover	Figure 7-79 indicates the landcover for both the proposed pipeline servitude (solid black line) as well as the previously authorised pipeline servitude (hatched black line). Where the proposed changes occur the main landcover types consist out of:

³³ These are distinct types of landscapes that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.

	• Eroded land • Subsistence/small scale agriculture • Residential • Open woodland It is clear that the landcover type remain vastly similar for all proposed pipeline servitude deviations. Based on this information the proposed changes will not be significantly more, or less sensitive to the landscape and visual impacts associated with the infrastructure.
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Visual absorption capacity and visual intrusion

Visual absorption capacity (VAC) is an indication of the ability of the landscape to visually conceal the development. Areas with high VAC have the ability to accommodate and absorb physical changes in the landscape without transforming its visual character and quality. The factors that contribute to the VAC factor includes slope, vegetation height and visual pattern. The VAC can be expressed as follows:

- High VAC - Built up areas and industrial/mining zones, where tall structures provide a high degree of visual screening;
- Moderate VAC – Areas of natural vegetation and moderately undulated topography; and
- Low – Agricultural areas (crops provide little screening) where the topography is fairly flat.

The degree of visual intrusion is related to the idea of context and maintaining the integrity of the landscape and essentially rates the degree of contrast. The higher the landscape quality and the simpler the visual context, the more likely the impact will be intrusive.

The first section of the alignment from the R37 to the turnoff of the D4180 has low - moderate VAC as a result of the proximity to industrial type infrastructure, over grazed stretches of land, sparse natural vegetation and slightly more dense built typology. As receptors move closer to the section of the alignment which runs along the foothills of the Leolo Mountain Range (along the D4180) the landscape's VAC decreases as this segment is characterised by natural woody vegetation and unique rock formations with small-scale man-made infrastructure. VAC increases again towards the D4182.

Visual intrusion is rated as indicated in **Table 7-53** below:

Table 7-53: Visual intrusion

Visual intrusion (How the project fits into the surrounding landscape)	Criteria
High	Results in a noticeable change or is discordant with the landscape
Moderate	Partially fits into the landscape, but clearly noticeable
Low	Minimal change or blends in well with the landscape
None	Negligible change to the landscape

The proposed access roads will have low visual intrusion as a result of:

- The presence of already established gravel and tar access roads traversing the study area;
- The fact that the proposed access roads will have no height; and
- Vast areas across the landscape have been left barren (eroded as a result of overgrazing) and the clearing of vegetation for new access roads will result in minimum change.

The proposed deviation in the alignment will not be visually more intrusive than the authorised alignment as the landscape types which traverses the area remain vastly similar.

Landscape Quality

Landscape quality is based on human perceptions and expectations in the context of the existing environment. The landscape quality rating is a combination of the landscape's, intrinsic physical properties consisting out of the landform, vegetation, water, colour, adjacent scenery, scarcity, cultural or man-made modifications. Landscape quality increases with the presence of water, topographic ruggedness and where diverse patterns of vegetation occur. Areas that contain more natural features or harmonious man-made compositions will have a more favourable landscape quality than areas with non- harmonious human activity.

Table 7-54: Landscape quality rating

Landscape quality rating	Criteria
High	Unmodified landscape: The landscape is almost free from human encroachment, Visual integrity occurs and where human intervention is visible, no visual discontinuity occurs, and visual order is harmoniously maintained. Strongly defined landforms are noted, including mountains and large bodies of

	water. Distinct visual patterns are formed through patterns, colours and textures.
Moderate	Moderately transformed/disturbed landscape: There is average visual integrity between the natural and manmade landscape. Some visual encroachment is visible which lacks visual order. There is some disruption of the natural and man-made patterns. Moderately distinctive landscape patterns are visible, including rolling hills and smaller water bodies.
Low	Extensively transformed human intervention: There is low or no visual integrity between the natural and man – made natural features. The visual integrity of the landscape is disrupted, and visual order is entirely lost. Little visual patterns are formed, and vegetation patterns, colours and textures are not noticeable.

The landscape quality from the most eastern section of the alignment, up to the D4182 can be considered moderate – low. This is as a result of the landscape's modification, proximity of the existing mines and other medium scale, similar type of infrastructure, small scale built-up areas, illegal dumping, the overall rural feel, the absence of natural open bodies of water and the fairly rugged topography.

The visual quality for the central section of the study area is considered high (especially west of the alignment), due to the diverse topography, rising landforms and complex vegetation. The rural image is picturesque in localised areas and relatively unspoiled by human activity, this is especially true in sections where mining activities are not visible from a distance.

The section along the D4197 and D4190's visual quality is regarded as moderate due to the modification of the landscape by human intervention and intrusion such as roads, mines housing, grazing pastures and villages. The visual setting is not vivid and nor does it have elements that fully unify a view. Transformed areas such as mining and residential areas have a lower landscape quality than undisturbed areas, broadly located east of the D4182.

Error! Reference source not found. is a high-level illustration of these areas when traveling along main gravel roads.

Landscape Value

The landscape is likely to be most valued by tourists who travel through the broader study area to visit nature and game reserves throughout the year which offer various eco-tourism activities. The proposed activities may therefore lower the landscape value to a very small extent through the direct loss of rural and natural land, especially during the construction phase of the project.

Local residents attach a high cultural and economic value to their surrounding landscape in terms of cultural value, various landscape elements have cultural connections and regional significance. In essence, local communities live from the landscape, and it is seen as a communal asset. Considering the above local residents will therefore attach a moderate - high value, depending on their direct association with the landscape.

Construction workers, mine workers and stakeholders associated with various current and future industrial projects within the study area will have a different perception because of the employment opportunities, their more regular contact with the landscape and the ongoing infrastructural type changes within it. The proposed project will therefore affect the landscape value to a lesser extent for this specific receptor group.

Sense of place

Sense of place is the "extent to which a person can recognise or recall a place as being distinct from other places, as having a vivid or unique, or at least a particular character of its own". Sense of place is constituted by spatial form and character of the natural landscape together with human intervention and transformation mainly associated with habitation. Sense of place is determined through a site visit.

The overall remoteness of the area, the denuded landscape and the typical rural one storey, scattered brick houses, juxtaposed with narrow dust roads, open parcels of eroded land and livestock, gives the area its particular character. There is a distinct character change between the sections located closer to larger village settlements and main roads such as the R37 and D4190.

The most significant human made features includes the various chrome and platinum mines with associated waste rock dumps, slimes dams and infrastructure located north of the proposed pipeline servitude. Other main features include the striking Leolo Mountain Range, lying east of the alignment. The several nature and game reserves (located within the Wolkberg Wilderness Area) are situated approximately 7 km north of phase 2F. The sense of place for the section located at the foothills of the Leolo Mountains is provided by the topography, interesting rock formations, mining activities (which have caused visual scarring) in the distance and sparsely scattered settlements and gravel roads. All these features combined gives this area its distinct natural and rural character.

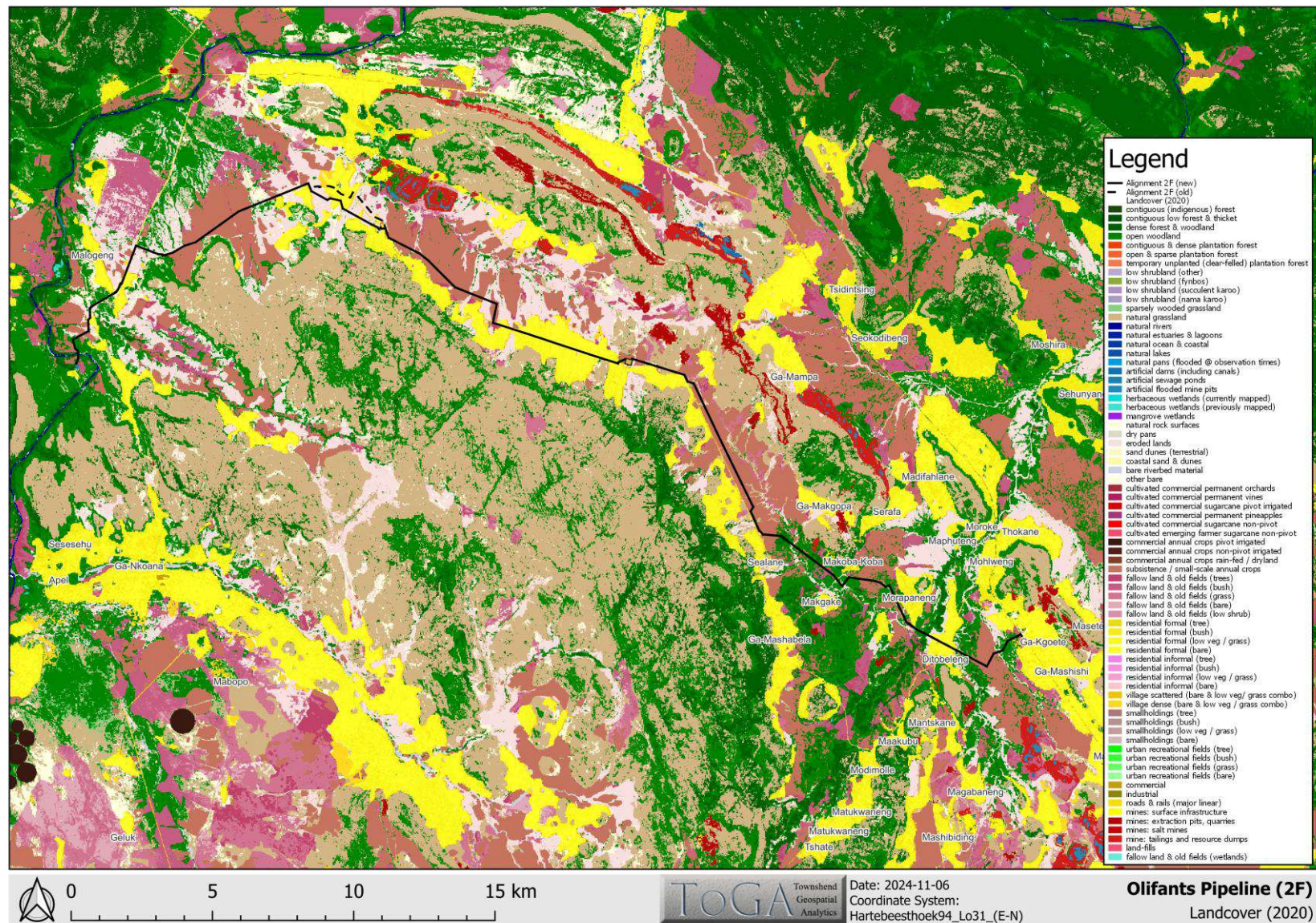


Figure 7-79: Landcover Map (Create Landscape, 2024).



Figure 7-80: Areas of increased and decreased visual sensitivity (Create Landscape, 2024).

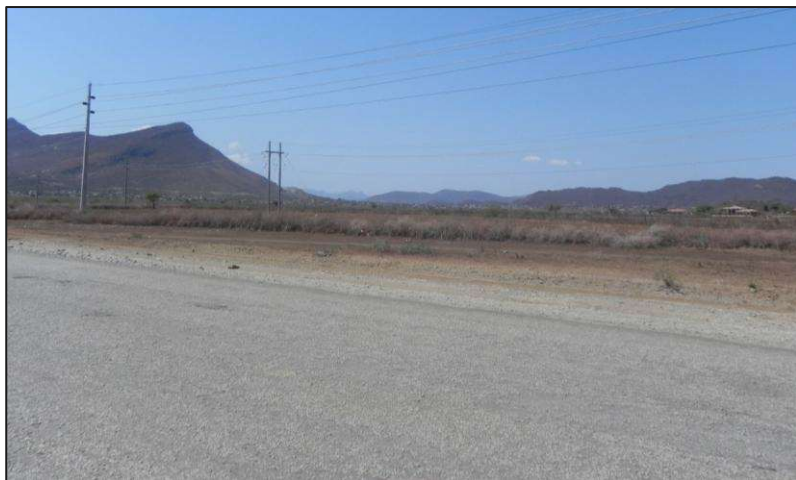


Figure 7-81: Typical topographical features along the Twickenham Mine access road.



Figure 7-82: Scour boxes next to the R37, at the eastern section of the alignment.

