
**DRAFT BASIC ASSESSMENT REPORT: PROPOSED
KWAZULU-NATAL (KZN) AUTOMOTIVE SUPPLIER PARK
(ASP) INCORPORATING INDUSTRIAL DEVELOPMENT
ON THE REMAINDER OF THE FARM NOGI NO. 17469, AT
ILLOVO AND ASSOCIATED SEWER LINE, ELECTRICAL
POWERLINE AND ROAD UPGRADES, WITHIN THE
ETHEKWINI MUNICIPALITY, KWAZULU-NATAL**

GE38083

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DRAFT BASIC ASSESSMENT REPORT

Durban Office

27-29 Jan Hofmeyer Road
Delmat House
2nd Floor
Westville
3630

Tel: +27 31 267 8560
Fax: +27 31 266 3310

www.gibb.co.za

DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED KWAZULU-NATAL (KZN) AUTOMOTIVE SUPPLIER PARK (ASP) INCORPORATING INDUSTRIAL DEVELOPMENT ON THE REMAINDER OF THE FARM NOGI NO. 17469, AT ILLOVO AND ASSOCIATED SEWER LINE AND ELECTRICAL POWERLINE, WITHIN ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

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List of Abbreviations

AEL	Air Emissions Licence
AIDC	Automotive Industry Development Centre
AIDS	Acquired Immune Deficiency Syndrome
AOI	Area of Influence
APDP	Automotive Production and development Programme
ASCCI	Automotive Supply Chain competitiveness Initiative
ASGISA	Accelerated Shared Growth Initiative for South Africa
ASP	Automotive Supplier Park
AQSR	Air Quality Sensitive Receptors

BA	Basic Assessment
BAR	Basic Assessment Report
BAS	Best Attainable State
B-BBEE	Broad-Based Black economic Empowerment
BID	Background Information Document
BMP	Best Management Practice
BSP	Biodiversity Spatial Plan
CA	Competent Authority
CARA	Conservation of Agriculture Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
CFA	Continuous Flight Auger
CFP	Chance Finds Procedure
CR	Critically Endangered
CVB	Channelled Valley Bottom
DAFF	Department of Agriculture, Forestry and Fisheries
DBAR	Draft Basic Assessment Report
DEA	Department of Environmental Affairs
DMEA	Department of Minerals and Energy Affairs
DO	Dissolved Oxygen
DSW	Durban Solid Waste
DTI	Department of Trade and Industry
DTP	Dube Tradeport
DTPC	Dube Tradeport Corporation
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Electric Conductivity
ECO	Environmental Control Officer
EDTEA	Economic Development, Tourism and Environmental Affairs
EE	EThekweni Electricity
EFZ	Estuarine functional Zone
EGL	Existing Ground Level
EI	Ecological Infrastructure
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EKZNW	eZemvelo KwaZulu-Natal Wildlife
ELM	Electric Line Module
EN	Endangered
EPCPD	Environmental Planning and Climate Protection Department
ESA	Ecological Support Area
EWS	EThekweni Water and Sewage Department
EWT	Endangered Wildlife Trust
FEPA	Freshwater Ecosystem Priority Area
FOV	Field of View
GRIP	Groundwater Resource Information Project

HEC	Hydrologic Engineering Centre
HGM	Hydrogeomorphic
HIV	Human Immunodeficiency Virus
IAP	Invasive Alien Plant
IBA	Important Bird Area
IEM	Integrated Environmental Management
IHAS	Integrated Habitat System
IHI	Index of Habitat Integrity
INR	Institute of Natural Resources
IPAP	Industrial Policy Action Plan
ISLAP	Illovo South Local Area Plan
IUCN	International Union for Conservation of Nature
IWWMP	Integrated Water and Waste Management Plan
JIT	Just-in-Time
KZN	KwaZulu-Natal
KZNBSP	KwaZulu-Natal Biodiversity Spatial Plan
KZNSCP	KwaZulu-Natal Systematic Conservation Plan
LC	Least Concern
LCC	Land Capability Class
LED	Light Emitting Diode
MAR	Mean Annual Runoff
MER	Marine and Estuarine Research
MIDP	Motor Industry Development Programme
MSDF	Municipal Spatial Development Framework
MV	Medium Voltage
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act (Act 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (Act 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act
NEMPAA	National Environmental Management: Protected Areas Act, 2003
NEMWA	National Environmental Management: Water Act (Act 59 Of 2008)
NGA	National Groundwater Archive
NGP	New Growth Path
NHBRC	National Home Builders Registration Council
NHRA	National Heritage Resources Act (Act 25 of 1999)
NIPF	National Industry Policy Framework
NSBA	National Spatial Biodiversity Assessment
NT	Near Threatened
NWA	National Water Act
OEM	Original Equipment Manufacturers
OHSA	Occupational Health and Safety Act (Act 85 of 1993)
PA	Protected Area
PAIA	Promotion of Access to Information Act
PES	Present Ecological Status
PGDSP	Provincial Growth and Development Strategy and Plan
POSA	Plants of Southern Africa

PSEDS	Provincial Spatial Economic Development Strategy
PU	Planning Unit
QDGC	Quarter Degree Grid Cell
RAS	River Analysis Software
REC	Recommended Ecological Category
RZ	Riparian Zone
SA	South Africa
SAAM	South African Automotive Masterplan
SABAP	South African Bird Atlas Project
SAFAP	Southern African frog Atlas Project
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SANS	South African National Standard
SASS	South African Scoring System
SAWQG	South African Water Quality Guidelines
SDF	Spatial Development Framework
SEZ	Special Economic Zone
SPLUMA	Spatial Planning and Land Use Management Act 16 of 2013
SR	Sensitive Receptors
SVP	Sensitive Viewing Point
SWMP	Stormwater management Plan
TDS	Total Dissolved Solids
TEA	Township Establishment Area
TEC	Target Ecological Category
TIA	Traffic Impact Assessment
TLB	Tractor Loading Brackhoe
UCVB	Unchannelled Valley Bottom
UDL	Urban Development Line
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VOC	Volatile Organic Compounds
VP	View Point
VU	Vulnerable
WMA	Water Management Area
WML	Waste Management Legislation
WUL	Water Use licence
WULA	Water Use licence Application
WWTW	Waste Water Treatment Works

PURPOSE OF THIS DOCUMENT

A period of 30 calendar days (20 September 2022 to 21 October 2022) has been provided to the State Departments and Interested and Affected Parties (I&APs) for the review and comment on the Draft Basic Assessment Report (DBAR). All I&APs, as well as State Departments were notified of the said review period. This DBAR provides the details of the Public Participation Process (PPP) that is being undertaken during the public review of the DBAR. The comments that will be received from I&APs during the public review period and the responses thereto, will be included in a Comments and Responses Report. The Final BAR (FBAR) will be reviewed by the Competent Authority i.e., the Department of Forestry, Fisheries and the Environment (DFFE), as the decision-making authority toward consideration of an Environmental Authorisation (EA).

PROJECT SUMMARY

Project Name	Proposed KwaZulu-Natal (KZN) Automotive Supplier Park (ASP), incorporating industrial development on the Remainder of the Farm Nogi No. 17469, at Illovo, associated sewer line, pump stations, road upgrades and 11kV and 132kV electrical powerlines, within the eThekweni Municipality, KwaZulu-Natal
Farm Name and Portions	<p>Proposed KZN ASP Site</p> <ul style="list-style-type: none"> • Portion 3 of Erf No.17469 in NOGI <p>Proposed sewer rising main</p> <ul style="list-style-type: none"> • Rem of Farm Nogi No. 17469, • Portion 4 of Illovo No. 16946, • Portion 8 of Illovo No. 16946, • Rem of Illovo No. 16946, • Rem of Lower Illovo 17126, • Portion 105 Lower Illovo 17126, • Rem of Illovo 16409 and • Erf 3520 Kingsburgh No. 0163 • Erf 3519 Kingsburgh No. 0163 • Rem of Erf 2496 Kingsburgh No. 0163 • Rem Lot SPW No. 15066 <p>Preferred Powerline Routes</p> <p>132kV Powerline</p> <ul style="list-style-type: none"> • Proposed Erf 4915, • Rem of Farm Nogi No. 17469, • Rem of Illovo No. 16946, and • Rem of Farm Togo No. 9374 <p>11kV Powerline</p> <ul style="list-style-type: none"> • Rem of Farm Nogi No. 17469, • Rem of Farm Togo No. 9374

	<ul style="list-style-type: none"> • Portion 105 Lower Illovo 17126, • Rem of Lower Illovo 17126, • Portion 4 of Illovo No. 16946, • Portion 8 of Illovo No. 16946, • Portion 74 of Illovo No. 17126 • Portion 75 of Illovo No. 17126 • Rem of Illovo No. 16946, • Portion 1 of Erf 962 Kingsburgh No. 0163 • Portion 4 of Erf 962 Kingsburgh No. 0163 • Portion 5 of Erf 962 Kingsburgh No. 0163 • Portion 6 of Erf 962 Kingsburgh No. 0163 • Rem of Portion 2 of Erf 962 Kingsburgh No. 0163 • Rem of Portion 3 of Erf 962 Kingsburgh No. 0163
	<p>Bulk Water</p> <ul style="list-style-type: none"> • Portion 3 of Erf No.17469 in NOGI
Brief Project Overview	<p>The Study Area is located south of Durban, immediately west of and adjoining the National Road N2 between Winkelspruit and Umgababa, Kwa Zulu Natal (Figure 1). The Study Area is strategically located between existing automotive related manufacturing industries in Prospecton and associated facilities being planned at Umkomaas. To the north of the Study Area is the R603, which is seen as a potential freight route within the municipality. The southern boundary of the Study Area is defined by the uMsimbazi River.</p> <p>The proposed ASP for Phase 1S and 1N will incorporate an area of approximately 123 Hectares (ha) of the total property area. The development is proposed to occur in two phases with a portion of Phase 1-South, occurring within the uMsimbazi Catchment and the remaining portion of Phase 1-South and Phase 1-North located within the iLovu catchment. Whilst the ASP is planned on a formerly cultivated sugarcane plantation, its location is directly between the iLovu and uMsimbazi Estuaries.</p> <p>Various land uses such as general industry, industrial and commercial park and administration are proposed for establishment as part of the proposed project. The remainder of the site will be set aside for potential future development and open space/conservation uses in order to maintain ecological corridors through the site. The site will also include a municipal services node comprising of a potable water reservoir, a sewer line and associated pump stations, an 11kV and 132k electrical powerline and road upgrades to accommodate for the ASP development..</p> <p>The project will further include the construction of the following bulk service infrastructure:</p> <ul style="list-style-type: none"> • Water supply - connecting to an existing municipal bulk water supply line, running adjacent to the P197, together with the construction of a new reservoir on site for the storage of potable water; • Electricity - eThekweni Electricity would be supplying the 16MVA from Kingsburgh Substation across the Lovu River Bridge via an underground

	<p>medium voltage cable feed. It is envisaged that the medium voltage 11kV cable will be fixed to the pillars of the Lovu River Bridge within a steel ducting and travel along the P197 for the majority of the route. The detailed design and route of the 11kV powerline is still to be finalised. Preliminary indications are that eThekweni Electricity will be utilising 3 x 300mm Sq 11kV aluminium cables to convey the power to the ASP development. A 132kV powerline and substation also forms part of this Basic Assessment Process.</p> <ul style="list-style-type: none"> Sewerline- There are existing sewer mains to the north, west and east (across the N2) of the Study Area. The sewer reticulation pipes are mostly 150mm diameter (GIS 2014). There are no existing sewer mains in the Study Area. The proposed sewer line route external to the ASP Site stretches from the intersection of the western end of the proposed Boulevard Road and the P197 at the north-western boundary of the KZN ASP site to the existing Kingsburgh Wastewater Treatment Works (WWTW) in the north. The route is therefore approximately 6.6km in length and will commence at the north-western boundary of the proposed KZN Automotive Supplier Park and will continue in a westerly direction along this boundary for approximately 532m. It will thereafter travel in a northerly direction on the east side of and adjacent to the road reserve of the P197 until it reaches a proposed Sewage Pump Station (referred to as Pump Station 4) some 760 metres north of the Boulevard Road / P197 intersection. The sewer line on exiting this pump station will continue to travel in a northerly direction adjacent to the P197 Road Reserve. The entire pipeline will be trenched until it reaches the existing steel bridge crossing of the iLovu River. The proposed sewer line will be attached to the existing steel bridge and will be trenched for the remainder of the route until it reaches the existing Kingsburgh Wastewater Treatment Works (WWTW). <p>After crossing the iLovu River, the route of the sewer pipeline will travel in a north-easterly direction adjacent to the road reserve of P197 via a new Intermediate Sewer Pump Station (approximately 1.4km north of the river crossing) and pass through existing built-up areas such as the Illovo Industrial area, and then through existing land uses such as cane land and residential areas. At the T-Junction with the R603, the proposed pipeline bends at 90 degrees to the left and travels adjacent to the road reserve of the R603. The pipeline route travels north, past existing residential areas of Whitfield Road, adjacent to the road reserve of the R603. It then turns right along the road reserve of 10570 Street for approximately 180m. It thereafter bends to the right along the road reserve of Santo Alberto Road for approximately 1,243m. It passes through existing built-up areas (mainly residential). The route lastly turns right along the road reserve of Longacres Drive for 452m till it reaches the existing Kingsburgh WWTW.</p>
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	<p>As there is no municipal sewer main located close to the site, a main sewer pump station (Pump Station 4) is proposed on the eastern portion of the site. Phase 1 South (1S) will pump from a temporary pump station (Pump Station 3) to an intermediate Pump Station 5, then up to Kingsburgh Wastewater Treatment Works (WWTW) along P197 within DTPC land for the majority of the route.</p> <ul style="list-style-type: none"> ○ Phase 1 North (1N) new pump station (Pump Station 2), will pump up to the bypass temporary pump station (Pump Station 3) and enter into the same system. ○ 1S – If constructed first, a temporary pump station will be built (Pump Station 3), pumped to the stilling chamber and gravity feed down to a point and instead of the sewage gravitating southwards down P197 it will gravitate northwards along the P197 towards a repurposed Pump Station 4. ○ If Phase 1N is constructed later, the new pump station for this phase (Pump Station 2) will be built. ○ If Phase 1N and 1S is constructed simultaneously then a temporary station (Pump Station 3) will not be necessary. 1N and 1S will gravity feed to Pump Station 2. ○ Collection box –any future planned developments would link to the collection box and the sewage would gravitate to Pump Station 4. ○ Rising main – starts at Pump Station 4 via intermediate Pump Station 5 to Kingsburgh WWTW. The total length of the rising main is approximately 5.88km. <ul style="list-style-type: none"> ● Roads - To provide access to the various land use areas, the establishment of a central boulevard with a road reserve of approximately 50m in width and 1,76km in length, running across the site from the P197. There will also be private access-controlled roads that will link off this central boulevard to the various land use areas. Phase 1S of the proposed development requires access from the proposed P197 roundabout at the intersection with the proposed central boulevard on the KZN ASP site. The routes that will be followed to access the KZN ASP site in Phase 1S and 1N will be as follows: <p>Phase 1 South:</p> <ul style="list-style-type: none"> ● R102/Gordon/Araucaria intersection – no upgrades ● R603/R102 intersection – Lengthen right turn lane on northern (by 45m) and western approaches (by 65m), add exclusive left turn lane on southern approach (50m) and change slip lane to a continuous lane, ie add lane on southern side of existing R603 ● R603/N2 eastern ramp terminal intersection – Add exclusive right turn lane on northern approach (170m) and add through lane and short
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	<p>receiving lane (200m) for eastern approach, ie on the southern side of existing R603, and signalise when warranted</p> <ul style="list-style-type: none"> • R603/N2 western ramp terminal intersection – Add exclusive left turn continuous slip lane (60m with 120m receiving lane) and signalise when warranted • R603/Riet/Uitsig road intersection – add exclusive left turn lanes on southern (40m) and northern (35m) approaches, add exclusive right turn lanes on southern (35m), eastern (25m), northern (35m) and western (30m) approaches and signalise when warranted <p>Phase 1S and 1N</p> <ul style="list-style-type: none"> • R102/Gordon/Araucaria intersection – no upgrades • Widen the R603 from a 1+1 to a 2+2 cross-section between the R102 and the P197 • R603/R102 intersection – Implement R603 lane changes due to R603 widening • R603/N2 eastern ramp terminal intersection – add a second exclusive right turn lane on northern approach (40m) as well as implement R603 lane changes due to R603 widening • R603/N2 western ramp terminal intersection – Lengthen right turn lane on eastern approach (by 35m) as well as implement R603 lane changes due to R603 widening • R603/Riet/Uitsig road intersection – Implement R603 lane changes due to R603 widening <p>This Application for EA is sought for Phase 1 of the KZN ASP development (Phase 1S and 1N), construction of the central boulevard and construction of bulk services (<i>water, sewer and electricity</i>).</p> <p>Refer to the Site Layout Plan in Appendix B.</p>
Development specifications	<p>KZN ASP (incorporating industrial development): 123ha</p> <p>Proposed sewer rising main: approximately 8.8km</p> <p>Proposed 11Kv powerline route: approximately 4.9km x 35m corridor</p> <p>Proposed 132kV powerline route: approximately 3.6km x 35m corridor</p>
Site Photographs	Attached in Appendix C
ADDITIONAL AUTHORISATIONS REQUIRED	
Water Use Licence Application (WULA)	<p>A number of wetlands and watercourses were delineated within the 500m regulated area of the proposed KZN ASP, sewer rising main and 11kV and 132kV powerline routes. As such, in terms of the National Water Act, 1998 (Act No. 36 of 1998) the following water use activities are triggered:</p> <ul style="list-style-type: none"> • Section 21 (c) impeding or diverting the flow of water in a watercourse; and

	<ul style="list-style-type: none"> Section 21 (i) altering the bed, banks, course or characteristics of a watercourse. <p>A WULA will therefore be lodged with the Department of Water and Sanitation (DWS).</p>
CONFIRMATION OF CAPACITY REQUIREMENTS	
Infrastructure Services	All services required by the Project (viz. electricity, water, sewage etc.) will be provided by the eThekweni Municipality (See confirmation of supply letters in Appendix E).
Solid Waste (Construction and Operation)	<p>Construction Phase: The Contractor will be responsible for the management and removal of all solid waste (refer to the Environmental Management Programme (EMPr) in Appendix F.</p> <p>Operational Phase: An inclusive and comprehensive Waste Management Plan will be developed incorporating all of the individually required plans from prospective tenants.</p> <p>All waste (glass, plastic, paper) generated on site will be recycled as far as possible. General waste, not recycled, will be collected on a weekly basis for removal by an appointed registered waste removal company or the eThekweni Metropolitan Municipality (Durban Solid Waste).</p>

Legal requirements for Basic Assessment Report content as detailed in the Environmental Impact Assessment Regulations, 2017 as amended

Legal requirements as per the NEMA GNR 928	Relevant Report Section
Details of the EAP who prepared the report.	Section 1.3 of Chapter 1 and Appendix I (CVs).
Details of the expertise of the EAP, including curriculum vitae	Section 1.3 of Chapter 1 and Appendix I (CVs).
The location of the activity, including:	Section 2.1.2 in Chapter 2.
(i) the 21 digit Surveyor General code of each cadastral land parcel;	Section 2.1.2 in Chapter 2.
(ii) where available, the physical address and farm name; and	Section 2.1.2 in Chapter 2.
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 2.1.2 in Chapter 2.
A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is	Figure 2-4 and Figure 2-5, Figure 2-8 to 2-12 in Chapter 2.
(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
(iv) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Figure 2-2 and Section 2.1.2 of Chapter 2

Legal requirements as per the NEMA GNR 928	Relevant Report Section
A description of the scope of the proposed activity, including-	Table 2-25 in Section 2.11.1 of Chapter 2.
(i) All listed and specified activities triggered and being applied for; and	
(ii) A description of the associated structures and infrastructure related to the development;	Section 2.1.2, Section 2.6 of Chapter 2
A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Chapter 2.11.3 – Legal Requirements
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;	Section 2.10.1 of Chapter 2
A motivation for the preferred site, activity and technology alternative;	Section 2.10 of Chapter 2.
A full description of the process followed to reach the preferred alternative within the site, including:	
(i) Details of all the alternatives considered;	Chapter 2.10 of Chapter 2
(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 4.4 of Chapter 4
(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 4.4.2 of Chapter 4. Refer to the Comments and Responses Report in Appendix G based upon comments received during the distribution of the Background Information Document (BID). A summary of the issues raised by the I&APs during public review of the Draft BAR is included in Section 4.4.8 of the Final BAR.
(iv) The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 3 – Receiving Environment
(v) The impacts and risks identified 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;	Chapter 5 – Impact Assessment
(vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Chapter 5 – Impact Assessment

Legal requirements as per the NEMA GNR 928	Relevant Report Section
(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;	Chapter 5 – Impact Assessment
(viii) The possible mitigation measures that could be applied and level of residual risk;	Chapter 5 – Impact Assessment All mitigation measures provided by the specialists have also been included in the EMPr (Appendix F).
(ix) The outcome of the selection matrix;	Alternatives are discussed in Chapter 2. Alternatives deemed as unfeasible were not assessed further. Relevant reasons are provided in this Chapter. Refer to Section 6.2 of Chapter 6.
(x) If no alternatives, including alternatives locations for the activity were investigated, the motivation for not considering such; and	Refer to Section 2.10.1.
(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Refer to Section 2.10 of Chapter 2 and Section 6.2 of Chapter 6.
A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure 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	Chapter 5 and 6
(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;	Chapter 5 – Impact Assessment
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 mitigated;	Chapter 5 – Impact Assessment

Legal requirements as per the NEMA GNR 928	Relevant Report Section
Where applicable, a summary of the findings and recommendations of 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 assessment report;	All specialist studies are included in Appendix D. Specialist Studies provided their findings of the receiving environment which have been included in Chapter 3 – Description of the Receiving Environment. Chapter 5 – Impact Assessment includes all the impacts and findings as identified by the specialists. Findings of the specialist studies were also used to determine the consequences of the residual risk (see Chapter 6).
An environmental impact statement which contains—	
<ul style="list-style-type: none"> (i) a summary of the key findings of the environmental impact assessment; (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 development footprint 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; 	<p>Chapter 5.8 – Impact Assessment</p> <p>Refer to Chapter 5 – receiving environment which includes sensitivity maps.</p> <p>Chapter 5.8 – Impact Assessment</p>
Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Refer to Section 6.2 and 6.2.1 of Chapter 6 – Conclusion and Appendix F for the EMPr.
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;	Refer to Section 6.2.1 of Chapter 6.
A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Refer to Assumptions and Limitations section in Chapter 6.
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;	Refer to Chapter 6.2.1 of Chapter 6.
Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalized;	Refer to Section 2.1.1 of Chapter 2.

Legal requirements as per the NEMA GNR 928	Relevant Report Section
<p>An undertaking under oath or affirmation by the EAP in relation to-</p> <ul style="list-style-type: none"> (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. 	See attached declaration under oath in Appendix I .
Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	n/a
Any specific information that may be required by the competent authority; and	As provided above and as included in Chapter 6.2.1.
Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Noted.
Where a government notice gazette by the Minister provides for any protocol or minimum information requirement to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply.	Noted.

Executive Summary

Introduction

GIBB has been appointed by the Dube TradePort Corporation (DTPC) to carry out the town planning rezoning application, in terms of the Spatial Planning and Land Use Management Act, 2013 (SPLUMA), to allow the establishment of an industrial township for the proposed KwaZulu-Natal Automotive Supplier Park (KZN ASP). This appointment includes undertaking an Application for Environmental Authorisation (EA), subject to a Basic Assessment (BA) Process, a Water Use License Application (WULA) and the associated specialist studies.

The above legislative processes are applicable to the proposed construction of the KZN ASP, the proposed sewer line connection from the development site to the existing Kingsburgh Wastewater Treatment Works (WWTW), the proposed 11kV electrical powerline from the existing Kingsburgh substation to the KZN ASP and various road upgrades as part of this Basic Assessment Process.

The DFFE is the Competent Authority for the project as the DTPC is a parastatal. The proposed project triggers 'listed activities' as defined by Government Notice GNR 983 and 985, and as such, an Environmental Authorisation by way of a BA process, in terms of the National Environmental Management Act, 1998 (No.107 of 1998) [NEMA]), will be required before activities can commence. The Draft Basic Assessment Report (DBAR) has been compiled in accordance with the requirements set out in the Environmental Impact Assessment (EIA) Regulations, 2017 (as amended) and with input from various specialist studies.

The DBAR is available for public review and comment for a period of 30 days from July 2022 to August 2022. Following the commenting period, the Final BAR will be compiled as an update to the DBAR. The comments received from the I&APs during the commenting period and the responses to them, will be included in a Comments and Responses Report that will be included in the Final BAR that will be submitted to the DFFE for consideration towards an Environmental Authorisation.

Background to the Previous Application for Environmental Authorisation

An Application for Environmental Authorisation was submitted to the DFFE on 25 October 2019 and a Draft BAR was available for public review and comment from 25 October 2019 to 27 November 2019. The application for Environmental Authorisation lapsed on 10 July 2020. The Public Participation Process (PPP) including the Comments and Responses Reports, Focus Group Meetings and Public Open Days relevant to the previous application are provided in Appendix G. This application was relevant to Phase 1 of the KZN ASP development, the proposed bulk services (sewer, water and electricity) and various road access options (five in total) for Phase 1A, 1B, 1C and 1D.