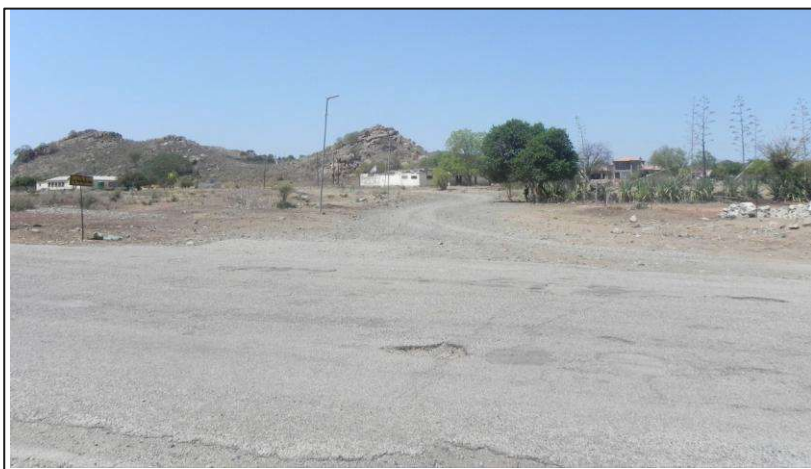


Figure 7-83: Typical houses and rocky outcrops next to the Twickenham Mine access road at the southern section of the alignment.

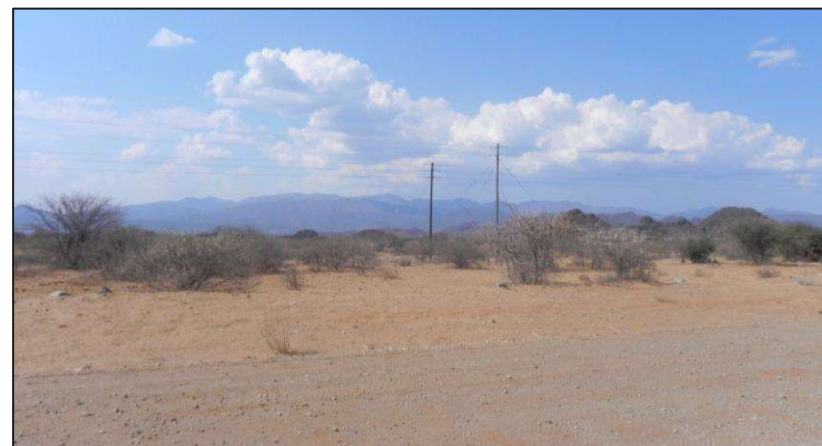


Figure 7-84: Mixed savanna and bushveld vegetation with an absence of understorey vegetation.



Figure 7-85: Village settlement on the D4180, along the Leolo Mountains.



Figure 7-86: Informal structure opposite the pipeline servitude, along the D4180.



Figure 7-87: Typical view along the D4180.



Figure 7-88: Along the D4190, with Bokoni platinum mine infrastructure in the background.



Figure 7-89: Eskom Middelpunt substation located close to the settlement of Zeekoegat.



Figure 7-90: View along the D4190.

7.11.2 VISUAL BASELINE

Table 7-55: Summary of the visual baseline.

Visual receptors	
Receptors for visual impacts are potential viewers of the proposed development and receptor sensitivity refers to the degree that a development affects people. This depends on the number of people viewing the project and their perceptions of the study area. Perception of an object is linked to the purpose for which a viewer is present in the study area (i.e. the reason for their visit). The sensitivity of a particular individual to the visual impact of a proposed development may, therefore, also vary over time as they experience different features and land uses in the area. The sensitivity of viewers is determined by the number of viewers and by how likely they are to be impacted upon. It is also dependent on their perception of the area and their ability to adapt to changes in their environment and can include how frequently they are exposed to the view. A visual receptor's sensitivity is based upon the viewer's: • Familiarity with the actual scene; • Circumstances that bring them into contact with that view; and • Nature of the view (full or glimpsed, near or distant). Receptor sensitivity is therefore expressed as follows: • High sensitivity – e.g. nature reserves, coastal areas and scenic routes or trails; • Moderate sensitivity – e.g. residential areas, agricultural areas, sporting / recreational areas or places of work; and • Low sensitivity – e.g. industrial, mining or degraded areas. The criteria used to define receptor sensitivity are summarised in Table 7-56 below.	
Table 7-56: Receptor perception	
Receptor perception	Criteria
High	People attach a high value to aesthetics, such as in or around a game reserve, coastal areas, scenic routes or conservation areas, and the project is perceived to significantly impact on this value of the landscape
Moderate	People attach a moderate value to aesthetics, such as neighbourhoods and smaller towns, where natural character is still plentiful and in close range of residency.
Low	People attach a low value to aesthetics, when compared to employment opportunities. Environment has already been transformed.
For access roads and where the servitude pipeline deviates, the main views will be from people traveling along the D4197, D4180, D4185 and the D4190, it is highly unlikely that tourists would be traveling on these roads they are mainly used by local residents and the occasional mine or utility infrastructure employee. Due to the visually minimal invasive proposed infrastructure, the possible positive perception for local job opportunities and the already transformed environment, the overall receptor sensitivity will be low for these transient receptors. Stationary receptors who reside directly next to an access road or a section where the proposed pipeline servitude deviates are most likely considered to have moderate sensitivity as the natural character is still plentiful and in close range of residency, this is especially true for the section along the D4180 which runs along the Leolo Mountains.	

Visual exposure
Visual exposure refers to the geographic area from which the proposed project will be visible and is defined by the degree of visibility of a proposed project from various receptor sites. According to Hull and Bishop (1998), the visual exposure of the proposed project is based on the distance from the proposed source of impact and usually (depending on the type of infrastructure) fades out beyond 7 km (in this context the estimated visual exposure will not be more than 1 km). The visibility of an object decreases exponentially over distance and accordingly visual impact will diminish as the viewer moves away from the object being viewed. It is also important to note that the actual zone of visual influence (ZVI) of the proposed project may be smaller than indicated because of screening by existing vegetation and infrastructure. The influence of diminishing visual exposure over distance is shown below in Figure 7-91Error! Reference source not found..

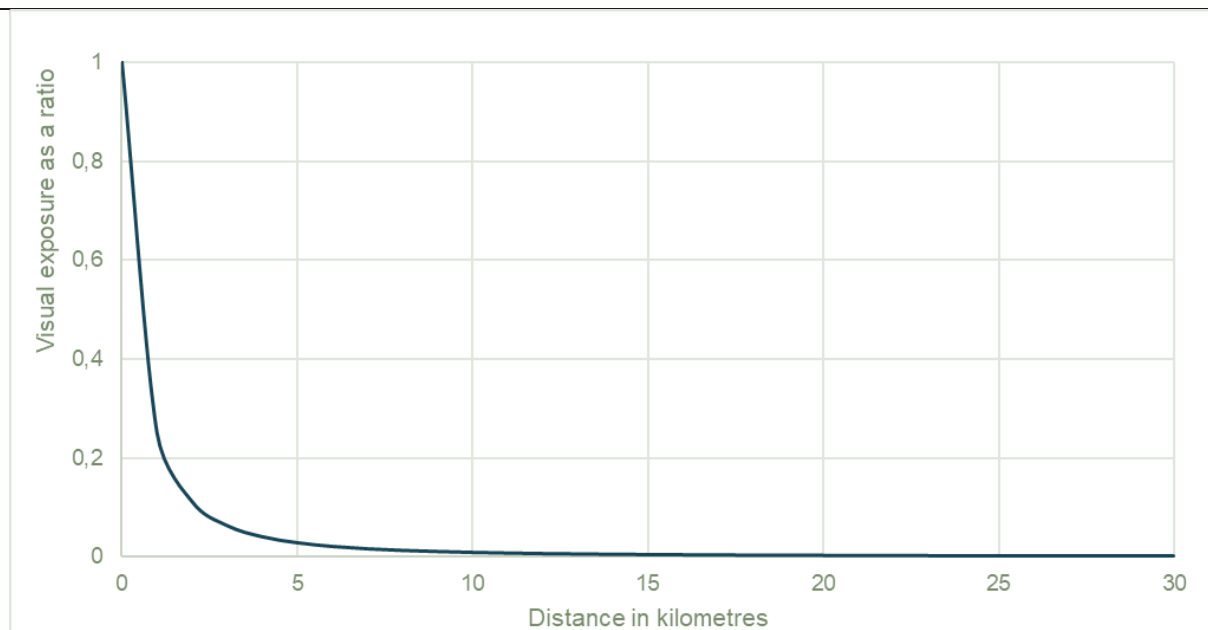


Figure 7-91: Visual exposure (Hull and Bishop, 1988).

It is highly likely that visual exposure (and therefore visibility) will only be experienced during the construction phase of the project due to the larger concentration of activity and construction machinery/vehicles.

Table 7-57: Key observation points.

Key observation points					
This table indicates the Key Observation Points (KOPs) identified during the site visit (Figure 7-92 - Figure 7-101). The viewpoints were not randomly selected but were chosen because they are likely to best represent the visibility (or the lack thereof) of the infrastructure to receptors.					
KOP	Particular infrastructure	Location	Visibility	Receptor sensitivity	Transient or Stationary
1	Access road (existing road)	24°26'38.22"S 30° 3'45.63"E On the D4185	Full	Low	Transient
2	Realignment of pipeline servitude Access road (existing gravel road)	24°26'13.23"S 30° 2'55.80"E Close to Twickenham Mine (mine access road)	Full	Low	Transient
3	Access road (new)	24°24'19.11"S 29°59'47.39"E From the D4180	Full	Low	Transient
4	Access road (existing gravel road)	24°21'34.63"S 29°58'18.88"E From the D4180	Full	Moderate - Low	Stationary and Transient
5	Access road (existing gravel road)	24°20'29.94"S 29°54'41.24"E From the D4180	Full	Moderate Low	Stationary and Transient
6	Realignment of pipeline servitude Access road (existing gravel road)	24°18'35.21"S 29°51'59.14"E From the D4180	Full	Moderate Low	Stationary and Transient
7	Realignment of pipeline servitude	24°17'59.22"S 29°51'12.16"E	Full	Moderate Low	Stationary and Transient

	Access road (existing gravel road)	Within the settlement of Zeekoegat			
8	Access road (new road)	24°18'43.41"S 29°48'17.14"E On the D4197	Full	Low	Transient
9	Access road (existing gravel road)	24°19'46.75"S 29°46'27.89"E On the D4190	Full	Low	Transient
10	Access road (existing gravel road)	24°20'13.06"S 29°45'57.80"E On the D4190	Full	Moderate Low	Transient and Stationary



Figure 7-92: KOP 1



Figure 7-93: KOP 2



Figure 7-94: KOP 3

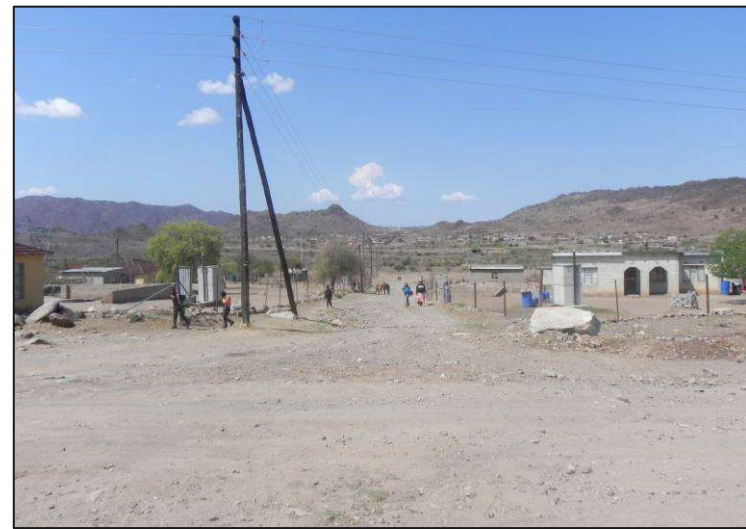


Figure 7-95: KOP 4



Figure 7-96: KOP 5



Figure 7-97: KOP 6



Figure 7-98: KOP 7



Figure 7-99: KOP 8



Figure 7-100: KOP 9



Figure 7-101: KOP 10

7.11.3 IMPACT ASSESSMENT

After conducting the site visit the specialist confirmed that there will be no additional or an increase in landscape and visual impacts for:

- The proposed realignment of sections of the pipeline servitude; and
- The use of existing access roads for phase 2F (best practice guidelines are however given under Section 1 of the LVIA report.

7.11.3.1 Landscape Impacts

Landscape impacts relate to physical changes to the landscape resulting from the proposed development, that is changes to the landscape character and to the landscape as a resource.

7.11.3.1.1 Impact on Landscape Character and Sense of Place

This impact is a change in the landscape character and sense of place of the study area through the addition of industrial-type infrastructure. The proposed development will add to the light industrial components in the landscape, resulting in negative changes to the landscape character and sense of place.

Table 7-58: Summarised impacts: Landscape character and sense of place.

Infrastructure	Impact significance: Construction phase		Impact significance: Operational phase	
	Before mitigation	After mitigation	Before mitigation	After mitigation
SECTION WEST OF THE D4197 AND SECTION EAST OF THE D4182: Widening and construction of new access roads.	Very low	Very low	N/A	N/A
CENTRAL SECTION ALONG THE LEOLO MOUNTAIN RANGE: Widening and construction of new access roads.	Low	Very low	N/A	N/A

7.11.3.1.2 Visual Intrusion and VAC

The level of compatibility and the ability of the landscape to visually absorb the proposed infrastructure, including contrasts in form, line, colour, and texture resulting from vegetation clearing.