The five road access options that were assessed are summarised below. Option 1 was assessed as the preferred access alternative for the ultimate development in the previous Application for Environmental Authorisation. Access to the site also included the P197 on the western side of the proposed development for all road access options.

Alternative	Description
Option 0	No road upgrades – status quo of the road network remains
Option 1 (Preferred)	New full narrow diamond interchange on the N2
Option 1c	New full narrow diamond interchange on the N2, with the R102 link bridge
Option 1d	New R102 link bridge with no new interchange on N2
Option 3b	New loop off-ramp for south-bound traffic, and new half narrow diamond N2 interchange for north-bound traffic and exit on N2 for north-bound traffic only

Following the submission of the DBAR for public review and comment and through engagements with eZemvelo KZN Wildlife (EKZNW), SANRAL was requested to provide comments on a preferred access option to site (refer to the letter by EKZNW in Appendix G).

There were several engagements with the transport authorities, namely, eThekweni Transport Authority (eTA), South African National Roads Agency Limited (SANRAL) and KZN Department of Transport (DoT) post submission of the DBAR for the previous application. Through these engagements, SANRAL indicated that they are in support of access Option 0 (*no road upgrades*) for Phase 1A of the proposed KZN ASP development as an interim solution. The long-term solution for the ultimate development (*Phase 1B, 1C and 1D, including Phase 1A*) to ensure regional connectivity is a new R102 link road with a proposed N2 interchange. This could be a variation of Option 1c and the design of this ‘variant’ access option requires a detailed traffic engineering feasibility study and an environmental solution to ensure residual impacts on the impacted forest area are addressed and accepted by EKZNW, eThekweni Environmental Planning and Climate Protection Department (EPCPD) and KZN Department of Agriculture and Forestry and Fisheries (DAFF).

In light of the above regional connectivity with the R102 for a variant of Option 1c, there may be potential residual impacts to the forest habitat and therefore, a Biodiversity Offset for the forest is required. The conservation value of the forest habitat present in the affected area was acknowledged in the Draft BAR dated 25 October 2019. The National Forests Act, 1998 (Act No. 84 of 1998) provides a mandate for the protection of all natural forests in South Africa. The principles of the Act in Section 3 clearly state that *‘natural forests may not be destroyed save in exceptional circumstances, where, in the opinion of the Minister, a proposed new land is preferable in terms of its economic, social or environmental benefits’*. This prescribes that no development affecting forests may be allowed unless ‘exceptional circumstances’ can be proven. Section 7 of the Act prohibits the cutting, disturbance, destruction or removal of any indigenous living or dead tree in a forest without a license, while Section 15 places a similar prohibition on protected tree species listed under the Act.

Therefore, a decision was taken by the Applicant, DTPC to separate the Application for Environmental Authorisation pertaining to the proposed access to the proposed development as follows:

- 1) Application for Environmental Authorisation for access to Phase 1A and 1D (now Phase 1S and 1N) of the development from a new roundabout on the P197 at the intersection with the proposed central boulevard on the KZN ASP development and the associated road upgrades that are required; and
- 2) Application for Environmental Authorisation for access to Phase 1B and 1C from a variant of Option 1c (*includes road upgrades, new N2 interchange and a new R102 link*).

The DFFE has given approval for the separation of the access options to site into two separate Applications for Environmental Authorisation. Refer to email correspondence from the DFFE dated 30 June 2020 in Appendix A.

Following further engagement with commenting authorities i.e. KZN Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA), KZN eZemvelo Wildlife (EKZNWL) and the eThekweni Municipality's Environmental Planning and Climate Protection Department (EPCPD), it was decided that there will be a "tipping point assessment" undertaken which determines the point at which the environmental impacts associated with the entire proposed KZN ASP development (1A, 1B, 1C and 1D) becomes unacceptable. As a result of this engagement with the commenting authorities, the DTPC decided that the scope of the ASP will be reduced to only include Phase 1A and 1D (now known as 1S and 1N). These platforms are associated with impacts that can be mitigated and/or offset at present. Further investigation will be conducted for Phase 1B and 1C, however this falls outside of the scope of this Basic Assessment Process.

Project Description

The project involves the proposed construction of an Automotive Supplier Park (ASP) in Illovo, KwaZulu-Natal and associated infrastructure and services. South Africa currently has three dedicated ASPs in the country, which were conceptualised and implemented by the Automotive Industry Development Centre (AIDC) and other relevant international and local stakeholders. Two are located in the Eastern Cape and one in Gauteng. The aim of the ASPs is to accommodate component suppliers and service multiple Original Equipment Manufacturers (OEMs) from a centralised location. The primary objective of establishing these ASPs was thus to stimulate investment in major specialised infrastructure and integrated logistics services to the automotive industry in close proximity to OEMs, with the ultimate aim of increasing local content, reducing manufacturing costs and increasing competitiveness amongst OEM suppliers.

Although the majority of the automotive industry is located in the Eastern Cape, the automotive manufacturing activity in KwaZulu-Natal (KZN) accounts for over 25% of South Africa's automotive manufacturing activity. The automotive sector is furthermore one of the four major lead sectors identified in the Industrial Policy Action Plan IV (IPAP) which underscores the framework for the implementation of the National Industrial Policy Framework (NIPF) in addition to the New Growth Path.

Toyota SA is currently at the forefront of automotive manufacturing in South Africa and has significantly contributed to the KZN economy. In light of this, the specific objective of the KZN Automotive Supplier Park (ASP) is to support Toyota SA Motors, who is the only Original Equipment Manufacturers (OEM) based in KZN, and to further attract other OEMs. This would unlock investment opportunities, provide sustainable jobs and advance the OEMs growth trajectory in KZN. A preferred site was identified at Illovo South and this site formed the base of the initial pre-feasibility study for an ASP in KZN. In November 2015, the KZN MEC for Economic Development, Tourism and Environmental Affairs (EDTEA) requested that the DTPC take responsibility for acquiring the preferred development site from Illovo Sugar SA (Pty) Ltd. The DTPC completed this acquisition process and it is envisaged

that the DTPC will apply for the ASP site to be designated as part of the DTP Special Economic Zone (SEZ).

The initially proposed development entailed a large-scale industrial park (~256ha) initially comprising of four large platforms (for warehousing) ranging in size from approximately 37ha to 56ha that will be levelled by cut and fill construction methods. Various land uses such as general industry, industrial, business and municipal (proposed reservoir and electrical substation) are proposed for establishment as part of the proposed project. However, following the lapse of the initial application for EA, it was then decided that the ASP will be reduced to Phase 1A and D only (now referred to as 1S and 1N). The remainder of the site will be set aside for open space/conservation uses in order to maintain ecological corridors through the site and potential future development. The proposed ASP development is also associated with an 11kV and 132kV powerlines, sewerline and pump stations, bulk water including a reservoir and access to the ASP in the form of a central boulevard and associated road upgrades.

Phases 1S and 1N will consist of the proposed construction of Platforms 1S and 1N, the Central Boulevard, municipal services site, Business site 4908, sewer rising main, sewer pump stations, an 11kV and 132kV powerlines as well as access roads to be upgraded to support the ASP development. Phase 1S and 1N of the proposed development requires access from the proposed roundabout on the P197 intersection that is adjacent to the proposed central boulevard. There would be several road upgrades required for traffic generated by Phases 1S and 1N of the proposed development. The routes that will be followed to access the site for Phase 1S and 1N will be as follows:

- From the north for light motor vehicles: Via P21-2 (R603) and along the P197; and
- From the south for heavy motor vehicles: Via P578 and along the P197.

This Application for Environmental Authorisation therefore covers Phase 1S and 1N of the KZN ASP development (formerly referred to as Phase 1A and 1D), construction of the proposed central boulevard and construction of bulk services (*water, sewer and electricity*). Refer to the Site Layout Plan in Appendix B.

To provide access to the various land use areas within the development, the establishment of a central boulevard with a road reserve of approximately 50m in width and 1,76km in length, running across the site from the P197. A number of private roads that will be access-controlled, will link off this central boulevard, to the various industrial land use areas.

The project will further include the construction of service infrastructure such as:

- connecting to an existing municipal bulk water supply line, running adjacent to the P197, together with the construction of a new reservoir on site for the storage of potable water;
- constructing a 11kV underground powerline and 132kV overhead powerline linking the ASP site from the existing Kingsburgh Substation; and
- as there is no municipal sewer main located close to the site, a sewer pump station is proposed on the western portion of the site as well as a sewer rising main adjacent to the road reserves of the P197 and R603, and within municipal roads to the existing Kingsburgh Wastewater Treatment Works (WWTW).

Alternatives

The most *relevant* alternatives are shown below (refer to Chapter 2 for further details).

Proposed KZN ASP Site Location

The property is located south of Durban and adjacent to the N2, between Winkelspruit and Umgababa, in KZN Province. The property (also referred to as the Township Establishment Area (TEA)) earmarked for the proposed development of the KZN ASP is described as the remainder of the Farm Nogi No. 17469, in Illovo, within the jurisdiction of the eThekweni Municipality, in KwaZulu-Natal. The size of the entire property is approximately 400ha with Phase 1S and 1N covering approximately 123ha.

Proposed ASP Site Layout

Through several engagements at length (spanning over two/2 years) with the Project Team comprising of the Applicant, EAP, Traffic, Civil, Stormwater and Electrical Engineers, the Town Planner, Hydrologist, Estuarine, Terrestrial and Wetland Ecologists, one Site Layout Plan has been agreed as the preferred Site Layout Plan. Refer to the Site Layout Plan in Appendix B. This Site Layout Plan is referred to as Alternative 1 and is the preferred (and only) alternative for the ASP site.

Through Specialist Study findings, engagement with the Project Team and authority consultation, cognisance of environmental sensitivities such as the iLovu and uMsimbazi Estuaries, wetlands and watercourses, 1: 100-year floodlines, natural forest areas and sensitive neighbouring communities had to be taken into consideration in the development of the Site Layout Plan.

The development site layout for the proposed KZN ASP has undergone a detailed, iterative process, with input from the Town Planners, Engineers, and Environmental team, in order to avoid and minimise impact on the existing natural areas on site as far as possible, and to try and maintain a degree of landscape connectivity through the development of ecological corridors to link the uMsimbazi Estuary with the iLovu Estuary. These natural areas within the study area provide essential ecosystem services such as water filtration, flood attenuation, ecological corridors and habitat for biodiversity. These habitats have high potential for rehabilitation. Ecological corridor between the two estuaries have been incorporated into the Site Layout Plan for the proposed development.

To allow movement of fauna through the landscape, the natural areas in the valleys between the platforms that form ecological corridors between the two estuaries must not be fenced. Fences must rather be erected around each platform and the boulevard.

The layout is designed to keep the platforms to the higher lying, sugar cane covered crests of the hills, and avoid the deep valleys in between, which support natural vegetation, wetlands and drainage lines. These natural areas will be connected by the proposed installation of large box culverts under the portion of the boulevard and other roads where the valleys will join.

The majority of the site is currently used for sugar cane cultivation and these areas are therefore transformed. Areas of high ecological significance/biodiversity value (*natural coastal forested areas that provide high habitat diversity for flora and fauna*) within the proposed KZN ASP site is steep and unsuitable for development. The vegetation will therefore not be impacted.

In order to enhance ecological infrastructure and strengthen ecosystem services in the landscape, the natural areas that fall within the development site can be rehabilitated and habitat restored to structurally sound wetland. This restoration process will include the removal of all existing alien plant infestations from the wooded drainage lines, coastal thicket, and wetland areas, and include planting of appropriate indigenous species. This can become a positive impact, should the proposed development be authorised, and could help compensate for negative impacts.

Several wetlands occur on the site, some of which will be retained within the proposed development as open spaces and will be rehabilitated as part of the on-site wetland rehabilitation plan for the proposed development.

Some of the wetlands onsite will be impacted by the proposed ASP development which can be mitigated by onsite rehabilitation for 1S and 1N. Regarding estuaries, the proposed development is expected to have a very low overall impact on the uMsimbazi and iLovu Estuaries and with mitigation, rehabilitation and offset activities, could in fact have a slight positive impact on the health of both systems (Anchor Environmental, May 2022).

The provincial road P491, which is in a state of disrepair, is situated within the Estuarine Functional Zone (EFZ) of the Msimbazi Estuary and is currently responsible for a number of negative impacts on the estuary and biophysical environment surrounding it. Negative impacts include the spread of invasive alien plant species, illegal dumping of solid waste, pollution associated with the disintegrating road surface, and interference with the natural flows of the estuary due to the physical barrier. In order to help compensate for negative impacts, and as part of the offset strategy, this road should be decommissioned and the area rehabilitated and restored to estuarine habitat. The decommissioning of the road does not form part of this application for EA.

Through consultation with EKZNW, it became apparent that stormwater attenuation facilities must not be located within the wetlands and watercourses on site. Therefore, the stormwater attenuation facilities are located within the platforms of the site. Refer to Section 2.5 which provides details of the Stormwater Management Plan (SWMP).

Proposed Sewer Rising Main

The proposed sewer line route external to the ASP Site stretches from the intersection of the western end of the proposed Boulevard Road and the P197 at the north-western boundary of the KZN ASP site to the existing Kingsburgh Wastewater Treatment Works (WWTW) in the north. The route is therefore approximately 6.6km in length and will commence at the north-western boundary of the proposed KZN Automotive Supplier Park and will continue in a westerly direction along this boundary for approximately 532m. It will thereafter travel in a northerly direction on the east side of and adjacent

to the road reserve of the P197 until it reaches a proposed Sewage Pump Station (referred to as Pump Station 4) some 760 metres north of the Boulevard Road / P197 intersection. The sewer line on exiting this pump station will continue to travel in a northerly direction adjacent to the P197 Road Reserve. The entire pipeline will be trenched until it reaches the existing steel bridge crossing of the iLovu River. The proposed sewer line will be attached to the existing steel bridge and will be trenched for the remainder of the route until it reaches the existing Kingsburgh Wastewater Treatment Works (WWTW).

After crossing the iLovu River, the route of the sewer pipeline will travel in a north-easterly direction adjacent to the road reserve of P197 via a new Intermediate Sewer Pump Station (approximately 1.4km north of the river crossing) and pass through existing built-up areas such as the Illovo Industrial area, and then through existing land uses such as cane land and residential areas. At the T-Junction with the R603, the proposed pipeline bends at 90 degrees to the left and travels adjacent to the road reserve of the R603. The pipeline route travels north, past existing residential areas of Whitfield Road, adjacent to the road reserve of the R603. It then turns right along the road reserve of 10570 Street for approximately 180m. It thereafter bends to the right along the road reserve of Santo Alberto Road for approximately 1,243m. It passes through existing built-up areas (mainly residential). The route lastly turns right along the road reserve of Longacres Drive for 452m till it reaches the existing Kingsburgh WWTW.

The main pump station (Pump Station 1) was to be located to be in the south of the property to service the full development site i.e. all phases of the ASP. The full ASP development site included Phases 1A, B, C, and D included the following:

- 1A - pump from temporary pump station (Pump Station 3) to intermediate Pump Station 5, then up to Kingsburgh WWTW along P197 within DTPC land for the most part of the route
- 1B - was going to gravity feed straight down to the pump station (Pump Station 1).
- 1C - was going to gravity feed onto the P197 down to the pump station (Pump Station 1).
- 1D - new pump station (Pump Station 2), pump up bypass temp pump station (Pump Station 3) and go into the same system.

As there is no municipal sewer main located close to the site, a main sewer pump station (Pump Station 4) is proposed on the eastern portion of the site. Phase 1 South (1S) will pump from a temporary pump station (Pump Station 3) to an intermediate Pump Station 5, then up to Kingsburgh Wastewater Treatment Works (WWTW) along P197 within DTPC land for the majority of the route.

Due to the reduction in the development footprint to only Phase 1S and 1N, the following applies:

- For 1S and 1N - Omitted the pump station in the south (Pump Station 1), as nothing will be picked up there.
- 1S – If constructed first, a temporary pump station will be built (Pump Station 3), pumped to the stilling chamber and gravity feed down to a point and instead of the sewage gravitating southwards down P197 it will gravitate northwards along the P197 towards a repurposed Pump Station 4 which replaces the pump station (Pump Station 1) in the south.

- If Phase 1N is constructed later, the new pump station for D (Pump Station 2) will be built. If 1S and 1N are constructed at the same time then a temporary station (Pump Station 3) will not be necessary. 1N and 1S will gravity feed to Pump Station 2.
- Collection box –potential future planned developments would link to the collection box and the sewage would gravitate to Pump Station 4.
- Rising main – starts at Pump Station 4 via intermediate Pump Station 5 to Kingsburgh WWTW.

Proposed Bulk Water Infrastructure

The ASP will connect to an existing municipal bulk water supply line, running adjacent to the P197, together with the construction of a new reservoir on site for the storage of potable water. The reservoir will have a capacity of 3MI (North of the Boulevard Road) and a 240kl water tower with a standby pump station. The connecting pipeline will be approximately 1000m in length from the connection point on Umgeni Water's South Coast pipeline at the intersection of the Boulevard Road and the P197 the ground reservoir line i.e., a 200mm diameter line.

Proposed 11kV and 132Kv Electrical Powerlines

- **132kV powerline and substation** - eThekwini Electricity have indicated to GIBB that they have approximately 16MVA maximum spare capacity at Kingsburgh Substation. The 16MVA will be fed to the ASP via and Medium Voltage cable (11Kv). The total platform for the new substation needs to be prepared in the first phase and then the equipment for the bays can be phased as the loads grows. Based on the demand and the fact that the supply is required over such a vast area, it is essential to establish two x 60MVA substations with two load centres be established. eThekwini electricity has indicated that the supply would be at 132kV, requiring a dual circuit servitude of 35m wide.
- **Current proposal of the 11kV powerline** - eThekwini Electricity would be supplying the 16MVA from Kingsburgh Substation across the Lovu River Bridge via an underground medium voltage cable feed. Presently Dube Trade Port Corporation (DTPC) are applying to Department of Transport to be able to fix the medium voltage cable to the bridge pillars within a steel ducting. The detailed design and route of the 11kV powerline is still to be finalised. Preliminary indications are that eThekwini Electricity will be utilising 3 x 300mm Sq 11kV aluminium cables to convey the power to the ASP development.

Proposed Road Upgrades

To provide access to the various land use areas, the establishment of a central boulevard with a road reserve of approximately 50m in width and 1,76km in length, running across the site from the P197. There will also be private access-controlled roads that will link off this central boulevard to the various land use areas. Phase 1S of the proposed development requires access from the proposed P197 roundabout at the intersection with the proposed central boulevard on the KZN ASP site. The routes that will be followed to access the KZN ASP site in Phase 1S and 1N will be as follows:

Phase 1 South upgrades

1. R102/Gordon/Araucaria intersection – no upgrades
2. R603/R102 intersection – Lengthen right turn lane on northern (by 45m) and western approaches (by 65m), add exclusive left turn lane on southern approach (50m) and change slip lane to a continuous lane, i.e., add lane on southern side of existing R603
3. R603/N2 eastern ramp terminal intersection – Add exclusive right turn lane on northern approach (170m) and add through lane and short receiving lane (200m) for eastern approach, ie on the southern side of existing R603, and signalise when warranted
4. R603/N2 western ramp terminal intersection – Add exclusive left turn continuous slip lane (60m with 120m receiving lane) and signalise when warranted
5. R603/Riet/Uitsig road intersection – add exclusive left turn lanes on southern (40m) and northern (35m) approaches, add exclusive right turn lanes on southern (35m), eastern (25m), northern (35m) and western (30m) approaches and signalise when warranted
6. R603/P197/Cane Road intersection – southern approach: add exclusive left turn lane (55m) and additional short (200m) receiving lane, eastern approach: add exclusive right turn lane (25m), northern approach: add exclusive left (40m) and right (40m) turn lanes, western approach: convert current lane to a right turn lane, add a shared through-left turn lane (55m) and an exclusive right turn lane (70m) and signalise intersection when warranted
7. P197 / ASP Blvd / D982 intersection – re-align D982 (over a distance of 337m) to intersect with proposed ASP Blvd at P197, introduce double lane roundabout, northern approach: add auxiliary lanes (400m) in both directions of travel to/from proposed roundabout, eastern approach: add ASP Blvd 2+2 lanes – re-aligned D982 falls outside of road reserve
8. Provide a 2m wide sidewalk along the eastern side of the P197 from P578 intersection to a point approximately 400m north of this intersection
9. P197 / P578 intersection – no intersection lane upgrades
10. Provide a 2m wide sidewalk along both sides of the P578 from the P197 intersection to the P578 / local access intersection 90m west of the P578 / N2 western ramp terminal intersection. Re-align local access road (located approximately 660m east of P197 / P578 intersection) to intersect with adjacent P578 / local access road intersection (35m further east) – re-alignment over a distance of 81m falling outside of road reserve
11. P578 / N2 western ramp terminal intersection – no upgrades
12. P578 / N2 eastern ramp terminal intersection – no upgrades
13. P578 / R102 intersection – no upgrades
14. P197 / P491 intersection – no upgrades
15. R102 / P491 intersection – no upgrades

Phase 1 South plus Phase 1 North upgrades

1. R102/Gordon/Araucaria intersection – no upgrades
2. Widen the R603 from a 1+1 to a 2+2 cross-section between the R102 and the P197
3. R603/R102 intersection – Implement R603 lane changes due to R603 widening
4. R603/N2 eastern ramp terminal intersection – add a second exclusive right turn lane on northern approach (40m) as well as implement R603 lane changes due to R603 widening

5. R603/N2 western ramp terminal intersection – Lengthen right turn lane on eastern approach (by 35m) as well as implement R603 lane changes due to R603 widening
6. R603/Riet/Uitsig road intersection – Implement R603 lane changes due to R603 widening
7. R603/P197/Cane Road intersection –northern approach: lengthen exclusive right turn lane (by 40m), as well as implement R603 lane changes due to R603 widening
8. P197 / ASP Blvd / D982 intersection – no further upgrades
9. P197 / P578 intersection – re-align collector road to the south-east (over a distance of 71m) to intersect with P578 at P197, upgrade intersection to single lane roundabout – depending on splays allowed at intersection only small portions of roundabout will be located outside of “road reserve” (based on guidance from Rob for latter). Normal splay guidelines would however have entire roundabout located within “road reserve” –
10. P578 / N2 western ramp terminal intersection – southern approach: add exclusive right turn lane (40m)
11. P578 / N2 eastern ramp terminal intersection – northern approach: add exclusive right turn lane (120m) and signalise intersection when warranted
12. P578 / R102 intersection – no upgrades
13. P197 / P491 intersection – no upgrades
14. R102 / P491 intersection – no upgrades

No–Go Alternative

The “No-Go” alternative refers to the alternative of not embarking on the proposed project. This alternative would imply that the current biophysical and socio-economic environment will prevail. Should the project not go ahead, there would be no negative impacts in terms of noise, visual, ecological, wetlands, air quality, traffic and other socio-economic impacts.

Without the proposed establishment of the industrial township for the proposed KZN ASP and associated land uses, the status quo as it currently exists, would remain. Thus, in the absence of the proposed development, there would be no provision to realise the goals of the South African Automotive Masterplan (SAAM) to 2035. Firstly, should the no-go alternative be implemented, there will be no initiative for the South African automotive industry to be globally competitive (relative to leading international automotive producers). The second component relates to the industry’s contribution to the transformation of the South African economy. This encompasses multiple elements, from employment equity to the greater inclusion of Black-owned firms within the automotive value chain. The no-go alternative will not lead to an impetus for this to be realised. The third component relates to the sustainable development of the South African economy. The critical elements encompassed within this component relate to the growth of the industry, employment provided, skills developed, and the improved environmental impact of products and production processes. The final component relates to the shared prosperity created by the industry, with the critical elements here comprising the financial health and wellbeing of firms within the value chain, fair employee remuneration, and the broader contribution of the value chain to the South African fiscus. In light of the vision of SAAM, the no-go option is therefore not feasible at this stage.

The Automotive industry plays a significant role in social and economic development and therefore the Government has recognised that vehicle production and component manufacturing are important

in creating new sustainable employment opportunities across the automotive value chain and enhancing the trade balance of SA. Should the proposed development not be approved, these objectives would not be attained.

Impact Statement

The following impacts were identified and assessed during the Impact Assessment phase of this project (refer to Chapters 5 and 6 for further details). Outlined below is a summary of the significance of the impacts after before and after mitigation for each of the preferred alternatives.