Table 7-59: Summarised impacts: Visual intrusion and VAC.

Infrastructure	Impact significance: Construction phase		Impact significance: Operational phase	
	Before mitigation	After mitigation	Before mitigation	After mitigation
SECTION WEST OF THE D4197 AND SECTION EAST OF THE D4182: Widening and construction of new access roads.	Very low	Very low	N/A	N/A
CENTRAL SECTION ALONG THE LEOLO MOUNTAIN RANGE: Widening and construction of new access roads.	Low	Very low	N/A	N/A

7.11.3.2 Visual Impacts

Visual impacts relate to the recording of existing views and the determination of potential impacts as perceived by those living, working, and visiting the area. Infrastructure within visually significant locations will detract from the existing cultural landscape and interfere with the viewsheds of receptors, including road users on main and local gravel roads as well as village settlements in proximity to the proposed

infrastructure. The sections below present the results of the findings for each potential visual impact identified. Landscape scarring from exposed and cleared areas during the construction phase of the project will contribute to visual impacts in localised areas.

7.11.3.2.1 Impact on Visual Exposure and Visibility

The visibility and presence of a cleared servitude and associated infrastructure.

Table 7-60: Summarised impacts: Visual exposure and visibility.

Infrastructure	Impact significance: Construction phase		Impact significance: Operational phase	
	Before mitigation	After mitigation	Before mitigation	After mitigation
SECTION WEST OF THE D4197 AND SECTION EAST OF THE D4182: Widening and construction of new access roads.	Very low	Very low	N/A	N/A
CENTRAL SECTION ALONG THE LEOLO MOUNTAIN RANGE: Widening and construction of new access roads.	Very low	Very low	N/A	N/A

7.11.4 MITIGATION MEASURE AND RECOMMENDATIONS

Few landscape and visual mitigation measures are feasible with infrastructure with such a geographical spread. It is usually impossible to apply mitigation measures entirely satisfactorily to a point where the significance of the visual impact is greatly reduced. The following recommended mitigation measures are therefore primarily intended to minimise the intensity of the landscape and visual impacts but will in some of the cases not necessarily lower the overall significance.

7.11.4.1 Planning and Construction Phase

The most significant landscape and visual impacts will result during the construction phase and is likely to be from erosion and visual scarring of the landscape from clearing of areas for access roads and work areas. Where access roads will not be used on a permanent basis clean-up from site and rehabilitation monitoring is required to ensure that the mitigation measures are implemented to an acceptable level in order that long term rehabilitation is successful.

There is thus a need to carefully monitor the progress of the physical aspects of rehabilitation (soil stripping, spoil handling, landform development and soil replacement) during the construction and defects liability phases, and the progress of re-establishment of the desired final land use (i.e. to a state where the land use is as close to the pre-construction environment as possible). Implementing rehabilitation in a phased manner simultaneously with the progression of construction for those works areas and applicable access roads that are no longer required will provide a longer lead time for monitoring of rehabilitation before the defects liability period is completed.

7.11.4.1.1 New/Widening of Access Roads

a. Natural form and shape

- New access roads should avoid straight edges and corridors, and rather complement / reflect the physical shape of the landscape through which they pass; and
- Any spoil remaining from the construction of the access roads, as well as the fill areas below the constructed road should be suitable shaped to reflect the natural terrain/contours and tie into/ blend with the surrounding landscape.

b. Minimising the risk of erosion

- Avoid cutting across and down steep slopes;
- Develop a method statement for post construction rehabilitation that includes aspects such as:
 - Land restoration;
 - Topsoil storage and replacement;
 - Erosion control through feasible sediment and erosion control devices;
 - Alien plant control; and reseeding or revegetation (if applicable) as well as post construction monitoring of erosion and rehabilitation; and
 - The use of indigenous species for restoration.
- The use of heavy machinery on areas that are outside of the access road area must be avoided to protect soils from erosion and compaction;
- Reduce slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and
- Use drainage control measures and culverts to manage the natural flow of surface runoff.

c. Routing

- Delineate routes prior to clearing tracks to minimise disturbance footprints and to ensure correct tracks followed by contractors; and
- Route access roads around larger vegetation patches, especially where it is located close to a village settlement.

7.11.4.1.2 All Work Areas

a. Protection of natural features

- The contractor shall not deface, paint, damage or mark any natural feature (e.g., rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand with the Engineer/ECO. Any features affected by the contractor in contravention to the above shall be rehabilitated/restored to the satisfaction of the Engineer /ECO).
- Develop a site layout and clearance plan that indicates the footprint of site clearance including topsoil stockpile zones, areas for vehicular access, parking and turning zones for construction equipment in order to minimise multiple tracks and areas of disturbance. Access to areas outside of the demarcated areas should be treated as no-go areas;
- Demarcate works areas by means of rocks and/or use of stakes and construction tape; and
- All existing large trees which fall out of the works area must be retained, these will assist in softening forms and obscuring views.

b. Protection of topsoil

- Retain and reuse soils for reinstatement and rehabilitation of disturbed areas, topsoil must be separated from subsoil during excavation and replaced as the top soil layer upon backfilling or reused elsewhere for rehabilitation.
- Monitoring of the effectiveness of rehabilitation will be undertaken throughout construction as phased rehabilitation is implemented in accordance with the proposed Method Statement and/or Rehabilitation Plan developed by the contractor and approved by the ECO/ Engineer. Aspects that need to be monitored and corrective action taken include:
 - Erosion
 - Surface water drainage
 - Vegetation basal cover
 - Vegetation species diversity
 - Presence and abundance of invasive plant species
- To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted to 2 m maximum; and
- Locate all topsoil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation. All stockpiles should be clearly demarcated and protected.

c. Housekeeping

- Active work areas should be well maintained and clean, they must be free of litter and other wastes; and
- Temporary construction signs and barricading must be removed as soon as the particular activity or set of activities are complete and in accordance with health and safety requirements.

7.11.4.2 Operational Phase

Mitigation for operational impacts is ensuring long-term erosion risks from construction areas, especially along steeper topographical areas. Additional measures such as low stone walls or gabions may need to be implemented in order to reduce these risks.

7.11.4.2.1 Ongoing Rehabilitation

- All disturbed areas need to be rehabilitated as soon as possible after construction;
- Additional long term mitigation measures of the pipeline servitude include the reinstatement of the of the backfilled pipeline trenched to its original soil condition, with shaping and re vegetation of the topsoil; and
- The pipeline servitude must be periodically monitored in order to determine if the reinstatement of the rehabilitated areas is effective. Problem areas must be addressed, and proper maintenance should be undertaken on an on-going basis.

7.11.5 SPECIALIST CONCLUSION

The change in the landscape character of the study area is mostly a result of the removal of sparsely located existing natural vegetation in an area already undergoing and showing the impacts of desertification. A variety of shapes, lines, textures, and patterns are visible in the landscape, this is mostly as a result of the variety of land uses such as mining infrastructure, residential infrastructure, subsistence farming, open degraded areas and other typical urban infrastructure (such as overhead transmission lines and substations) which increases the overall VAC and reduces the proposed infrastructure's visual intrusion upon the landscape.

During the site visit, whilst driving around local gravel roads, it was noticed that the alignment can roughly be divided into areas of decreased landscape and visual sensitivity such as the sections west of the D4197 and the section east of the D4182. The section of higher landscape and visual sensitivity run along the villages located along the foothills of the Leolo Mountains. Looking west the latter area have striking views towards this mountainous terrain which include woody vegetation and remarkable rock formations, whilst standing in stark contrast to mining activities which are (in some localised areas) visible towards the north east in the area of Maroteng. Areas which have lower scenic quality are characterised by illegal dumping activities, eroded stretches of land, denser housing typology and large-scale transmission line and mining infrastructure within close range of settlements.

There are varying degrees of VAC (low – moderate) and visual intrusion (low – moderate) depending on the landscape's scenic quality, the proximity to industrial type infrastructure, the height and density of the natural vegetation and overall built typology.

During construction the landscape and visual impacts remains very low - low as the overall duration is expected to be limited, however the intensity of the anticipated landscape and visual impacts is expected to be highest during the peak construction phase of the project when the proposed activity will be more noticeable with typically having highly visible construction machinery and an increase in vehicular movement.

Landscape and visual impact are expected to be very low – low. The vegetation cover of the region is the most important element during the construction and operation of the proposed infrastructure and should be regarded as an important component during the mitigation of the proposed infrastructure.

With reference to Oberholzer, B. (2005) minimal landscape and visual impact is expected, after the site visit and specialist assessment the overall combined anticipated landscape and visual impact is also expected to be minimal and from a visual perspective it is not fatally flawed, this is largely as a result of:

- Existing mining and industrial infrastructure within the study area. This includes the RPM Twickenham, Cromex Mining Mecklenburg, Sefateng Chrome Mines, and ARM Bokoni Platinum Mine (Atok). (Earlier unsuccessful mining activities, without any attempt at rehabilitation, resulted in extensive damage to the immediate environment, which is visible as scars on many of the hills and mountains of the region);
- No significant visual envelope due to the nature of the proposed infrastructure (access roads and pipeline servitude with no significant height);
- The low stationary receptor sensitivity;
- The majority of receptors being transient;
- The proposed infrastructure is not a dominant and significant component in the landscape and blends in well with existing urban forms, colours and textures (various gravel roads (formal and informal) traverse the study area);
- The majority of proposed access roads are existing roads;
- Access roads does not affect steeper, visually more sensitive areas of the Leolo Mountain Range, they are situated in the low-lying valley;
- The low visual exposure, even though the natural vegetation provides little screening ability the infrastructure will have no significant height;
- New access roads are proposed in areas which have already been disturbed / cleared or eroded as a result of overgrazing;
- The assumption that some access roads will be temporary and will after rehabilitation blend in with the existing landscape as natural vegetation are sparsely scattered; and
- No additional and increased landscape and visual impact for the realignment of the pipeline and impacts remain as per previous LVIA, (land use, landcover and receptor type remain largely homogenous as proposed deviations are close (maximum of 700 m) to the authorised alignment.

From a visual perspective the proposed project does not heavily impact on landscapes of significant symbolic, aesthetic, cultural and historical value, however every possible effort should be made to make the new sections of access roads and pipeline servitude blend in with the existing environment. Considering this, the implementation of all mitigation guidelines will lower the intensity of the landscape and visual impacts but will in most cases not lower the overall impact significance.

7.12 TRAFFIC IMPACT ASSESSMENT (ZUTARI, 2024)

A TIA was conducted by Zutari. In 2010, Zutari was commissioned to conduct a Baseline Traffic Impact Study for Phase 2 of the project as part of the EIA process. In 2012, Zutari was reappointed to update the study for Phases 2C and 2I, followed by further updates in 2016 for Phases 2B, 2D, 2E, and 2F.

An updated traffic study was required to support this BA process for the pipeline realignment and associated infrastructure.

A site visit was conducted from the 28th of October to the 30th of October 2024, to assess the current conditions of the road network layout and intersection geometry.

7.12.1 KEY INTERSECTIONS

In addition to the proposed construction and operational access points, the key road network affected by Phase 2F transport activities includes the R37, Hackney Road, D4185, D4182, D4180, and D4190. The key intersections listed below were considered in the study area and are illustrated in **Figure 7-102**.

- Intersection 1: R37 / D4185
- Intersection 2: R37 / D4182
- Intersection 3: R37/D4180
- Intersection 4: R37 / D4190



Figure 7-102: Key Intersections.

7.12.2 EXISTING CONDITIONS

7.12.2.1 Affected Road Network

Table 7-61: Affected Road Network.

Existing Road Conditions
R37



The R37 is a major Class 2 arterial road under SANRAL's jurisdiction, connecting Polokwane to Nelspruit via Burgersfort and Lydenburg. It serves as the backbone of the Dilokong Corridor, supporting economic development and mining activities. Within the study area, it is primarily a single carriageway with bus stops near intersections and a speed limit of 100 km/h, reduced to 60–80 km/h in residential areas and at intersections due to pedestrian and livestock activity. The road experiences high freight traffic from mining operations and local villages, with limited lane expansion projects underway. Minibus taxis and buses are frequently observed, highlighting its importance for both public and commercial transport.

D4185



The D4185 is a paved, Class 4 single carriageway road with one lane in each direction.

Hackney Road



Hackney Road is a paved Class 4 road in a severely deteriorated condition. It consists of two lanes, but extensive wear and damage pose significant challenges to vehicle movement and safety.

D4182



The D4182 is a paved, Class 4 local road under the jurisdiction of the Fetakgomo Local Municipality. It is a single carriageway with one lane in each direction and no shoulders. While the designated speed limit is 50 km/h, actual speeds are often lower due to poor road conditions, including potholes, edge breaks, and roaming livestock.