Summary of Potential Impacts and their associated significance for the sewer pipeline and layout of the development (stand-alone)

Sewer pipeline and layout impacts		
Impact	Significance before mitigation	Significance after mitigation
Construction Phase		
Disturbance by increased noise and lights to the ecological corridors and the iLovu and uMsimbazi Estuaries (this is an impact influencing predominantly) the water bird component of estuaries	High negative	Low negative
Permanent loss of wetland habitat as a result of construction of platforms	High negative	Moderate
Ecological linkages become broken across the site and between the adjacent ESAs and the iLovu and uMsimbazi Estuaries	High negative	Moderate Positive
Loss of Ecological Support habitats of the uMsimbazi Estuary	High negative	Low negative
Destruction of plant species of conservation concern and protected plant species	High negative	Low negative
Increased informal dwellers as a result of construction activities at the site for development	Low negative	Very low negative
Increased criminal activity as a result of construction activity	Low negative	Very low negative
Impact of foreign direct investment as a result of the KZN ASP development	Moderate Positive	Moderate Positive
Impact of Urban renewal	Moderate Positive	Moderate Positive
Operational Phase		
Impacts on aquatic taxa sensitive to changes in water quality, due to accidental spillage of sewage	High negative	Very low negative
Impacts of sewerage spills or contamination on the iLovu and uMsimbazi Estuaries	High negative	Very low negative
Reduced water quality of wetlands as a result of sewerage spills	High negative	Very Low negative
Pollution of the vadose zone and regional water table / groundwater aquifer, as a result of broken sewer lines	Moderate negative	Very low negative

Sewer pipeline and layout impacts		
Impact	Significance before mitigation	Significance after mitigation
Water quantity changes as a result of modification of the local catchment with extensive areas of hardened and impervious surfaces.	Very high negative	low negative
Water quality changes as a result of pollutants being carried by runoff to the iLovu estuary with highly polluted urban stormwater flushing across hardened surfaces.	Very high negative	low negative
Water quality changes as a result of pollutants being carried by runoff to the uMsimbazi estuary with highly polluted urban stormwater flushing across hardened surfaces.	Very high negative	low negative
Disturbance by increased noise and lights to the ecological corridors and the iLovu estuary (this is an impact influencing predominantly the water bird component of estuaries)	Moderate negative	Low negative
Aesthetic impacts on the iLovu and uMsimbazi Estuaries	Moderate negative	Moderate negative
Altered hydrology, erosion and / sediment regime of wetlands	Moderate negative	Low negative
Permanent change of visual character on the nearby receptors	Moderate negative	low negative
Loss of agricultural land as a result of the proposed development	High positive	High positive
Increased pressure on municipal services and existing community facilities	High negative	Low negative
Expanded manufacturing base	Moderate positive	Moderate positive
Increased contribution to municipal rates as a result of change of land use activities	High positive	High positive

Summary of Potential Impacts and their associated significance for the 11kV and 132kV powerlines

11kV and 132kV Powerline Development	Preferred	
Impact	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE		
Increased erosion potential and siltation of downstream watercourses due to construction and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Changes to stream flow characteristics as a result of excavation activities and compaction of soil due to construction vehicle movements and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Increase in sedimentation and turbidity due to the clearing of vegetation through or in the vicinity of watercourses and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative

11kV and 132kV Powerline Development	Preferred	
Impact	Significance before mitigation	Significance after mitigation
Degradation of water quality of non-perennial and perennial river systems situated downstream of the site, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Pollution of vadose zone and regional water table / groundwater aquifer during soil excavations / construction activities	low negative	Very low negative
Increased potential for soil erosion, caused by removal of vegetation during construction and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Altered hydrology, erosion, and/sediment regime as a result of construction of the powerline and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Reduced water quality of wetlands and watercourses, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Altered ecological processes and biodiversity of wetland habitat as a result of increased spread of invasive alien plant activities and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Impact on heritage and archaeological resources as a result of construction activities	Very low negative	Very low negative
Increased noise generation due to construction activities and the movement of construction vehicles and associated infrastructure developments (e.g. pipeline, site layout)	Low negative	Very low negative
Increase in ambient dust levels and air emissions, due to construction activities and associated infrastructure developments (e.g. pipeline, site layout)	Low negative	Very low negative
Increased traffic caused by construction of the proposed powerline the movement of construction vehicles and associated infrastructure developments (e.g. pipeline, site layout)	Low negative	Very low negative
Skills transfer and capacitating of local communities during construction	Very low positive	Moderately positive
Disturbance / destruction of indigenous vegetation including protected species	Moderate negative	low negative
OPERATIONAL PHASE		
Increased potential for electrocution of birds, as a result of the presence of powerlines	Moderate negative	Very low negative
Increased potential for collision of birds, as a result of presence of the powerlines	High negative	Very low negative

11kV and 132kV Powerline Development	Preferred	
Impact	Significance before mitigation	Significance after mitigation
Altered hydrological processes, erosion and/sediment regime of the nearby wetlands, as a result of maintenance activities	Very low negative	Very low negative
Altered ecological processes and biodiversity as a result of spread of alien invasive plant species	Moderate negative	Very low negative
DECOMMISSIONING PHASE		
The proposed 11kV and 132kV transmission powerlines will not be decommissioned in the future, as it will be permanent electrical infrastructure that will be owned and maintained by the eThekweni Municipality. It is also not envisaged that the sewer pipeline will not be decommissioned.		

Summary of Potential Impacts and their associated significance for Access Road Upgrades

Access Road Upgrades	Preferred Alternatives	
Impact	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE		
Increased pressure on local roads and traffic congestion	Low negative	Very low negative
Inconvenience and nuisance to the local community	Low negative	Very low negative
Economic opportunities	Low positive	Moderate positive
Impact on heritage resources as a result of the proposed construction activities	Very low negative	Very low negative
Destruction of plant species of conservation concern and protected plant species	Moderate negative	Very low negative
Increase and spread of invasive alien vegetation	Moderate negative	Very low negative
Erosion and siltation of drainage lines, wetlands, and downstream estuaries	Moderate negative	Low negative
Pollution of surrounding natural areas, downstream watercourses and estuaries	Moderate negative	Low negative
Loss of ecosystem services and ecological corridors	Moderate negative	Low negative
Altered hydrology, erosion and sediment/regime of wetlands as a result of vegetation clearance	Moderate negative	Low negative
Reduced water quality of wetlands and downstream watercourses	Moderate negative	Low negative
Altered ecological processes and biodiversity of wetland habitat	Moderate negative	Low negative

Access Road Upgrades	Preferred Alternatives	
<i>Impact</i>	<i>Significance before mitigation</i>	<i>Significance after mitigation</i>
OPERATIONAL PHASE		
Increased pressure on local roads	Very low negative	Very low negative
Economic opportunities	Low positive	Moderately positive
Potential health (air quality) impacts	Low negative	Low negative
Increased noise impacts	Low negative	Low negative
Ecosystem enhancement and decrease in alien plant infestations	Moderate positive	moderate positive
Altered hydrology, erosion and/sediment regime	Moderate negative	Low negative
Reduced water quality of wetlands	Moderate negative	Low negative
Altered ecological processes and biodiversity of wetland habitat, as a result of invasive alien plant establishment	Moderate negative	Low negative

Conclusion

In accordance with EIA Regulations, 2014 (as amended), the Basic Assessment Process for the proposed KZN ASP Project has identified and assessed the potential impacts caused by the proposed development and all its components. The ability to mitigate identified impacts are also addressed and summarised into a working / dynamic Environmental Management Programme (EMPr) in Appendix F.

The Draft BAR is available for public review for a period of 30 days (July to August 2022) during which time all registered and potential I&APs are given adequate opportunity to review the Draft BAR and provide their comments on the content thereof. All correspondences that will be received during the public review period, comments and/or concerns identified by I&APs during the public review period of the Draft BAR will be incorporated into the Final BAR following the public commenting period of the Draft BAR.

All key issues associated with the alternatives for this project, as identified during the Basic Assessment, have been investigated by the specialist team and categorised in terms of their biophysical and socio-economic parameters. Following the assessment of the implications of the impacts for decision-making, the consequences and residual risk and benefits associated with the development of the proposed KZN ASP including the road upgrades, the associated sewer pipeline and 11kV powerline were summarised as follows:

- The likelihood of Nuisances occurring ranged from Unlikely to Definite, and the consequence ranged from Moderate to Low resulting in a Moderate- Low Residual Risk.
- The likelihood of the Loss of Heritage Resources was considered to be Unlikely with the consequence being very low after mitigation, resulting in a Low residual risk. Although the possibility of encountering previously unidentified heritage resources such as burial sites is low, should such sites be exposed during subsurface construction work, the chance finds process must be implemented where necessary. From a heritage and archaeological perspective, the proposed ASP site and access points are feasible.
- The likelihood of Reduction in Livelihoods occurring was determined to be Likely with the consequence being low resulting in a low residual risk. A concerted effort must be made to make preferential use of local labour for low / unskilled positions. Furthermore, the local authorities must be vigilant of the potential for informal settlements and an increase in criminal activities to take place and plan accordingly.
- The likelihood of Material Reductions in Biophysical Environmental Attributes was determined to be Unlikely but Possible for the sewer line and powerline options resulting in a Low to Moderate residual risk. All impacts can be mitigated and are included in the EMPr. The powerline Option 1 is the most feasible alternative and can be authorised with the condition that the entire route is fitted with anti-collision devices such as bird flight diverters / flappers.
- The likelihood of Material Reductions in Biophysical Environmental Attributes for the ASP, sewer and powerlines were determined to range between Definite and Likely with a low consequence after mitigation resulting in a Low Residual Risk.

- Based on all of the improvements above, the likelihood of Improved Environmental Quality occurring was determined to be definite resulting in a Moderate residual benefit.
- Overall there would be positive benefits to the surrounding local communities and Municipality resulting in a Moderate residual benefit.

Assumptions and limitations

The following assumptions and limitations apply to this report:

- This report was informed by the information provided by the Applicant, project engineers, town planners, engagement with the state departments, and findings of various specialist studies and site investigations undertaken at the time of compilation of this report;
- The specialist studies conducted meet the minimum requirements, and as such, no additional studies were undertaken;
- All spatial data available to the EAP was utilised in the assessment of the proposed development. It was not deemed necessary for additional spatial data to be obtained;
- Preferred alternatives are assumed to be feasible and reasonable.

1 INTRODUCTION

1.1 Description of the Project

It was reported in 2014 that the automotive industry encompassed 30% of the South African industrial sector, employed more than 100 000 people and that in 2013 automotive exports, which include components and vehicles, exceeded R102 billion (which equates to 11.1% of the total South African (SA) exports for the year).¹ According to the KwaZulu-Natal Automotive Supplier Park (ASP) Pre-feasibility Study, 2015, the automotive industry is also South Africa's leading manufacturing sector and the largest attractor of direct foreign investment in manufacturing. It further states that the industry's vision for 2020 is to double production levels to 1.2 million units, with much stronger development of the local manufacturing component.

The importance of the automotive industry to the South African economy was further highlighted in 2013 by the launch of the Automotive Production and Development Programme (APDP), and the Automotive Supply Chain Competitiveness Initiative (ASCCI). The purpose of these initiatives is to support new investment in the automotive industry and to enhance localisation, production and supplier capabilities.²

Although the majority of the automotive industry is located in the Eastern Cape, the automotive manufacturing activity in KwaZulu-Natal (KZN) accounts for over 25% of South Africa's automotive manufacturing activity.³ The automotive sector is furthermore one of the four major lead sectors identified in the Industrial Policy Action Plan IV (IPAP) which underscores the framework for the implementation of the National Industrial Policy Framework (NIPF) in addition to the New Growth Path.

Toyota SA is currently at the forefront of automotive manufacturing in South Africa and has significantly contributed to the KZN economy. In light of this, the main objective of the KZN Automotive Supplier Park (ASP) is to support Toyota SA Motors, who is the only Original Equipment Manufacturers (OEM) based in KZN, and to further attract other OEMs. This would unlock investment opportunities, provide sustainable jobs and advance the OEMs growth trajectory in KZN. A preferred site was identified at Illovo South and this site formed the base of the initial pre-feasibility study for an ASP in KZN. In November 2015, the KZN MEC for Economic Development, Tourism and Environmental Affairs (EDTEA) requested that the Dube TradePort Corporation (DTPC) join the project team and take responsibility for acquiring the preferred development site from Illovo Sugar SA (Pty) Ltd.

The DTPC completed this acquisition process and it is envisaged that the DTPC will apply for the ASP site to be designated as part of the DTP Special Economic Zone (SEZ). As mentioned

¹ <https://www.businesspartners.co.za/en-za/entrepreneurs-growth-centre/useful-articles/manufacturing/south-africa%E2%80%99s-automotive-industry-at-a-glance> Accessed 12 June 2018

² <https://www.businesspartners.co.za/en-za/entrepreneurs-growth-centre/useful-articles/manufacturing/south-africa%E2%80%99s-automotive-industry-at-a-glance> Accessed 12 June 2018

³ <http://kzntopbusiness.co.za/site/kzn-top-businesses/Durban-Automotive-Cluster-%28DAC%29/page/9201> Accessed 12 June 2018

previously, apart from the automotive sector identified as a priority sector in terms of the IPAP, the SEZs are seen as policy instruments to advance industrialisation in South Africa. Making the KZN ASP part of the DTP SEZ will, therefore, ensure strategic alignment with government policies.