D4180



The D4180 is a gravel, Class 4 local road under the jurisdiction of the Fetakgomo Local Municipality. It is a single carriageway with one lane in each direction and no shoulders, with a posted speed limit of 50 km/h. Several gravel speed humps serve as traffic calming measures for residents. Despite the lack of designated non-motorised transport (NMT) infrastructure, the road experiences high pedestrian activity, with numerous street vendors present at key intersections and along the approach to the R37.

D4190



The D4190 is a Class 3 paved access road with a single carriageway and one lane in each direction. It serves as a direct link between the Olifants River Pump Station and the R37. Designed for moderate traffic volumes, it has a maximum operating speed of 80 km/h, which is reduced to 60 km/h in residential areas.

Apart from the R37, which is in good condition, the remaining paved and unpaved roads range from fair to very poor condition, highlighting challenges in infrastructure maintenance and accessibility. Many roads are uneven, heavily potholed, and prone to erosion, especially during the rainy season. The absence of proper drainage systems further accelerates their deterioration, making navigation difficult and unsafe, particularly for low-clearance vehicles.

7.12.3 PROPOSED ACCESS ROADS AND ROAD MAINTENANCE CONSIDERATIONS

7.12.3.1 Proposed Access Considerations

The temporary construction access points for Phase 2F are primarily proposed along Class 4 gravel roads. These roads experience little to no vehicular traffic but have notable pedestrian activity, as well as the presence of animal-drawn carts and domesticated animals. Due to the low traffic volumes and slow travel speeds caused by the poor condition of the gravel roads, access spacing is not a concern. However, the presence of pedestrians and animals along these roads is a critical factor that must be considered. To mitigate potential risks, special attention will be given to maintaining safe access and ensuring the protection of pedestrians and animals during construction activities.

For access points located within communities along the D4180 gravel road (Pipeline F1: Access 12-17 and Pipeline F2: Access 1-22), the following mitigation strategies should be implemented:

- **Temporary Warning Signage:** Install clear, visible signs to alert drivers about pedestrians, livestock, and reduced speed limits.
- **Speed Limit Enforcement:** Implement and enforce reduced speed limits, particularly in areas with high pedestrian activity.
- **Community Awareness Campaigns:** Conduct safety awareness initiatives for residents and truck drivers, emphasizing road-sharing with animals and pedestrians.
- **Dust Suppression:** Apply water or other methods to control dust generated by construction vehicles.
- **Road Maintenance:** Ensure regular grading and upkeep of gravel roads to maintain safe driving conditions and minimise hazards.
- **Traffic Monitors:** Deploy road safety personnel or community wardens to oversee adherence to traffic regulations.
- **Incident Reporting System:** Establish a mechanism for the community to report road safety concerns and incidents.

The remaining access points are detailed in the table below.

F1 Pipeline	
Accesses 1 - 5	Access spacing: Access 1 – The proposed access is approximately 70 m from the nearest residential access, which is below the minimum spacing requirement for a Class 3 road in a semi-rural environment. However, given the low operating speeds in this area, a practical and cost-effective mitigation measure would be the construction of a speed hump on the critical approach. The remaining access points are adequately spaced. Sight distance: No permanent obstructions are affecting the sight distance at any of the intersections.
Access 7	Access Spacing: The location of the proposed access is a concern, as it is situated on a curve, which inevitably reduces sight distances. Sight Distance: Poor sight distance was observed for vehicles approaching from the east. Mitigation: To improve safety, an access road should be provided adjacent to the existing road, 100 m south of the proposed access.
Access 8	Access spacing: Adequate spacing is achieved.

	Sight distance: No permanent obstructions are affecting the sight distance at the intersection.
Access 9 - 11	Access spacing: All access spacings are adequate. Sight distance: Access 9 - The proposal involves utilising an informal access route that appears to be used by locals. However, in its current state, sight distance is severely limited for vehicles approaching around the corner. Analysis indicates that clearing vegetation at the intersection would improve visibility, allowing for the minimum required sight distances to be achieved. The remaining access points have adequate sight distance.
F2 Pipeline	
Access 11 - 14	To address the access points located within communities along the D4180 gravel road, the following mitigation strategies should be implemented: ▶ Warning Signage: Install clear, visible signs to alert drivers to pedestrians, livestock, and reduced speed limits. ▶ Speed Limit Enforcement: Implement and enforce reduced speed limits, particularly in areas with high pedestrian activity. ▶ Community Awareness Campaigns: Conduct safety awareness initiatives for residents and truck drivers, emphasizing road-sharing with animals and pedestrians. ▶ Dust Suppression: Apply water or other methods to control dust generated by construction vehicles. ▶ Road Maintenance: Ensure regular grading and upkeep of gravel roads to maintain safe driving conditions and minimise hazards. ▶ Traffic Monitors: Deploy road safety personnel or community wardens to oversee adherence to traffic regulations. ▶ Incident Reporting System: Establish a mechanism for the community to report road safety concerns and incidents.
Access 23 - 24	Access Spacing: Consolidating the access points is recommended, as the spacing between them is less than 100 m. Beyond this, no access spacing issues have been identified. Sight Distance: There are no permanent obstructions affecting sight distance at the proposed access.
Access 25 - 28	Access spacing: Access 25 - The proposed access poses a significant safety concern if intended as a permanent access, as it is located within 50 m of an existing access. Constructing an adjacent access road would be a preferable alternative. Accesses 26 and 27 - These should be consolidated into a single access due to their close proximity and overlap with two existing local accesses.

	Access 28 - This access is adequately spaced relative to existing accesses. Sight Distance: There are no permanent obstructions affecting sight distance at the accesses. At Access 26, temporary obstructions may occur due to motorists parking on the roadside.
Access 29 - 31	Access spacing: Adequate spacing is achieved. Sight distance: No permanent obstructions are affecting the sight distance at the intersection.
Access to Pipeline	 Following correspondence with SANRAL, it was communicated that the proposed access link from the R37 to the pipeline's starting point is not feasible, as it does not meet their established standards and guidelines. SANRAL recommended aligning the access with locations identified in their future planning; however, the relevant plans have not yet been made available. Given this, it is recommended that existing access points, while not optimal, be utilized as an alternative to the initially proposed access. Utilising the local road to the east of the proposed pipeline would present challenges, as a river channel may obstruct operations. As previously discussed, mitigation measures to minimise impact on the community will need to be implemented.

7.12.3.2 Road Maintenance

The D4180 road, particularly around the culverts, presents a critical issue due to its deteriorated condition. The primary causes of this deterioration are poor stormwater management and inadequate maintenance, which not only affect the road's structural integrity but also pose significant challenges to both construction and operational activities. With the increased traffic from construction vehicles, these conditions are likely to worsen, leading to further degradation of the road. The challenges include potential delays, increased costs, and heightened safety risks, particularly for both construction vehicles and local traffic. Additionally, the road's condition impacts local communities, hindering mobility,

creating safety hazards, and possibly leading to economic disruptions due to limited access to essential services or markets.

To address these concerns, it is essential to maintain continuous communication with the RAL to coordinate efforts and explore potential solutions. A clear delineation of responsibilities among RAL and other relevant stakeholders, including contractors and project teams, must be established to define the necessary actions for restoring the road's condition. If no remedial measures are implemented before the scheduled construction date, the road is likely to deteriorate further, exacerbating project complexities and potential delays. Therefore, a structured timeline for addressing these issues must be defined to prevent disruptions. Additionally, temporary measures—such as reinforcing road sections or enhancing stormwater management—may be required to mitigate risks until a permanent solution is implemented.

7.12.4 ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT PLAN

7.12.4.1 Typical Hazards and Environmental Conditions

Table 7-62 details common road hazards and environmental conditions, identified through data collection and site visits, that may pose safety risks and potentially lead to incidents along the routes to be used by development traffic during construction and operation. The risks outlined are applicable to the conditions anticipated across the various routes.

Table 7-62: Typical hazards and Environmental Conditions.

Category	Hazards
Road Conditions	Potholes: Potholes can cause vehicle damage and contribute to poor road conditions, reducing road rideability and capacity.
	Poor road conditions: The routes have unpaved access roads which also creates challenges for drivers if not well maintained.
	Dust: Although the greater portion of the route is paved, dust from the gravel roads will impact both road safety and adjacent communities.
	Dust is also likely to be a concern for road visibility, especially when considering the use of trucks.
	Faded road markings: Some road sections and intersections have faded road markings, which may create confusion and lead to erratic decision-making and thus increase road safety risk.
Human Activity	Protest actions in communities along major roads usually lead to the barricading of roads. This causes traffic jams and increases the journey times. Some protests turn violent and lead to the loss of life and property.
	Several vehicles travel at dangerous speeds along the R37, D4182, D4180, D4185, and D4190: where vehicles are observed to be travelling both above and abnormally below the speed limit. These vehicles cause dangerous conditions for other road users, resulting in unsafe passing manoeuvres done by speeding drivers and drivers trying to pass a slow-moving vehicle.
	Drivers need to be aware of the school crossings along the route, especially during the morning and afternoon peak periods. It is common for children to run across the road, which poses a safety hazard as heavy vehicles pass through communities.
	Since the route passes through communities, it is important to ensure that there are adequate safe pedestrian crossings within populated areas and that adequate signage is provided in areas that have gravel roads. This helps drivers to be aware of pedestrian movements along the roads.
Animal hazards	The route passes through areas that are predominantly rural. Therefore, drivers need to take caution as they travel through communities. It is also important that they are aware of stray animals from the populated areas. Animals such as cattle, sheep, goats, pigs, and stray dogs were a common sight along all of the routes.
Other Hazards	Vehicle Failure: Vehicle failure can lead to delays and congestion due to stationary heavy vehicles blocking the route, particularly on narrower roads.
	Driver Fatigue: poses a significant risk of drowsiness, which can lead to crashes, resulting in injuries, vehicle damage, and loss of goods.
	Floods pose a risk to vehicles and drivers along the route. Heavy flooding may block roads and sweep away vehicles, leading to loss of life or property. Numerous culverts were also observed to be in poor condition on the D4180, indicating that surface runoff is high.
	Hijacking: a serious threat to driver safety and the security of vehicular assets. Financial implications are to be expected if assets are not recovered in their original state.

	Sun Glare: Reduces driver visibility.
	Inadequate lighting may cause low visibility, this may be an issue in the winter months, where peak hour occurs under low light conditions. It is also a safety concern for pedestrians who travel to school and to work in the early mornings.
	Fog/Smog: Reduces visibility on the road and surrounding elements.
	Informal roads and accesses may be a concern as the irregular nature of the layout is not consistent and may cause unexpected conditions for the drivers.

Addressing these hazards requires a multifaceted approach, including regular maintenance and inspections, strict enforcement of traffic regulations, comprehensive driver training, and robust emergency response plans.

Additionally, effective stakeholder engagement and continuous monitoring are essential to adapt to changing conditions and mitigate risks. By understanding and proactively managing these risks, stakeholders can enhance safety, reduce delays, and improve the overall reliability of transport along these critical routes.

7.12.4.2 Environmental Impact Assessment Matrix

Table 7-63: Impacts, significance and Proposed Mitigation Measures

Impact	Description	Mitigation Description	Pre-Mitigation	Post-Mitigation
Speeding	Excessive speeds reduce reaction time and increase the severity of accidents, endangering both drivers and pedestrians.	Implement speed humps, rumble strips, and raised intersections in collaboration with RAL and SANRAL to enhance road safety.	Moderate negative	Moderate positive
Potholes	Damaged road surfaces can cause drivers to lose control, especially at high speeds, and pose risks to pedestrians if vehicles swerve unexpectedly.	Establish a strong working relationship with RAL and SANRAL to ensure road maintenance protocols are followed throughout all phases of the project.	Low negative	Very low
Vehicle Failure	Mechanical issues like brake failure or tire blowouts can result in collisions, threatening nearby road users and pedestrians.	Conduct regular inspections and maintenance of all vehicles. Drivers should report failures immediately, and incidents along the route must be communicated to the relevant road authority.	Moderate negative	Low negative
Driver Fatigue	Drowsy driving leads to slower reaction times and a higher likelihood of accidents, putting all road users at risk.	Enforce regulated work hours, mandatory rest breaks, and task rotations to prevent monotony. Provide training on fatigue signs and encourage drivers to report when they feel tired.	Moderate negative	Low negative
Hijacking	Sudden attacks can cause erratic driving, leading to collisions or harm to pedestrians in the vicinity	Install trackers on construction machinery and encourage private vehicle owners to undertake defensive driving courses.	Moderate negative	Low positive
Driving through urban areas	High traffic density and mixed road usage in urban areas increase the likelihood of conflicts with pedestrians and other road users.	Install adequate road signage to alert drivers to speed reductions, especially in pedestrian zones.	Moderate negative	Low positive
Protest Action	Unpredictable protests on roads can obstruct traffic, leading to accidents or confrontations, endangering drivers and bystanders.	Ensure safety personnel are informed promptly about protest action and coordinate with contractors and employees to manage risks.	Low negative	Moderate negative
Cattle/Stray Animals	Animals crossing roads can cause sudden braking or swerving, increasing the risk of collisions or hitting pedestrians.	Enforce lower vehicle speeds in rural areas with high cattle and stray animal movement. Install signage to alert drivers to potential crossings.	High negative	Moderate negative
School and pedestrian zones	Areas with high pedestrian activity, especially children, are vulnerable to accidents if drivers are inattentive or speeding.	Reduce speed limits during school hours with visible signage and flashing lights. Mark pedestrian crossings clearly, install speed bumps, and station an official to assist children crossing the road.	High negative	Low negative
Pedestrian Crossings and Signage	Poorly marked crossings or inadequate signage can confuse drivers and pedestrians, increasing the risk of accidents.	Improve rural gravel road safety by installing reflective signs, visible road markings, and speed reduction measures near high-traffic pedestrian zones. Conduct public awareness campaigns on road safety.	Very high negative	Moderate positive
Poor Road Conditions	Uneven surfaces, loose gravel, or water accumulation can lead to vehicle instability, creating dangers for everyone on the road.	Regularly grade gravel roads, apply binding agents, and ensure proper drainage to maintain smooth surfaces and minimize hazardous conditions.	Low negative	High positive

Poor Lighting	Insufficient illumination reduces visibility, increasing the likelihood of hitting obstacles, vehicles, or pedestrians.	Install solar-powered lights at intersections and crossings, complemented by reflective markers along road edges to improve nighttime visibility.	Low negative	High positive
Road Geometry and Terrain	Sharp curves, steep inclines, or narrow roads make navigation challenging and increase accident risks, especially for larger vehicles.	Address risks on sharp curves, steep inclines, and narrow roads by installing warning signs and implementing speed reductions.	Low negative	Moderate positive
Dust	Dust clouds impair visibility, making it harder for drivers to see pedestrians or obstacles.	Apply dust suppressants like water or calcium chloride, regularly grade gravel roads, and enforce lower speed limits in dusty areas to minimise airborne dust.	High negative	Low positive
Vegetation	Overgrown plants near roads can block sightlines, hide pedestrians, or encroach on driving paths.	Trim or remove vegetation that blocks sightlines, obstructs pedestrians, or encroaches on roads to enhance visibility and safety.	Moderate negative	Moderate positive
Fog/Smog	Reduced visibility due to fog or pollution hampers a driver's ability to see other vehicles, pedestrians, and road signs.	Install clear, reflective road signs, improve street lighting, and enforce lower speed limits in foggy or dim conditions. Encourage drivers to use fog lights and workers to wear high-visibility clothing.	Low negative	Moderate positive
Flooding	Waterlogged roads can obscure potholes or debris, cause vehicles to hydroplane, and limit safe pedestrian access.	In case of flooding, drivers must stop the vehicle, report to the safety operator, and avoid using new routes unless directed by a traffic marshal or police officer.	High negative	Low positive
Infrastructure Failure	The D4180 exhibited severe road and culvert deterioration due to poor stormwater management and maintenance.	Prioritize repairs and upgrades for dilapidated culverts and gravel roads through regular inspections, proper drainage systems, and timely interventions to prevent erosion and instability.	High negative	Low negative
Sun Glare	Bright sunlight at certain times of the day can temporarily blind drivers, increasing the risk of accidents with other vehicles or pedestrians.	If visibility is critically low, drivers must reduce speed and stop in a safe location, reporting the situation to the safety operator.	Very low	Low negative

7.12.5 SPECIALIST RECOMMENDATIONS AND CONCLUSION

The following points summarise the key findings and recommendations from this traffic study:

- ▶ **Capacity Analysis:** The capacity analysis indicated that all key intersections in the study area are generally operating at an acceptable Level of Service (LOS) and well below capacity. Background traffic growth is expected to have a negligible impact, as intersections are projected to continue operating at acceptable LOS with minimal additional delays until 2029.
- ▶ **Impact of Phase 2F:** Phase 2F is expected to have a negligible impact on the surrounding road network. Therefore, no road upgrades are proposed to mitigate project-related impacts.
- ▶ **Road Inspections:** To maintain high road standards during both the construction and operational phases, the following aspects of the utilized routes should be reported to RAL:
 - Potholes
 - Edge break
 - Rutting
 - Pavement deformation
 - Loose aggregate
 - Line marking
 - Sign condition

An assessment of dust generation should be conducted regularly.

- ▶ **Contractor Requirements:** Contractors should be required to develop and implement specific traffic management measures in accordance with the traffic impacts caused by their work. These measures should align with broader traffic management strategies. Key requirements include:
 - Establishing appropriate speed limits and ensuring vehicle operators are informed of them.
 - Implementing an advanced live warning system to notify all project stakeholders of changing traffic conditions that may have an impact.
 - Applying mitigation measures for all activities that may affect public roads.
 - Planning start and finish times to minimize impacts on school children and pedestrians.
- ▶ **Code of Conduct for Vehicle Drivers:** A Code of Conduct for Vehicle Drivers should be implemented for all employees, contractors, and inspectors involved in the pipeline's construction and operation. This should apply to all drivers of light and heavy vehicles accessing the pipeline during both the construction and operational phases. The Code of Conduct for Vehicle Drivers should be incorporated as a transport contractual requirement for all parties involved in these phases. The provisions of the Code that drivers must adhere to include:
 - Complying with all laws, rules, and regulations governing vehicle use on public and private roads.
 - Respecting the rights of all road users, including pedestrians and cyclists.
 - Ensuring that vehicles are roadworthy, in good mechanical condition, and clean.
 - Following designated access routes.
 - Avoiding restricted access routes unless explicitly permitted.
 - Avoiding travel during school opening and closing times where possible, particularly for oversized and over-mass heavy vehicles.
 - Not traveling in convoy unless under approved escort.
 - Adhering to specified procedures for using causeways when water is present.
 - Minimising noise and dust emissions, primarily by reducing the use of unsealed roads, or by deploying water carts to suppress dust.

All employees and contractors should be informed of the provisions of the Code of Conduct for Vehicle Drivers and receive relevant training, including information on school opening and closing times, as appropriate.

- ▶ Employees and construction contractors should implement appropriate training and site induction programs relevant to the mitigation actions outlined in Chapter 7. All site attendees, during both

the construction and operational phases, are required to complete site induction and safety briefings, which should cover the following:

- Emergency response procedures
 - Incident and accident management and reporting
 - Code of Conduct for Vehicle Drivers
 - General traffic management arrangements, including site entry and exit procedures
- ▶ The procedures for reporting emergencies, as well as incident and accident management protocols, should be clearly outlined in the site induction. All records must be properly maintained in accordance with respective record management plans. Additionally, all construction and operational employees and contractors should receive inductions and training that cover:
- Traffic restrictions applicable to public roads (e.g., designated access points)
 - Construction and operational hours
 - Site access locations, including restricted areas for certain vehicle types
 - Awareness of the Traffic Management Plan (TMP) and relevant requirements for subcontractors
 - Procedures for reporting incidents, route deficiencies, and hazards
 - Compliance with the **Code of Conduct for Vehicle Drivers**
 - Designated access routes
 - Avoidance of certain roads, such as residential areas or roads in severe disrepair
 - Flood access procedures
- ▶ All contractors on-site shall be responsible for maintaining records of their employees and subcontractors to ensure they hold the appropriate licenses for the vehicles they operate.

7.13 NOISE IMPACT SCREENING (ENVIRO ACOUSTIC RESEARCH, 2024)

A screening noise report was compiled by Enviro Acoustic Research (EARES) for the entire Phase 2F alignment. Since the online Department of Forestry, Fisheries and the Environment (DFFE) screening tool report does not identify noise as an environmental theme requiring further investigation for a pipeline development, this screening report considered the requirements of SANS 10328:2008 to assess whether noise is a potential issue of concern.

The SANS 10328:2008 guideline does allow for the assessment of noise impacts on the environment from a proposed activity using an administrative screening questionnaire. If the outcome of all the questions is negative, the planned development or activity is not likely to present a noise impact of significance, and a Screening report is deemed sufficient.

7.13.1 POTENTIAL NOISE-GENERATING ACTIVITIES

Noises associated with a pipeline development project are generally limited to the construction phase, with the most common noise-generating activities including:

1. Site Preparation and Clearing

- **Hauling of equipment:** The delivery of construction equipment to the project area using flatbed trucks or trailers.
- **Construction of temporary access roads:** Bulldozers, graders, and other vehicles may be used to build access roads for construction equipment (or upgrade existing roads).
- **Construction camps and laydown areas:** The use of bulldozers, graders and rollers to develop locations to develop the construction camps and material laydown areas.
- **Clearing vegetation:** Use of chainsaws, bulldozers, and other heavy machinery at various locations.
- **Grading:** Bulldozers and graders used for levelling the ground.

2. Trenching and Excavation

- **Trenching operations:** Excavators, trenchers, and backhoes creating the trench for the pipeline.
- **Rock breaking:** Depending on the underlying ground conditions, it may be required to break large boulders using rock breaking equipment.
- **Rock blasting:** In areas where the pipeline route encounters hard rock, blasting may be required, which can produce significant noise levels.

3. Transportation and Delivery of Materials

- **Hauling of construction materials:** Trucks, dump trucks, and other heavy vehicles transporting materials like pipe sections, gravel to the site, with trucks or tractor/trailers removing vegetation, rocks and excess material from the site.
- **Loading and unloading:** Cranes and forklifts used to load and unload materials, such as large pipe segments.

4. Pipe Laying

- **Pipe handling:** Moving and positioning large pipe segments using cranes or other lifting devices for joining/fitting.
- **Pipe fitting and joining:** The process of welding pipe segments together and cutting pipes can generate substantial noise from machinery and the welding equipment itself.
- **Hydrostatic testing:** High-pressure water testing of the pipeline to check for leaks, which may involve pumps and compressors.

5. Trenching and Backfilling

- **Backfilling the trench:** After the pipeline is laid, earth-moving equipment such as bulldozers, backhoes and compactors are used to backfill the trench and compact the ground surface.

6. Testing and Commissioning

- **Pipeline pressure testing:** High-pressure pumps used during testing of the pipeline.
- **Flushing and purging:** If required, high-pressure air or other materials may be used for flushing or purging the pipeline.

7. Post-Construction Activities

- **Rehabilitation of disturbed areas:** Use of vehicles, machinery, and equipment for post-construction inspections, repairs, and maintenance.
- **Dismantling temporary facilities:** The removal of temporary construction equipment and facilities may involve activities such as dismantling structures and hauling away debris.

The operation of pipelines, particularly those with pump stations, can generate ongoing noise from compressors, pumps, and valves, depending on the pipeline's design and the location of pumpstations in relation to the closest Noise-Sensitive Receptors (NSR). Noise from the pump stations were however anticipated and addressed in the Design Criteria Memorandum (Report No: 01-1-05-05, Dated July 2010).

Noise design requirements and criteria were covered in **section 4.2.2** of the Design Criteria Memorandum, and included:

- Pump stations should not be sited closer than 300 metres (m) to houses or within 200 m of schools.
- As the internal noise levels in the pump stations are high, the buildings housing the pumps should be adequately designed to limit the transmission of the pump generated noise and other internal equipment noise to the outside of the building. Insertion losses for the building of at least 30dBA must be achieved.
- Where there are external sources of noise such as ventilation intake fans, appropriate measures will need to be taken. Typical measures such as the following should be taken:
 - Fan intakes to be low mounted (preferably ground mounted).
 - Fans to have a low sound power output.

- Fan intakes to be effectively screened off by an appropriately designed noise attenuation barrier (wall) with an insertion loss capability of at least 20dBA.

Compliance with these criteria would minimise potential noise risks associated with such operational noises and this screening report will not consider potential operational noises.

7.13.2 CONCEPTUAL NOISE LEVELS

Pipeline development activities does generate significant noise, which can be generalised as follows:

- Noise levels will be very high at distances within 50 m from active construction activities. Noise levels will exceed 65 dBA at times, and community members directly influenced by the pipeline development (receptors that must be relocated, or receptors indirectly influenced) would have a negative sentiment which may manifest as noise complaints;
- Noise levels will be high to very high at distances 50 – 100 m from active construction activities. Noise levels will mostly range between 60 – 65 dBA, and community members indirectly influenced by the pipeline development (neighbours had to relocate, dust, influx of workers from different areas) could have a negative sentiment which may manifest as noise complaints;
- Noise levels will be high to very high at distances 100 – 200 m from active construction activities. Noise levels will mostly range between 50 – 60 dBA, and community members indirectly influenced by the pipeline development (neighbours had to relocate, dust, influx of workers from different areas) could have a negative sentiment which may manifest as noise complaints;
- Noise levels will be low to high at distances further than 200 m from active construction activities, with noise levels generally being less than 50 dBA. Community members indirectly influenced by the pipeline development (neighbours had to relocate, dust, influx of workers from different areas) could have a negative sentiment.