GIBB has been appointed by the Dube TradePort Corporation (DTPC) to carry out the town planning rezoning application, in terms of the Spatial Planning and Land Use Management Act, 2013 (SPLUMA), to allow the establishment of an industrial township for the proposed KwaZulu-Natal Automotive Supplier Park (KZN ASP). This appointment includes undertaking an Application for Environmental Authorisation (EA), subject to a Basic Assessment (BA) Process, a Water Use License Application (WULA) and the associated specialist studies.

The above legislative processes are applicable to the proposed construction of the KZN ASP, the proposed sewer line connection from the development site to the existing Kingsburgh Wastewater Treatment Works (WWTW), the proposed 11kV and 132kV electrical powerline from the existing Kingsburgh substation to the KZN ASP and the proposed road upgrades required for the ASP development.

The DFFE is the Competent Authority for the project as the DTPC is a parastatal. The proposed project triggers 'listed activities' as defined by Government Notice GNR 983 and 985, and as such, an Environmental Authorisation by way of a BA process, in terms of the National Environmental Management Act, 1998 (No.107 of 1998) [NEMA]), will be required before activities can commence. The Draft Basic Assessment Report (DBAR) has been compiled in accordance with the requirements set out in the Environmental Impact Assessment (EIA) Regulations, 2017 (as amended) and with input from various specialist studies.

The DBAR is available for public review and comment for a period of 30 days from 20 September 2022 to 21 October 2022. Following the commenting period, the Final BAR will be compiled as an update to the DBAR. The comments received from the I&APs during the commenting period and the responses to them, will be included in a Comments and Responses Report that will be included in the Final BAR that will be submitted to the DFFE for consideration towards an Environmental Authorisation.

1.2 Details of the Applicant

The DTPC is the Applicant for Environmental Authorisation of the proposed industrial township for the ASP, associated sewer line and powerlines. The detail of the Applicant is included in Table 1-1 below.

Table 1-1: Details of the Applicant

Project Applicant:	Dube TradePort Corporation
Contact Person:	Mr Hamish Erskine
Physical Address:	07 Umsinsi Junction, 290 South, La Mercy, 4399
Postal Address:	PO Box 57757, King Shaka Airport

Postal code:	4407	Fax:	032 814 0100
Telephone:	032 814 0000	Cell:	n/a
E-mail:	hamish.erskine@dubetradeport.co.za		

1.3 Details of the Environmental Assessment Practitioner and Specialists

GIBB is an integrated group of scientists, project managers, engineers and architects providing cost-effective solutions and specialist services in a wide range of disciplines. The multi-disciplinary consulting, management and design approach allows for the execution of projects in a holistic way, as this is believed to be the best approach to fully meet the needs of our clients.

The GIBB Environmental Services Division has a formidable track record and comprises highly qualified and experienced technical staff *viz*, Environmental Scientists and Specialists, which collectively form the National Environmental Team. The team members have broad experience in terms of working on a range of environmental projects within the public and private sector across South Africa.

The tables below provide a summary of the EAP, Technical Reviewer and Specialists involved in the BA process. Please refer to **Appendix I** for relevant experience and *curriculum vitae* of the EAP.

Table 1-2: Details and Expertise of the EAP

Project EAP:	GIBB (Pty) Ltd		
Contact Person:	Ms Patricia Nathaniel		
Role in Project:	The EAP will conduct the EIA Process in accordance with the NEMA EIA Regulations, 2014 as amended.		
Physical Address:	Delmat House, 2nd Floor, 27-29 Jan Hofmeyer Road, Westville, 3630,		
Postal Address:	PO Box 1365, Westville, 3630		
Postal code:	3630	Fax:	+27 (0)31 266 3310
Telephone:	+27 (0)31 267 8560	Cell:	-
Email:	pnathaniel@gibb.co.za		
Expertise to conduct EIR:	<p>Patricia has an Honours Degree in Environmental Science (Environment and Society) from the University of KwaZulu-Natal and has been an Environmental Assessment Practitioner (EAP) for eleven (11) years.</p> <p>She has undertaken numerous Screening and Feasibility Studies, Scoping Reports, Environmental Impact Reports (EIR's) and Environmental Management Programmes (EMPr's), as required by the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and the EIA Regulations of 2006, 2010 and 2014 (as amended).</p> <p>She has also undertaken Integrated Water Use Licence Applications (IWULA's) for a number of projects, as required by the National Water Act, 1998 (Act No. 36 of 1998).</p> <p>She has been involved in a wide range of projects, which include industrial, township establishments, mixed-use development, road upgrades,</p>		

	<p>infrastructure developments, change of land use, proposed bulk water pipelines, proposed transmission powerlines, proposed filling stations, shopping centre developments, etc. She has worked extensively in South Africa particularly KZN, Gauteng, Western Cape and Limpopo Province.</p> <p>Key experience includes:</p> <ul style="list-style-type: none"> – Environmental Impact Assessment, including Basic Assessments, Public Participation and coordination and review of specialist studies for a variety of projects including infrastructure and mixed-use developments; – Tender and proposal compilations for Environmental Services; – Integrated Water Use Licence Applications; and – Waste Management Licence Applications.
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Table 1-3: Details of Technical Reviewer & Support Staff

Project Role	Name	Experience
Technical Peer Review of Reports to ensure that they meet legal requirements	Barend Smit	<p>Barend is a professional Environmental Consultant with 32 years of experience, Barend Smit specialises in strategic management of environmental aspects relating to the construction of bulk water supply projects such as dams, pipelines and tunnels, but also relating to roads, resources development, industrial and residential developments, and recreation and tourism infrastructure.</p> <p>Barend has gained extensive experience in leading, managing and conducting a range of environmental impact assessments, and the preparation and subsequent implementation of project specific environmental management plans. He has also managed social impact studies in the course of his work and has experience in liaison with local communities in project areas. He gained significant experience in the contractual aspects of implementing environmental management plans as part of larger construction projects, and the procurement of specialist services for impact assessments. In addition, he has undertaken landscape designs especially for rehabilitation of rock quarries, borrow pits and spoil dumps in relation to tunnels, dams and roads, in addition to purely aesthetic landscape design.</p> <p>Barend has successfully led and managed an environmental unit with up to 20 staff members for more than 10 years, being fully responsible for financial performance and reporting as well as staff management development and wellbeing.</p> <p>Barend is experienced in working as part of consortiums or independent projects teams set up for large scale engineering and EPCM projects.</p>

Table 1-4: Details of the Specialists

Name of specialist	Section/s contributed to	Title of specialist report/s as attached in Appendix D
Wetland Assessment		
Ms Salicia Gounden	Section 3.1.10	Wetland Assessment Report for the DTPC Automotive Supplier Park
Mr Adam Teixeira-Leite		Wetland Assessment Report for the DTPC Automotive Supplier Park: Sewer line
		Wetland Assessment Report for the DTPC Automotive Supplier Park: Powerline
Mr Adam Teixeira-Leite and Mr. Douglas Macfarlane		Wetland Offset Strategy for the DTPC Automotive Supplier Park
Ryan Edwards, Brad Graves and Trevor Pike	Section 3.1.10	Wetland and Riparian Zone Rehabilitation Plan
Ms Fiona Eggers		Review of the development phases focussing on Phase 1A and 1D
Ecological Assessment		
Ms Robyn Phillips	Section 3.1.9	Dube TradePort Proposed Automotive Supplier Park at Illovo South, Durban: Ecological Assessment
Mr Thembela Mshengu		Dube TradePort Proposed Automotive Supplier Park at Illovo South, Durban Sewer line
		Dube TradePort Proposed Automotive Supplier Park at Illovo South, Durban Powerline
Heritage Assessment		
Mr Trust Mlilo	Section 3.7	A Phase 1 Archaeological and Heritage Impact Assessment Report for the Proposed KZN Automotive Supplier Park (ASP) and Industrial Development on the Remainder of the Farm Nogi No. 17469, Illovo, within eThekwini Municipality, KwaZulu-Natal
		A Phase 1 Archaeological and Heritage Impact Assessment Report for the Proposed sewer line route from the KZN ASP site to the existing Kingsburgh Wastewater Treatment Works (WWTW) at Illovo, Durban South within eThekwini Municipality, KwaZulu-Natal
		A Phase 1 Archaeological and Heritage Impact Assessment Report for the Proposed 11kV and 132kV Transmission Powerline from the existing Kingsburgh substation to the proposed substation at the KZN ASP at Illovo, Durban South, within eThekwini Municipality
Estuarine Assessment		
Dr Nicolette Forbes	Section 3.1.8	Estuarine Impact Assessment for the KZN ASP development
Ms. Jess Dawson		Estuarine specialist report: Assessment of impacts of the KZN Automotive Supply Park on the Umsimbazi and iLovu estuaries (review)
Hydrological Assessment (Flood line Assessment)		

Name of specialist	Section/s contributed to	Title of specialist report/s as attached in Appendix D
Mr Aphiwe Nodada	Section 3.1.5	Flood line Assessment for an Automotive Supplier Park – Illovo, KwaZulu-Natal
Mr Andrew Hull		Proposed KZN ASP Powerline and Sewer line: Hydrological Assessment and 1: 100 year flood lines
Aquatic Assessment		
Ms Karin Loukes	Section 3.1.6	Aquatic Impact Assessment for the Proposed Sewer and Powerline Infrastructure of the KZN Automotive Supplier Park Township Establishment, Illovo KZN
		Aquatic Biomonitoring Assessment for the KZN Automotive Supplier Park Township Establishment, Illovo KZN
Geohydrological Assessment		
Ms Hendrik Botha	Section 3.1.4	Desktop Geohydrological Assessment for the Proposed ASP Sewer and Powerlines Report
		Hydrogeological Assessment for the Automotive Supplier Park (ASP) Project Report
Environmental Noise Report		
Mr John Hassall	Section 2.4.7	Environmental Noise Report Proposed KZN Automotive Supplier Park
Agricultural Potential Assessment		
Mr John Phipson	Section 3.1.2	Agricultural Impact Assessment of the Proposed Conversion of Land Use from a Sugarcane Farming Activity to an Industrial Township, incorporating the Establishment of a KwaZulu-Natal ASP
Socio-Economic Assessment		
Mr Corne van Rooyen	Section 3.6	KZN ASP Socio-Economic Impact and Market Needs Assessment Report
Mr Eugene de Beer		
Visual Assessment		
Mr Tony Danev	Section 3.8	Visual Impact Assessment for Illovo Automotive Supplier Park, Illovo, Durban
Mr Leo Quayle	Section 3.8	Visual Impact Assessment for the Proposed Development of a 132kV Powerline and Associated Substation for the Proposed Automotive Supplier Park, Illovo, KZN
Stormwater Management Plan		
Mr Nic Brien	Section 2.4.2	Stormwater Management Plan for an Automotive Supplier Park– Illovo, KwaZulu-Natal
Mr Aphiwe Nodada		
Traffic Impact Assessment and Transportation Plan		
Ms. Karin Liebenberg	Section 2.4	KwaZulu Natal Automotive Supply Park Township Establishment: Traffic Impact Assessment
		KwaZulu Natal Automotive Supply Park Township Establishment: Transport Master Plan

Name of specialist	Section/s contributed to	Title of specialist report/s as attached in Appendix D
Preliminary Design Report for Electricity Supply and Reticulation		
Mr Antony Londt	Section 2.4.3	KZN ASP: Electrical Preliminary Design Report
Civil Engineering Services Report for Water and Sanitation		
Mr Mark Marais	Section 2.4	KZN Automotive Supplier Park: Civil Engineering Services Report
Peter Wium	Section 2.4	Sustainable Drainage System Report

1.4 Details of Competent/Relevant Authority

The Department of Forestry, Fisheries and the Environment (DFFE) is the Competent Authority (CA) for this Application in terms of Section 24C (2)(d)(ii) of NEMA, 1998. Also, as per the National Department of Treasury, the Applicant, DTPC is further listed as a legislated Public Institution in terms of the Public Finance Management Act, 1999 (Act No. 1 of 1999) (Schedule 3C) in the KZN Province and reports to the MEC. Thus, the Competent Authority for their applications is confirmed to be the National DFFE.

A pre-application meeting was held with the DFFE on 31 October 2018 for the original application that subsequently lapsed and on 18 February 2022 for the application associated with Phases 1N and 1S. The objectives of this meeting were to obtain guidance from the DFFE regarding the execution of the BA Process under the 2014 EIA Regulations (as amended), to provide the background to the project and obtain an understanding of the DFFE requirements following the lapse of the old application. Refer to the minutes and attendance register of the pre-application meeting in Appendix A1.