7.13.3 POTENTIAL SENSITIVE AREAS

There are a number of low-density residential areas scattered through the project area that could be considered noise-sensitive. These areas are illustrated on **Figure 7-103**.



Figure 7-103: Phase 2F project and closest noise-sensitive areas (EARES, 2024).

7.13.4 POTENTIAL SIGNIFICANCE OF THE NOISE IMPACT

Noises associated with the development of the pipeline project will mainly originate from construction activities associated with the installation of the required infrastructure. Limited noises may be associated with pumpstations, but, the management of noise from pump stations are adequately covered in report “*Design Criteria Memorandum*”.

Noises associated with the construction phases will generally be limited to approximately 200 m from the construction activities and noises will be insignificant further than 200 m from such activities. The noises will however be very temporary and limited to the daytime period.

While noise levels will be high to very high within 200 m from such activities, the temporary nature of the daytime activities means that the significance of the noise impact is likely to be low to very low. Some receptors may be annoyed with the pipeline development process, though this might be due to a number of reasons, which could also include noise.

It is recommended that the project proponent consider a number of general management measures to ensure that noise annoyance with the project is minimised, which could include:

- If possible, construction camps should not be located within 200 m from communities (*that will reduce noise levels and reduce potential annoyance with the activities [the probability of a noise impact occurring]*);
- When selecting the equipment to be used for this project, the project proponent should consider the sound power levels and select the quietest equipment for the purpose (*that will reduce noise levels and reduce potential annoyance with the activities [the probability of a noise impact occurring]*);
- If possible, main construction activities (site clearing, excavation, pipelaying and trench backfilling) should be separated in time (different day) and space (at least 200 m from different activities) to minimise cumulative effects (*will reduce noise levels and reduce potential annoyance with the activities [the probability of a noise impact occurring]*);
- Receptors in the area should be notified when construction activities will take place, including details of the activities as well as the projected duration of the activities (*that will reduce the potential annoyance with the activities [the probability of a noise impact occurring]*);
- No construction activities should be permitted closer on Sundays (*will reduce noise levels and reduce potential annoyance with the activities [the probability of a noise impact occurring]*);
- No construction activities should take place during the night-time period in the communities (*will reduce potential annoyance with the project*);
- All employees and contractors should receive Health and Safety induction that includes an environmental awareness component about noise. This is to allow employees and contractors to the potential noise risks that activities pose to the surrounding environment (*will reduce potential annoyance with the project*);
- The project proponent must investigate any reasonable and valid noise complaint if registered by a receptor staying within 200 m from location where construction activities are taking place. If noise complaints are registered, the project proponent should investigate the complaint and could implement routine noise monitoring (*will reduce potential annoyance with the project*);
- The project proponent must ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures if available. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised (*will reduce potential annoyance with the project*); and
- The project proponent should investigate the use of white-noise alarms instead of tonal reverse alarms on heavy vehicles operating on roads and on the project (*will reduce potential annoyance with the project*).

7.13.5 SPECIALIST CONCLUSIONS AND RECOMMENDATIONS

The Screening Noise Report assessed the potential acoustical implications associated with the development of the Phase 2F pipeline through several rural communities in Limpopo.

Noises associated with the construction phases will generally be limited to approximately 200 m from the construction activities, and noises will be insignificant further than 200 m from such activities. The noises will, however, be very temporary and limited to the daytime period.

While noise levels will be high to very high within 200 m from such activities, the temporary nature of the daytime activities means that the significance of the noise impact is likely to be low to very low. Some receptors may be annoyed with the pipeline development process, though this might be due to several reasons, which could also include noise.

For the Phase 2F pipeline alignment project, it is the opinion of the author that noise will not be a fatal flaw, and further Scoping or other acoustical studies would not be required. It is therefore recommended that the Phase 2F pipeline alignment project be authorised (in terms of acoustics).

7.14 HYDROLOGY IMPACT ASSESSMENT (ZUTARI, 2024)

The hydrology impact assessment report was compiled by Zutari. An important observation during the site visit was the high erosion potential in the area.

7.14.1 INTERSECTIONS WITH THE FLOODLINE

The Phase 2F pipeline realignments intersect with the 1-in-100-year floodline at various sections (refer to the sensitivity maps in Section 7.15 below).

7.14.2 ACCESS ROADS

7.14.2.1 Classifications and Mitigations

Table 7-64 provides detailed classification per access road, including appropriate mitigation measures. Section **Error! Reference source not found.** provides additional information on certain new access roads for which additional context was deemed necessary.

Table 7-64: Detailed classification of access roads.

Access Number	Status	Road Type	Proposed Mitigation Measures
2F1-01	Existing	Paved Road	—
2F1-02	Existing	Unpaved Road	Erosion and siltation management.
2F1-03	Existing	Unpaved Road	—
2F1-04	Existing	Unpaved Road	—
2F1-05	Existing	Unpaved Road	—
2F1-07	Existing	Paved Road	—
2F1-08	Existing	Paved Road	—
2F1-11	Existing	Gravel Road	—
2F1-14	Existing	Unpaved Road	—
2F1-15	Existing	Unpaved Road	—
2F1-17	New	New Road	Erosion and siltation management.
2F2-01	Existing	Unpaved Road	—
2F2-02	Existing	Unpaved Road	—
2F2-03	Existing	Unpaved Road	—
2F2-04	Existing	Unpaved Road	—
2F2-05	Existing	Unpaved Road	—

2F2-06	Existing	Unpaved Road	—
2F2-07	Existing	Unpaved Road	—
2F2-08	Existing	Unpaved Road	—
2F2-09	Existing	Unpaved Road	—
2F2-13	Existing	Unpaved Road	—
2F2-14	Existing	Unpaved Road	—
2F2-15	Existing	Unpaved Road	—
2F2-16	Existing	Unpaved Road	—
2F2-17	Existing	Unpaved Road	—
2F2-18	Existing	Unpaved Road	—
2F2-20	Existing	Unpaved Road	—
2F2-21	New	Informal Tyre Tracks	Erosion and siltation management.
2F2-22	New	Informal Tyre Tracks	Erosion and siltation management.
2F2-23	Existing	Unpaved Road	—
2F2-24	Existing	Unpaved Road	—
2F2-25	Existing	Unpaved Road	—
2F2-25a	Existing	Unpaved Road	—
2F2-26	Existing	Paved Road	—
2F2-27	Existing	Paved Road	—
2F2-28	Existing	Paved Road	—
2F2-29	Existing	Unpaved Road	—
2F2-33	New	New Road	See Section Error! Reference source not found.
2F2-34	New	New Road	See Section Error! Reference source not found.

7.14.2.2 Detailed Mitigations

7.14.2.2.1 Access 2F2-33

It is understood that access 2F2-33 provides access to a spoil area as shown in **Figure 7-104**. It is recommended that the existing unpaved road indicated in **Figure 7-104** be used instead of developing a new road which will have an influence on drainage lines and will be sensitive to erosion. Provisions will need to be made for erosion and siltation management.

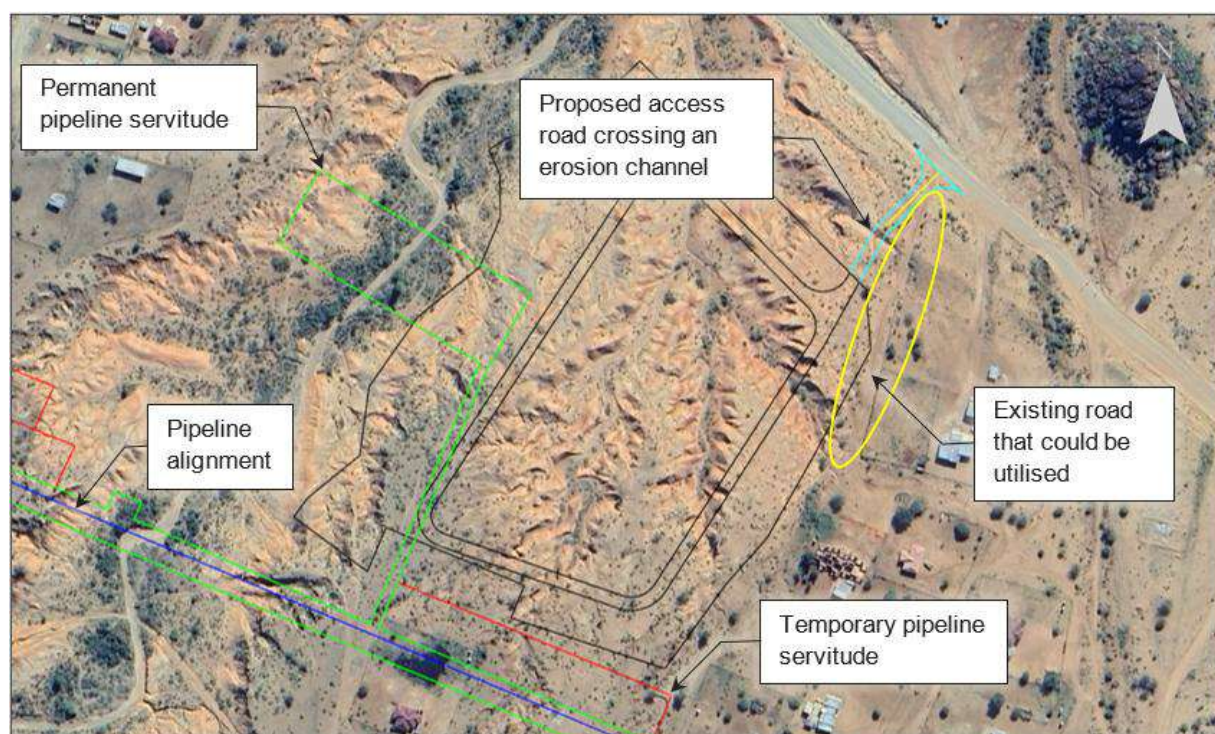


Figure 7-104: Access 2F2-33.

7.14.2.2.2 Access 2F2-34

It is understood that access 2F2-34 provides access to a site establishment area as per **Figure 7-105**. It is advisable to position this access road further north, as shown on **Figure 7-105** to increase its distance from the watercourse. Review of the hydrological impacts of the site establishment area itself does not form part of the scope of this assessment.



Figure 7-105: Access 2F2-34.

7.14.2.3 General Mitigations

To minimise erosion and ensure long-term functionality of access roads, particularly where they interact with natural or man-made drainage paths, the following general mitigation measures are recommended:

- ▶ Install drifts or culverts at locations where access roads intersect with natural watercourses to facilitate uninterrupted flow and reduce the risk of overtopping.
- ▶ Construct side drains along the upstream side of access roads to collect and safely convey stormwater along the road alignment, preventing water accumulation and surface erosion.
- ▶ Protect road embankments against erosion by lining the toe with semi-flexible materials such as Reno mattresses or stone pitching.
- ▶ Erosion protection should also be provided at culvert inlets and outlets using durable materials such as stone pitching, reno mattresses, or Armorflex to prevent scour and undermining.
- ▶ At junctions where access roads meet paved roads with existing drainage infrastructure, ensure that surface drainage patterns are preserved, if possible, and that flow continuity is maintained.

7.14.3 SPECIALIST CONCLUSION AND RECOMMENDATIONS

7.14.3.1 Flood Risk for Pipe Re-alignment

The aim of the mitigation measures was to address the hydrological impacts where the pipelines are affected by a watercourse. For this reason, the proposed mitigation measures can be divided into two main options:

- a. Placing the pipeline below ground at these areas
- b. Provide a pipe bridge to span the watercourse where feasible

These options are discussed in further detail below:

Mitigation measures (a):

It is understood that the current design intent is to place the pipeline underground which significantly mitigates the overall hydrological impacts of the pipeline when compared to an above ground pipeline. It is therefore anticipated that only structures protruding from the natural ground level may cause adverse hydrological impacts. If these structures are located within the 1 in 100-year floodline boundaries, they may locally alter the natural flow regime which may induce erosion. These structures will mainly include scour valve chambers which are generally located at low points along the alignment of the pipeline.

To mitigate the hydrological impacts of these structures, the following measures can be applied:

- ▶ Ensure that structures near watercourses and within floodlines do not impede/obstruct flow.
- ▶ Ensure that erosion control measures are implemented so that the protrusions do not exacerbate localised erosion in the area.
- ▶ Should the structure be situated in an area which is already subject to significant erosion, soil conservation measures (gabion baskets, silt fences, etc.) should be implemented in an attempt to stabilise the area.
- ▶ The hydrological impact during construction should be managed and must consider both downstream and upstream effects.

Additionally, due to the high erosion potential observed during the site visit conducted in January 2025, it is essential that additional precautions be taken at pipeline crossings over watercourses. Over time, ground cover above the pipeline may erode, potentially exposing the pipeline and increasing the risk of hydrological impacts. These may need to be managed in future, similar to the retrofitted erosion protection measures observed in the area. This natural variability should be accounted for during the detailed design phase, and it is therefore recommended that the following considerations be incorporated into the detailed design:

- ▶ Cover and backfill requirements:
 - This may be informed by sediment transport and erodibility assessments coupled with flow velocity determinations.
- ▶ Maximum undermined pipeline span (should excessive erosion be experienced):
 - An undermined pipeline will be subject to gravitational forces, as well as significant drag forces imparted by the flow of water. These forces have the potential to damage the pipeline, which may in turn cause significant downstream damage in the event of sudden pipeline failure. The potential for, and consequences of, such a sudden failure should be assessed.
- ▶ Erosion protection and soil conservation structures:
 - Construct erosion protection measures at all pipeline-watercourse crossings. These structures should be designed based on local flow velocities, flow depths, and soil erosivity conditions.
 - Construct soil conservation structures in erosion prone areas, such as dongas and gullies near the pipeline, to mitigate the progression of head-cuts in these areas.

- Both structures should aim to reduce the flow velocity upstream of the structure, effectively promoting sedimentation.
- Allowance should also be made for a key wall on the downstream side to intercept any potential head-cuts from progressing upstream which will allow the downstream reach to reach equilibrium in terms of sediment transport.

It is anticipated that by implementing the recommendations mentioned above, an overall improvement to risk of erosion in the area can be achieved. The mitigation measures will improve the stability of the watercourses and promote sedimentation in the upstream of the control structures essentially improving the overall hydrological impacts in the area. Ongoing maintenance and the surveying of donga growth should be monitored annually post construction.

Mitigation measures (b):

Alternatively, another approach that may be considered is to place the pipeline above the 1 in 100-year floodline by means of a pipe bridge in areas where excessive velocities and erosion is anticipated. The following may be considered:

- ▶ Ensure that portions of the pipeline that spans across the floodline boundary are above the water surface elevation of the 1 in 100-year flood.
- ▶ Locate the pipe supports outside the regulated boundaries where possible.
- ▶ Should pipe supports be required within the 1 in 100-year floodline boundary, appropriate erosion protection measures should be incorporated to reduce the risk of erosion compromising the supports.

Although this may reduce the immediate need of large erosion control measures and soil conservation structures at crossings, this does not prevent the propagation of head-cuts and there may be an increased risk for a local point failure at bridge supports. Consequently, erosion protection measures at the footing locations must be managed accordingly. In areas where long spans and multiple footings within the floodline are required, pipe bridges are not suggested due to the risk of failure.

As this assessment was prepared to reference design level as per New Engineering Contract (NEC), revised post-construction floodlines should be delineated as part of the final design and the detail design must ensure that the impact of these post-construction floodlines is fully mitigated, including the risk of inundation of property and infrastructure, and the risk of the exacerbation of erosion and sedimentation.

7.14.3.2 Access Roads

The access roads were assessed and stormwater management interventions are proposed to mitigate the impact of new access roads on the current hydrological conditions. The primary objective of these interventions is to preserve natural or man-made flow paths and to minimise erosion resulting from the construction of the new access roads. The proposed mitigations measures are listed below:

- ▶ Drift or culverts should be installed where access roads cross natural flow paths to allow for uninterrupted water movement.
- ▶ Side drains should be constructed along the upstream side of the road to collect and convey stormwater water along the road alignment.
- ▶ Erosion protection should be implemented by lining the toe of the road embankments with semi-flexible materials such as reno mattresses or stone pitching.
- ▶ Culvert inlets and outlets should be protected against erosion using durable materials like stone pitching, reno mattresses or Armorfex.
- ▶ Where access roads connect to paved roads where side drainage is present, the relevant surface drainage should be maintained by the access road.

7.15 SITE SENSITIVITY MAPS

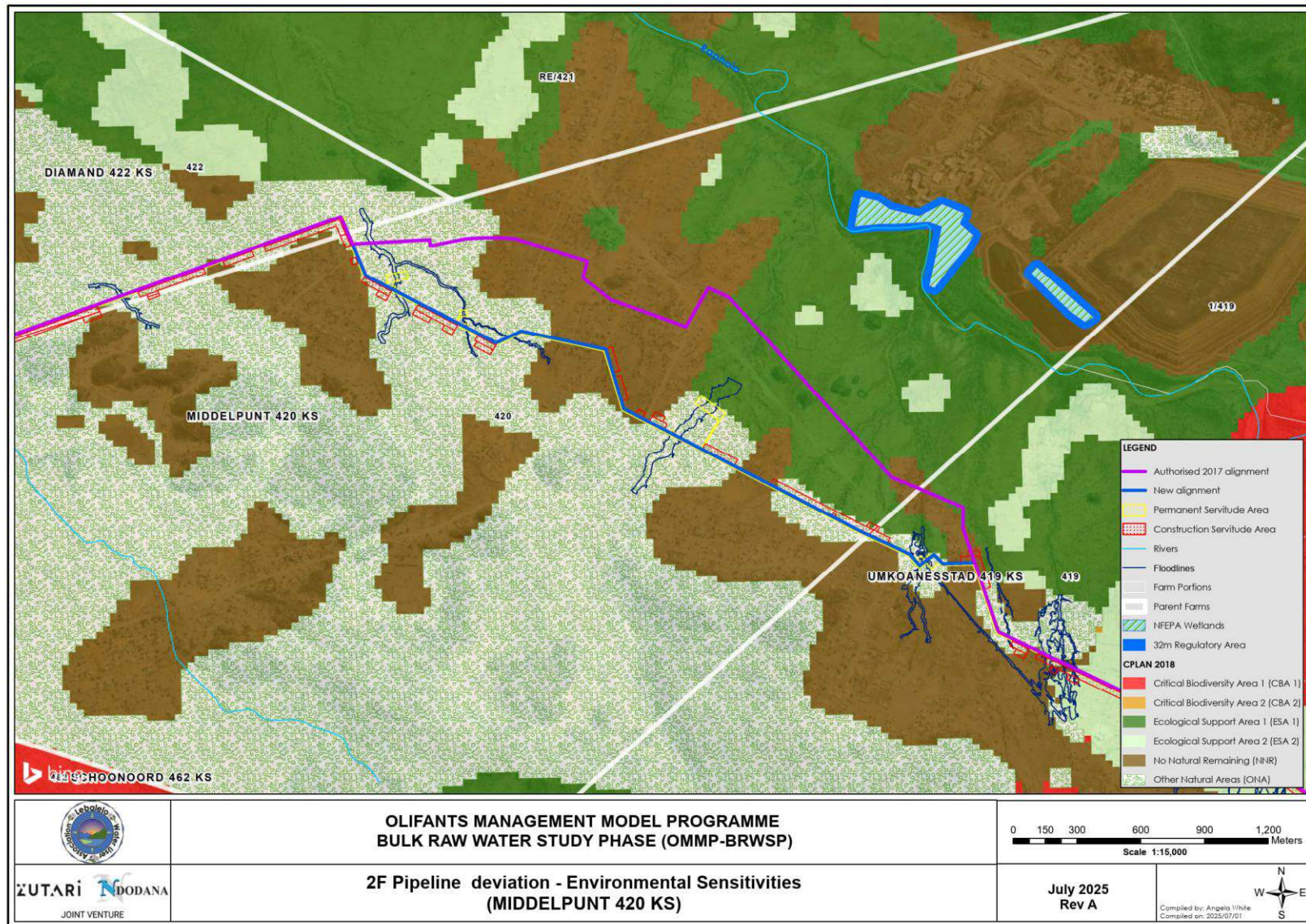


Figure 7-106: Environmental Sensitivities – 2F main pipeline deviation (Middelpunt 420 KS).

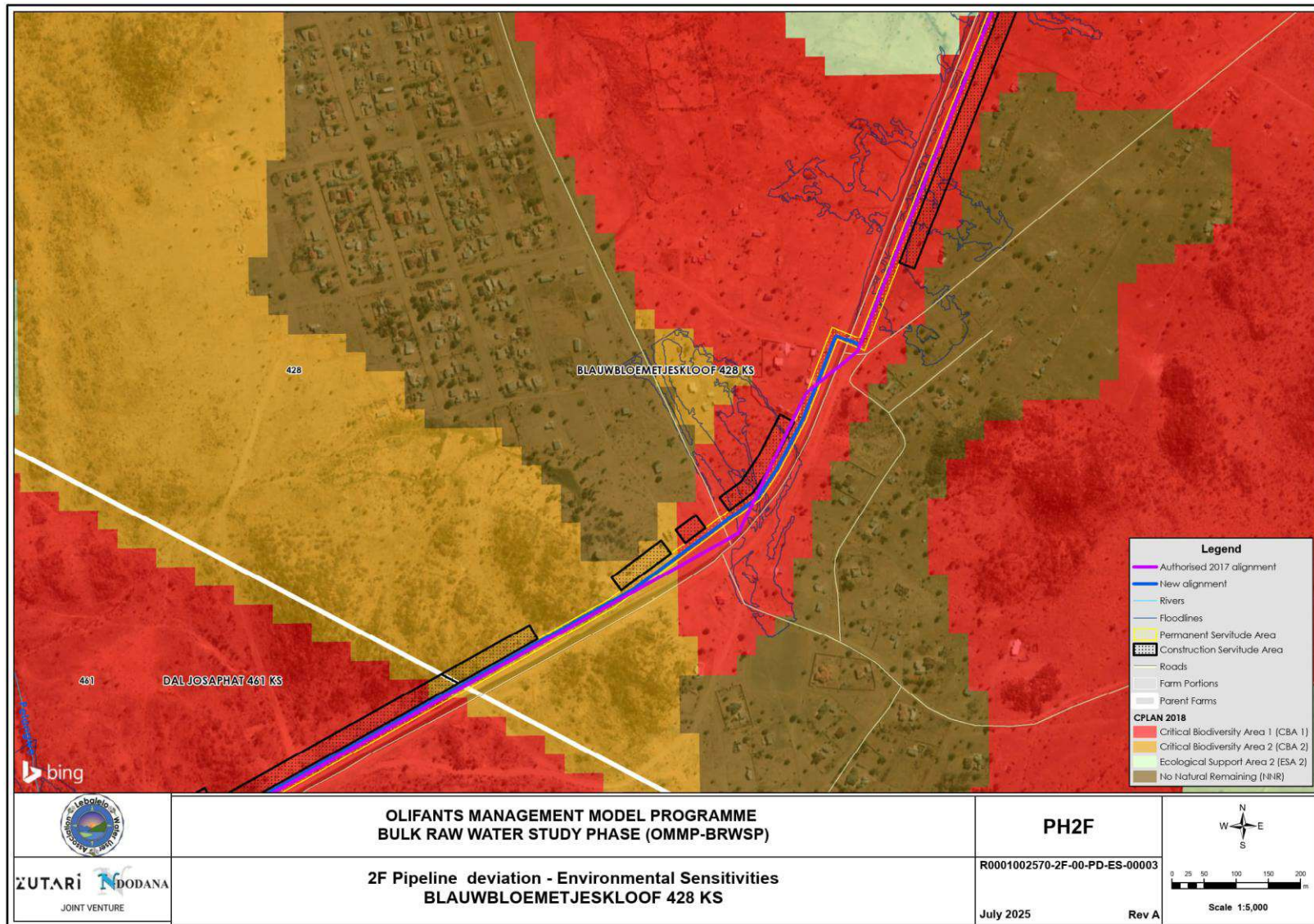


Figure 7-107: Environmental Sensitivities – 2F pipeline deviation (Blauwbloemetjeskloof 428 KS).