An Application for EA was submitted to the DEA on 25 October 2019. The contact details of the DFFE Case Officer are indicated in Table 1-5 below. In a letter dated 30 October 2019, the DFFE acknowledged receipt of the Application for EA and the Draft BAR. A reference number 14/12/16/3/3/1/2096 was issued for the Application. Refer to Appendix A9 for the DFFE acknowledgement of receipt of the application. A request for extension of submission of the Final BAR was submitted to the DFFE on 27 January 2020. On 10 February 2020, DFFE provided a letter granting extension for submission of the FBAR on 7 July 2020. However, the Application for Environmental Authorisation lapsed on 10 July 2020 (*this period co-incided with lockdown level 5 due to the COVID-19 pandemic*).

Subsequently, an enquiry email was sent to DFFE on 24 June 2020 to explain the approach to separating the Applications for Environmental Authorisations for the KZN ASP development in accordance with the proposed road access to the development in phases. Refer the email correspondence in Appendix A.

In a return email dated 30 June 2020, the case officer, Mr. Jay-Jay Mpelane at DFFE confirmed that the Applications for Environmental Authorisations be submitted as proposed by the EAP. On 9 July 2020, a request for a Pre-Application Meeting was discussed with Mr. Mpelane and

he confirmed that it was not necessary, and the Application should proceed based on DFFE email correspondence. Refer to email correspondence of 14 July 2020 in Appendix A.

Due to further engagement with the commenting authorities and environmental impacts associated with the Phase 1C and Phase 1B that cannot be fully mitigated and/or offset at this stage, the proposed ASP has been reduced from four (4) phases to two (2) i.e., Phase 1S and 1N for the purpose of this application. This application is specific to the reduced extent of the KZN ASP, the proposed 11kV and 132kV powerlines, the sewerline and associated pump stations and the various road upgrades required for access to the ASP site.

Table 1-5: Details of Competent Authority

Competent Authority:	Department of Environmental Affairs (DEA)		
Case Officer	Mr Jay-Jay Mpelane		
Address:	Environmental House 473 Steve Biko Road Pretoria		
Postal code:	0001	Fax:	--
Telephone:	012 399 9404	Cell:	--

1.4.1 Project Title

Proposed KwaZulu-Natal (KZN) Automotive Supplier Park (ASP) incorporating industrial development on the remainder of the Farm Nogi No. 17469, at Illovo and construction of the associated sewer line, electrical powerlines and road upgrades, within the eThekweni Municipality, KwaZulu-Natal.

2 ACTIVITY INFORMATION

2.1 Description of Project

2.1.1 Project Description

South Africa currently has three dedicated ASPs in the country which were conceptualised and implemented by the Automotive Industry Development Centre (AIDC) and other relevant international and local stakeholders, namely:

- the East London ASP (ELASP);
- the Nelson Mandela Bay Logistics Park (NMBLP) in Uitenhage; and
- the Rosslyn ASP (RASP) in Pretoria.

The aim of the ASPs is to accommodate component suppliers and service multiple Original Equipment Manufacturers (OEMs) from a centralised location. The primary objective of establishing these ASPs was thus to stimulate investment in major specialised infrastructure and integrated logistics services to the automotive industry in close proximity to OEMs, with the ultimate aim of increasing local content, reducing manufacturing costs and increasing competitiveness amongst OEM suppliers. The South African National Government was involved in the establishment of all three of the abovementioned ASPs.

In line with the abovementioned ASPs, the proposed ASP development at Illovo herein referred to as 'the project', is intended to create an enabling environment to establish an ASP to support the OEM's based in KZN, and to further attract additional OEMs to the region.

The proposed development entails a large-scale industrial park (~123ha) comprised of large platforms (for warehousing) that will be levelled by cut and fill construction methods. The site will include a municipal services node comprising a potable water reservoir and an electrical substation. Various land uses such as general industry, industrial and commercial park and administration are proposed for establishment as part of the proposed project. The remainder of the site will be set aside for open space/conservation uses in order to maintain ecological corridors through the site.

To provide access to these various land use areas, the establishment of a central boulevard with a road reserve of approximately 50m in width and 1,76km in length, running across the site from the P197. A number of private roads that will be access-controlled, will link off this central boulevard, to the various industrial land use areas. Refer to Figure 2-1 for an illustration of the proposed central boulevard from the P197 across the site.

The project will further include the construction of service infrastructure such as:

- connecting to an existing municipal bulk water supply line, running adjacent to the P197, together with the construction of a new reservoir on site for the storage of potable water;

- constructing an underground 11kV powerline, which will link to the existing Kingsburgh Substation; and
- as there is no municipal sewer main located close to the site, sewer pump stations will be constructed as well as a sewer rising main adjacent to the road reserve of P197 and R603, and within municipal roads to the existing Kingsburgh Wastewater Treatment Works (WWTW).

2.1.2 Site Description and Locality

(a) Proposed KZN ASP Site

The property (also referred to as the Township Establishment Area (TEA) earmarked for the proposed development of the KZN ASP is described as the remainder of the Farm Nogi No. 17469, in Illovo, within the jurisdiction of the eThekweni Municipality, in KwaZulu-Natal. The size of the property is approximately 400ha with the Phase 1S and 1N development covering an area of approximately 123ha in extent. The location of the proposed development site, within the context of the larger property, is shown in Figure 2-1.

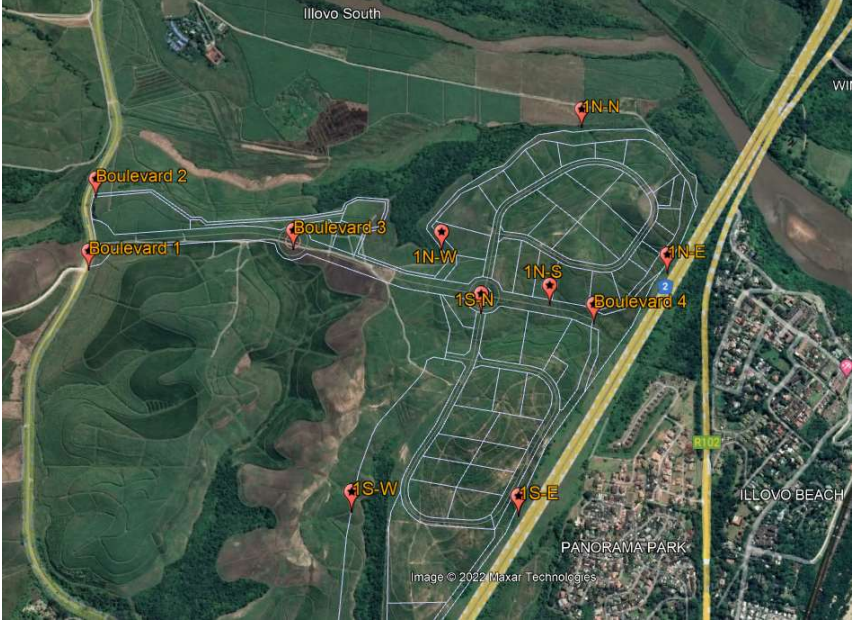
The property is therefore located south of Durban and adjacent to the N2, between Winkelspruit and Umgababa areas, in KZN Province. The site is strategically located between automotive-related manufacturing industries in Prospecton and associated facilities planned at Umkomaas and thus abutted by major transport routes, including Provincial Road P197 on the western boundary of the site and the N2 on the eastern boundary of the site.

Approximately 1.5km to the north of the property is the R603, which is seen as a potential freight route within the municipality. The southern boundary of the property is the uMsimbazi River and the northern boundary is the iLovu River. The property is located between formal urban areas in the east (Kingsburgh and Illovo Beach) and more dispersed semi-rural dwellings and associated pockets of subsistence farming to the west and south. The property is primarily used for agricultural purposes, with sugar cane production covering the majority of the land area. The property was previously owned by Illovo Sugar SA Ltd, but has now been purchased and falls under the ownership of the DTPC. Access to the site is presently gained from the P197. Refer to current access point in Figure 2-5.

Table 2-1 provides a summary of information on the property proposed for development.

Table 2-1: Property Information

Province	KwaZulu-Natal
Local Municipality	eThekweni Municipality
Ward number(s)	109
Nearest places / town(s)	Umgababa, Illovo, Panorama Park, Karridene, Winkelspruit, Astra Park, Kingsburgh,

Property Description	Portion 3 of the Farm Nogi No. 17469
SG Code	N0ET00000001746900003
Title Deed No.	T012751/2016
Co-ordinates of the boundary of the property	 <p>1S-Cardinal Points S - 30° 7'24.84"S; 30°50'4.38"E W - 30° 7'4.79"S; 30°50'1.36"E N - 30° 6'43.84"S; 30°50'16.78"E E - 30° 7'5.21"S; 30°50'21.38"E</p> <p>1N – Cardinal Points S - 30° 6'42.75"S; 30°50'25.38"E W - 30° 6'36.89"S; 30°50'11.73"E N - 30° 6'21.74"S; 30°50'29.93"E E - 30° 6'39.05"S; 30°50'40.49"E</p> <p>Central Boulevard 1 - 30° 6'38.95"S; 30°49'27.12"E 2 - 30° 6'30.58"S; 30°49'27.08"E 3 - 30° 6'36.79"S; 30°49'53.02"E 4 - 30° 6'44.79"S; 30°50'30.91"E</p>

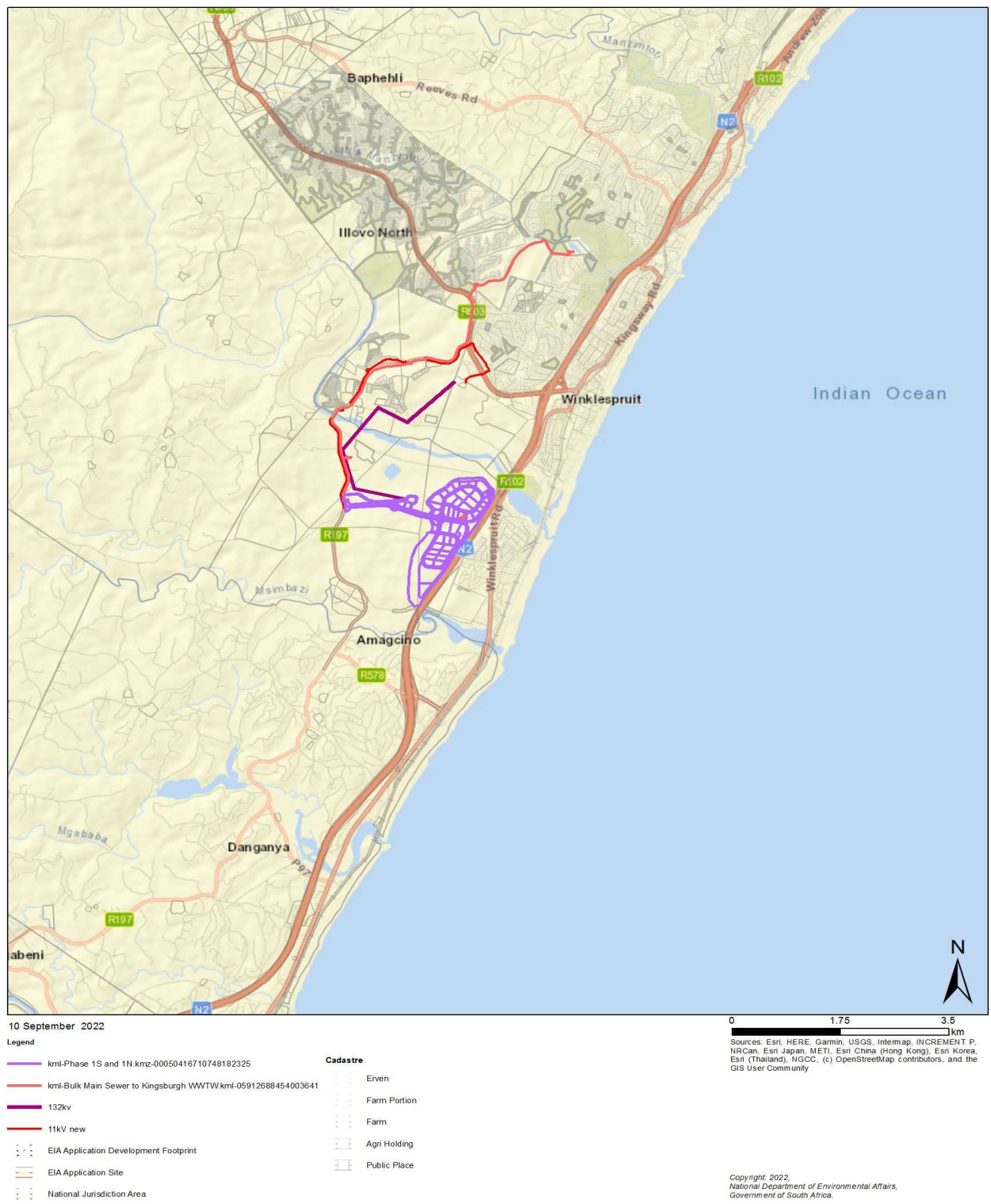


Figure 2-1: Locality Map of KZN ASP site (Phase 1S and 1N) (purple) including the sewerline (red), 11kV powerline(red) and 132kV powerline (purple)

(b) **Proposed Sewer line Route Alignment (Figure 2-2)**

The proposed sewer line route external to the ASP Site stretches from the intersection of the western end of the proposed Boulevard Road and the P197 at the north-western boundary of the KZN ASP site to the existing Kingsburgh Wastewater Treatment Works (WWTW) in the north. The route is therefore approximately 6.6km in length and will commence at the north-western boundary of the proposed KZN Automotive Supplier Park and will continue in a westerly direction along this boundary for approximately 532m. It will thereafter travel in a northerly direction on the east side of and adjacent to the road reserve of the P197 until it reaches a proposed Sewage Pump Station (referred to as Pump Station 4) some 760 metres north of the Boulevard Road / P197 intersection. The sewer line on exiting this pump station will continue to travel in a northerly direction adjacent to the P197 Road Reserve. The entire pipeline will be trenched until it reaches the existing steel bridge crossing of the iLovu River. The proposed sewer line will be attached to the existing steel bridge and will be trenched for the remainder of the route until it reaches the existing Kingsburgh Waste Water Treatment Works (WWTW).