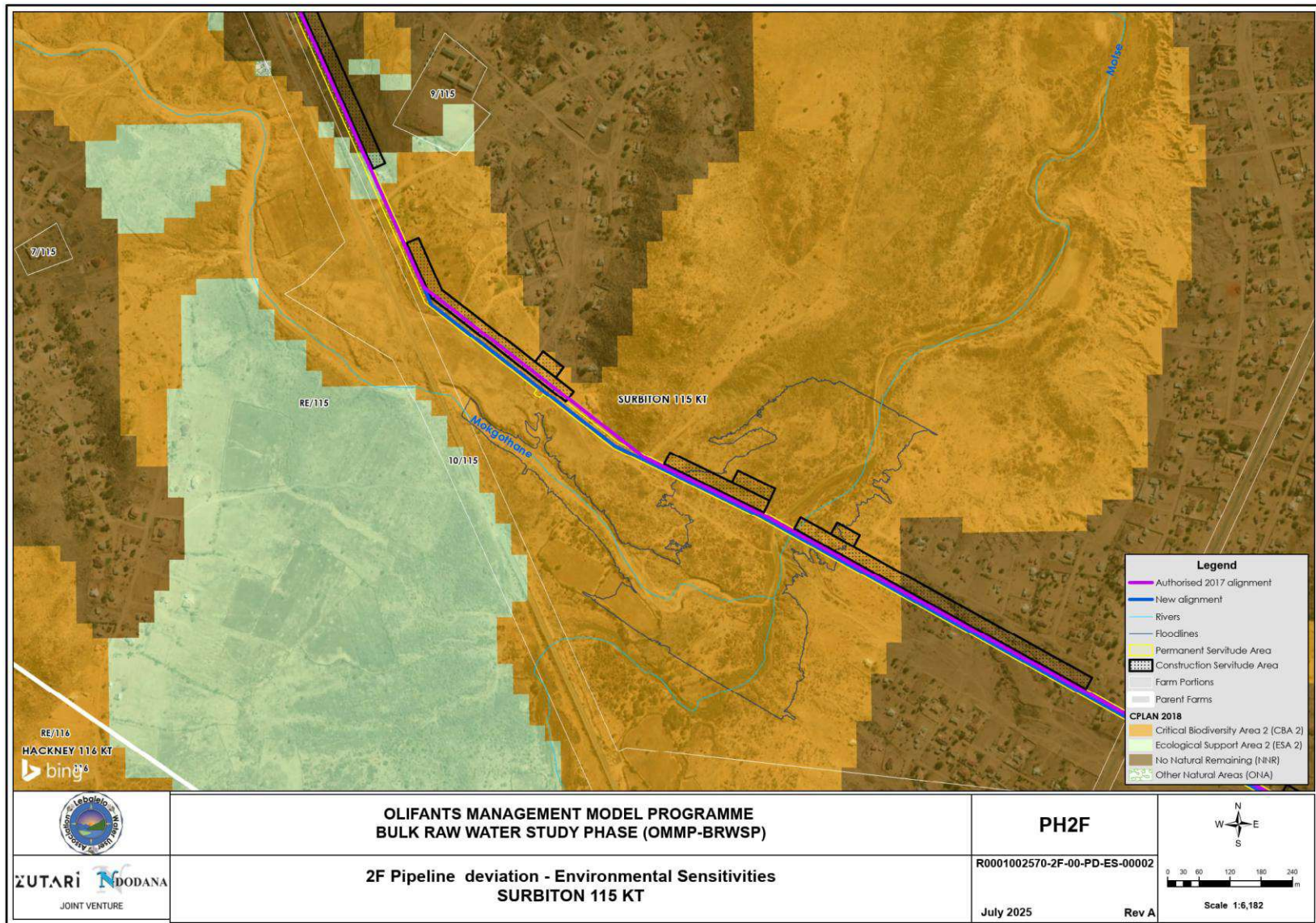


Figure 7-108: Environmental Sensitivities – 2F pipeline deviation (Surbiton 115 KT).

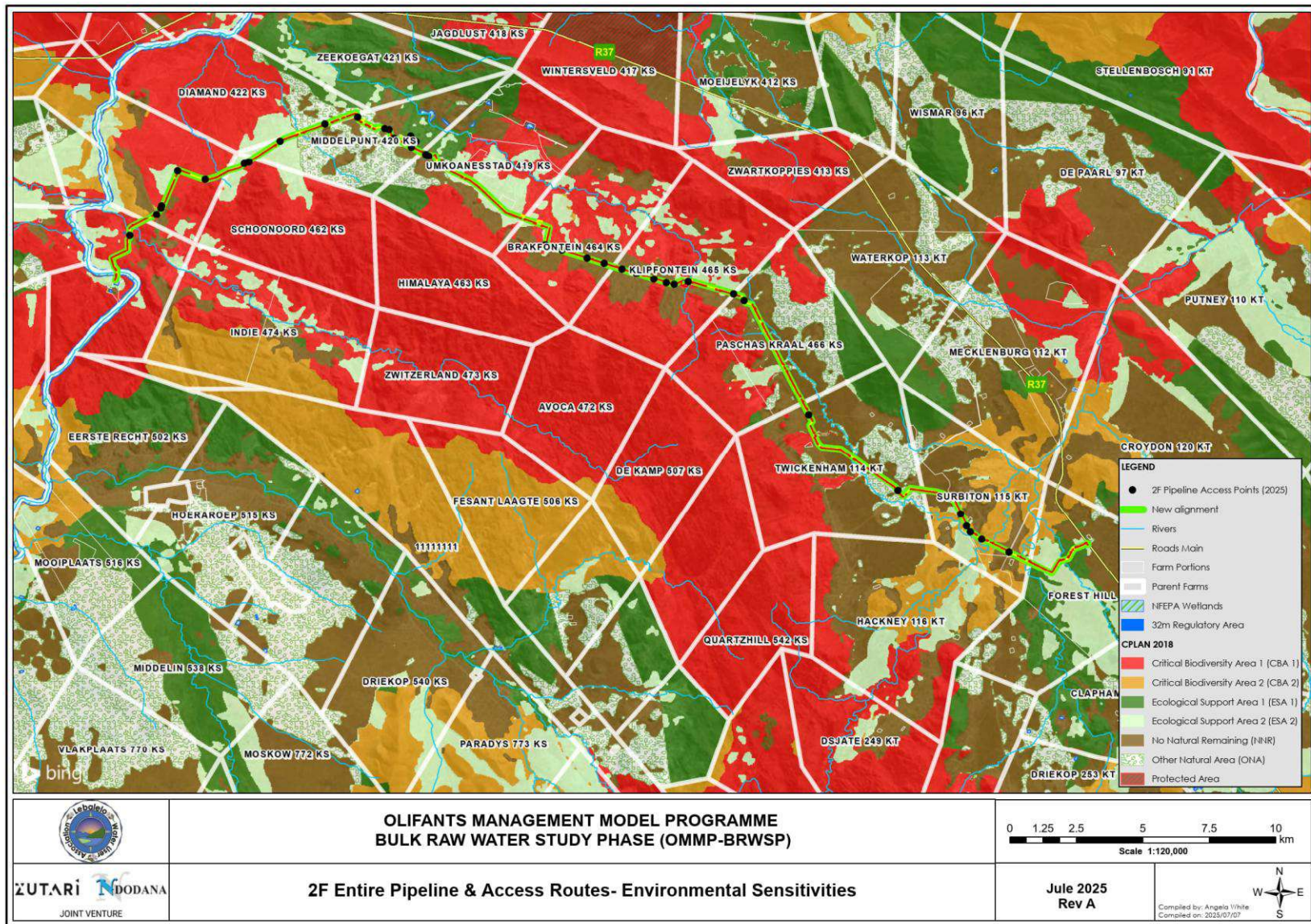


Figure 7-109: Environmental Sensitivities - Overall Phase 2F pipeline alignment.

8 CONCLUSIONS AND WAY FORWARD

8.1 SPECIALIST-PROPOSED MITIGATION MEASURES NOT ENDORSED BY THE EAP

Outlined below is a summary of the mitigation measures recommended by the specialists, which have not been endorsed by the EAP.

8.1.1 HERITAGE PROPOSED MITIGATION MEASURES

The heritage specialist has recommended a 30 m no-go buffer zone around all four sites to avoid potential direct impacts to these heritage resources. However, the EAP does not endorse this recommendation and has instead proposed that the buffer be reduced to 5 m. This is to ensure that the already narrow proposed servitudes are not further constrained, and to maintain consistency with the 2016 Heritage Impact Assessment, which previously recommended a 5 m buffer around identified gravesites along the alignment.

Furthermore, realigning the pipeline to avoid the 30 m buffer around the cemetery is not feasible, as such a realignment would result in impacts on surrounding houses, which have been deliberately avoided to minimise the number of households requiring resettlement. The alternative recommendation of relocating graves in instances where the temporary and/or permanent servitude encroaches into the 30 m buffer is not considered practical. Relocating at least 250 graves would not be justifiable from an environmental, social, or cost perspective.

In light of the above, a **5 m buffer** around these heritage sites is recommended as a more practical solution, given the spatial constraints. This will also accommodate the required **15 m permanent servitude** along the pipeline.

8.1.2 FRESHWATER AQUATICS PROPOSED MITIGATION MEASURES

- ▶ Stockpiles may not exceed a 2 m height and must be covered with a suitable geotextile (e.g. Geotextile or hessian sheeting) to prevent contamination by hydrocarbons/fuel and to prevent alien invasive encroachment until the excavation trench can be backfilled. While this is a valid recommendation regarding stockpile management, the EAP does not consider it directly relevant in the context of surface water impacts.
- ▶ The topsoil layer of the soil stockpile must be separated from the lower layers and protected from moisture loss and alien vegetation encroachment, using a geotextile such as hessian sheeting, for use during the rehabilitation phase of the river banks. Although this is a valid specialist recommendation, it should be noted that the proposed pipeline does not cross any riverbanks.
- ▶ It is imperative that construction occurs during the drier winter months when the lowest chance of rainfall and resultant stormwater will be present. However, the EAP notes that this is not a practical recommendation, as construction will proceed continuously from commencement until completion.
- ▶ It is strongly recommended that the reinstated areas be fenced off for a period (at least 6 months) following reinstatement to prevent livestock from accessing the rehabilitated areas thereby allowing vegetation to become established. The EAP notes that this fencing requirement is not practical, and the contractor should instead refer to the conditions outlined in the Terrestrial Biodiversity Impact Assessment (see section 7.9) for guidance on rehabilitation and the reinstatement of disturbed areas, as far as is practically possible.

8.2 PROPOSED SPECIFIC CONDITIONS OF AUTHORISATION

- ▶ A walkthrough of the final layout must be undertaken by a botanist and if populations of SCC will be impacted, infrastructure should be moved to avoid these areas. Where this is not feasible, a search and rescue plan will be required.
- ▶ If any SCC are to be impacted, these must be relocated to nearest appropriate habitat. Extreme caution should be applied during the relocation of the plants to ensure they are not damaged.
- ▶ A permit must be obtained from the relevant department for the removal or destruction of indigenous vegetation, protected, or endangered plant or animal species (if any).
- ▶ Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
- ▶ The temporary construction camps must be located outside of the water courses (including the aquatic buffers) during the construction mobilisation process. None are presently located within any aquatic systems, but should additional laydown areas be required during the construction process, this recommendation will be applicable.
- ▶ Rehabilitation must be planned as a staged approach to ensure an area is immediately rehabilitated once construction is completed. No exotic plants may be for rehabilitation purposed. Only indigenous plants of the area may be utilised.
- ▶ If any changes to the assessed layouts are made, the input of the relevant specialist must be considered or obtained and incorporated into any changes.
- ▶ If any evidence of archaeological sites or remains, unmarked human burials, fossils or other categories of heritage resources are uncovered during construction, work in the immediate area must be halted, and SAHRA or LIHRA must be alerted immediately, and a professional archaeologist or palaeontologist (depending on the nature of the finds) must be contacted as soon as possible to inspect the findings.
- ▶ Topsoil must be stockpiled separately from subsoil and should be placed within the designated areas.
- ▶ Where topsoil is stored for more than three months, a protective vegetation layer must be established to cover the stockpiles. Furthermore, soil stockpiles must be kept relatively moist during dry seasons to maintain the vitality of the soil.

8.3 VALIDITY OF THE ENVIRONMENTAL AUTHORISATION

It is proposed that the EA be valid for a period of 10 years from the date of the decision. This is to allow sufficient time for the Applicant and developers to gain the necessary approvals required before construction can commence.

8.4 EAP STATEMENT

It is the EAPs opinion that the recommended mitigation measures proposed by the specialists and contained in the EMP, together with the Applicant's consideration of the sensitivities and no-go areas in the current design, will sufficiently reduce the negative impacts to an acceptable level.

Provided that the mitigation measures outlined in the EMP are implemented, the EAP recommends that the proposed Phase 2F components be authorised. Furthermore, the EAP recommends that the 2017 EA (ref:14/12/16/3/3/1/1626) be consolidated with this EA, should it be granted, in accordance with Regulation 25(4) of the NEMA EIA Regulations of 2014, so that Phase 2F has a single EA.

The final layout within the footprint must take the identified sensitivities into account during the detailed design phase.

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ANNEXURE A: DETAILS OF THE EAP

ANNEXURE B: CORRESPONDENCE WITH DFFE

ANNEXURE C: PUBLIC PARTICIPATION

ANNEXURE C1: I&AP REGISTER

ANNEXURE C2: PUBLIC PARTICIPATION DOCUMENTS

ANNEXURE D: SPECIALIST REPORTS

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ANNEXURE F: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

ANNEXURE G: SITE PHOTOGRAPHS

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ANNEXURE I: EAP DECLARATION

ANNEXURE J: EXISTING AUTHORISATIONS

- Revised Record Of Decision (Ref: **03/2/4 And 12/12/20/553**)
- 2017 Environmental Authorisation (ref:**14/12/16/3/3/1/1626**)
- 2022 Amendment Environmental Authorisation (ref: **14/12/16/3/3/1/1626/AM1**)

In diversity there is beauty and there
is strength.

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