After crossing the iLovu River, the route of the sewer pipeline will travel in a north-easterly direction adjacent to the road reserve of P197 via a new Intermediate Sewer Pump Station (approximately 1.4km north of the river crossing) and pass through existing built-up areas such as the Illovo Industrial area, and then through existing land uses such as cane land and residential areas. At the T-Junction with the R603, the proposed pipeline bends at 90 degrees to the left and travels adjacent to the road reserve of the R603. The pipeline route travels north, past existing residential areas of Whitfield Road, adjacent to the road reserve of the R603. It then turns right along the road reserve of 10570 Street for approximately 180m. It thereafter bends to the right along the road reserve of Santo Alberto Road for approximately 1,243m. It passes through existing built-up areas (mainly residential). The route lastly turns right along the road reserve of Longacres Drive for 452m till it reaches the existing Kingsburgh WWTW.

The main pump station (Pump Station 1) was to be located to be in the south of the property to service the full development site i.e. all phases of the ASP. The full ASP development site included Phases 1A, B, C, and D included the following:

- 1A - pump from temporary pump station (Pump Station 3) to intermediate Pump Station 5, then up to Kingsburgh WWTW along P197 within DTPC land for the most part of the route
- 1B - was going to gravity feed straight down to the pump station (Pump Station 1).
- 1C - was going to gravity feed onto the P197 down to the pump station (Pump Station 1).
- 1D - new pump station (Pump Station 2), pump up bypass temp pump station (Pump Station 3) and go into the same system.

As there is no municipal sewer main located close to the site, a main sewer pump station (Pump Station 4) is proposed on the eastern portion of the site. Phase 1 South (1S) will pump from a temporary pump station (Pump Station 3) to an intermediate Pump Station 5, then up

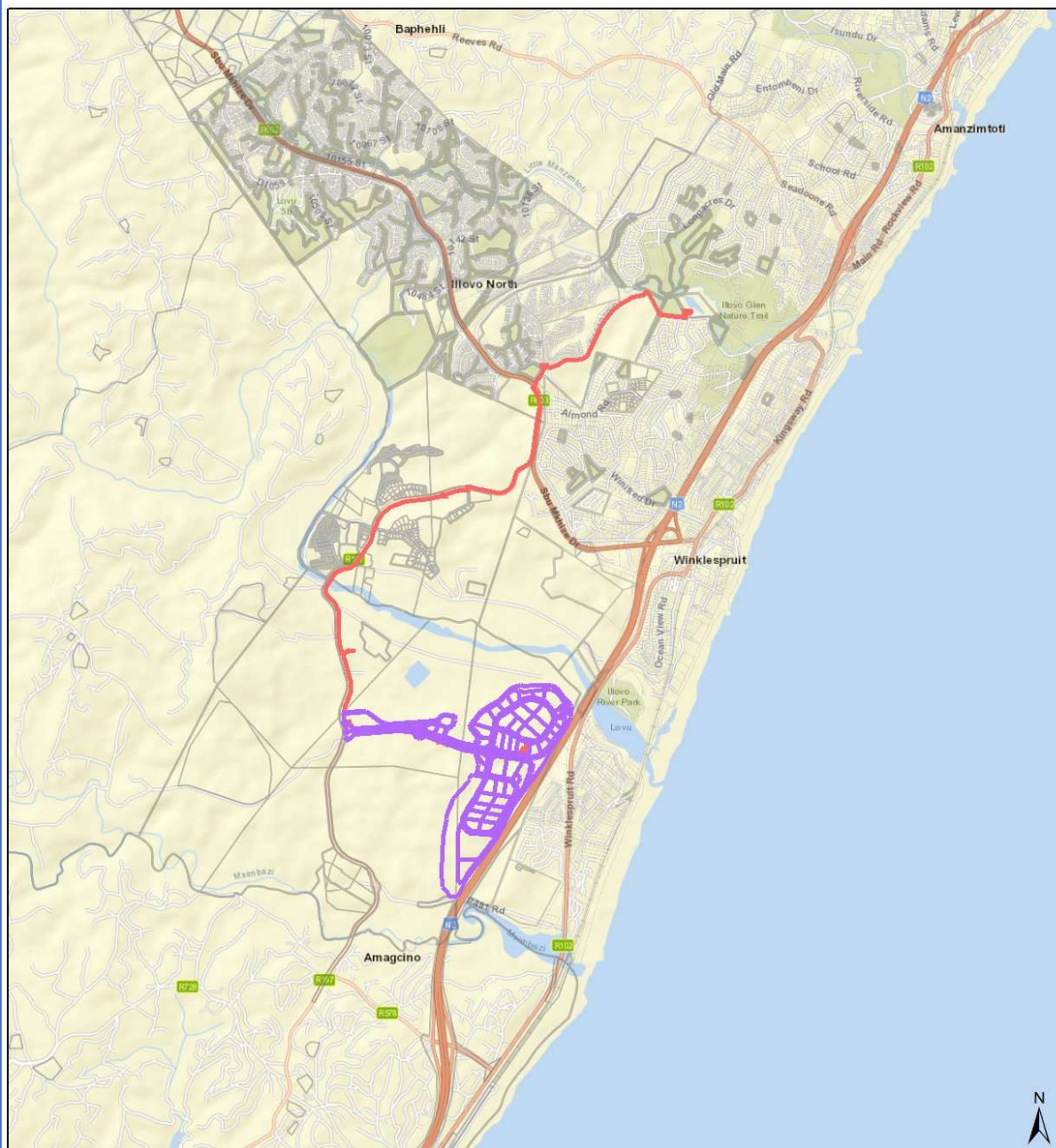
to Kingsburgh Wastewater Treatment Works (WWTW) along P197 within DTPC land for the majority of the route.

Due to the reduction in the development footprint to only Phase 1S and 1N, the following applies:

- For 1S and 1N - Omitted the pump station in the south (Pump Station 1), as nothing will be picked up there.
- 1S – If constructed first, a temporary pump station will be built (Pump Station 3), pumped to the stilling chamber and gravity feed down to a point and instead of the sewage gravitating southwards down P197 it will gravitate northwards along the P197 towards a repurposed Pump Station 4 which replaces the pump station (Pump Station 1) in the south.
- If Phase 1N is constructed later, the new pump station for D (Pump Station 2) will be built. If 1S and 1N are constructed at the same time then a temporary station (Pump Station 3) will not be necessary. 1N and 1S will gravity feed to Pump Station 2.
- Collection box –potential future planned developments would link to the collection box and the sewage would gravitate to Pump Station 4.
- Rising main – starts at Pump Station 4 via intermediate Pump Station 5 to Kingsburgh WWTW.

Table 2-2: Corridor table detailing location and width of the sewer line servitude

		Latitude	Longitude	Corridor Width
Start	Proposed sewer pump station 2 at Phase 1N	30° 6'30.42"S	30°50'42.46"E	3m
	Pump Station 3	30° 6'41.36"S	30°50'28.17"E	
	Stilling Chamber	30° 6'39.24"S	30°50'1.54"E	
	Collection Box	30° 6'33.25"S	30°49'27.02"E	
	Pump Station 4	30° 6'12.01"S	30°49'28.35"E	
End	Existing Kingsburgh Wastewater Treatment Works	30° 4'31.06"S	30°51'24.14"E	



14 June 2022

Legend

- kml-Phase 1S and 1N.kmz-0647744845676669
- kml-Bulk Main to Kingsburgh WWTW.kml-044122080792006746
- EIA Application Development Footprint
- EIA Application Site
- National Jurisdiction Area

Cadastre

- Erven
- Farm Portion
- Farm
- Agri Holding
- Public Place

0 1.25 2.5
km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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Figure 2-2: Locality Map of proposed sewer rising main (red) from the ASP proposed site to the Kingsburgh WWTW

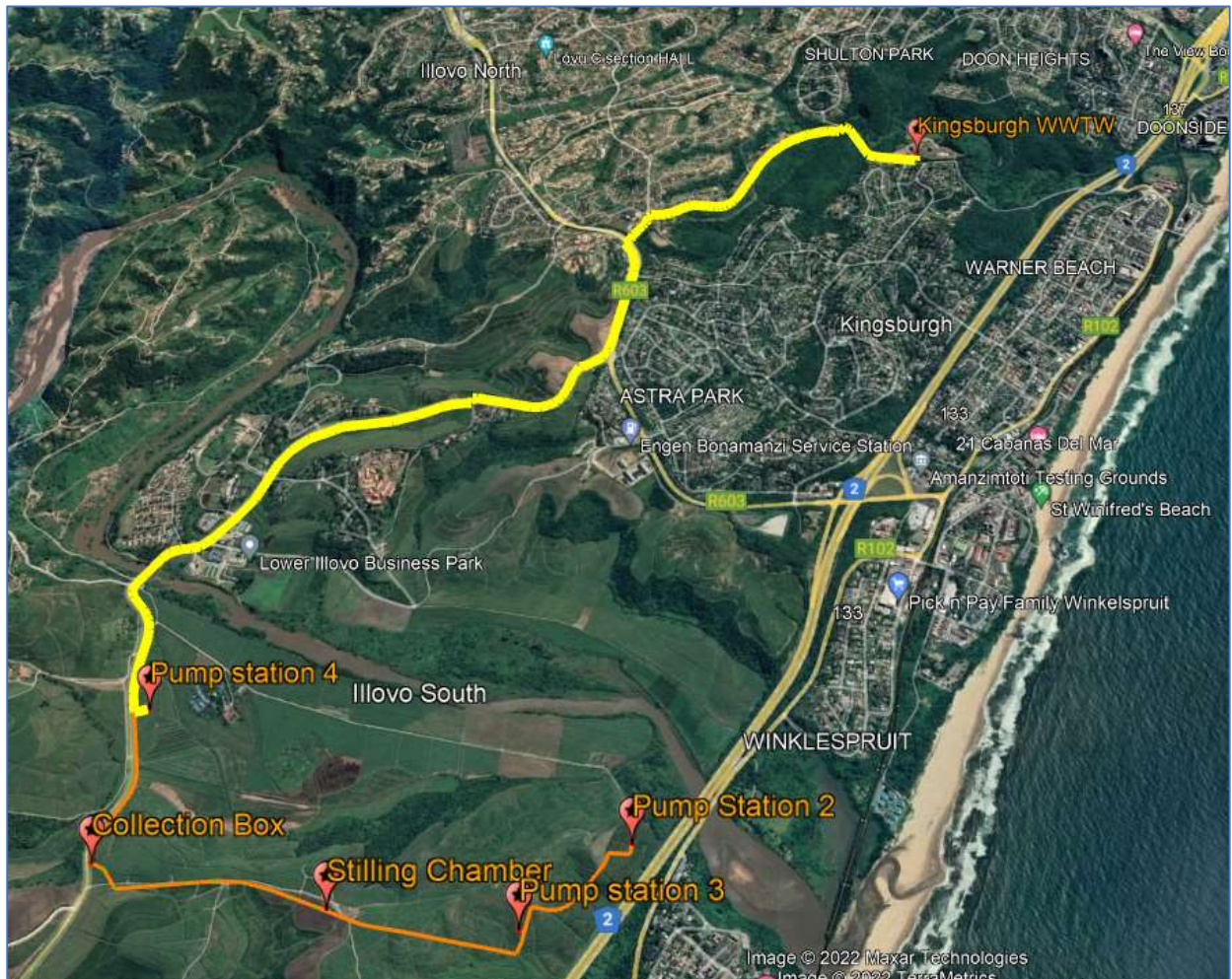


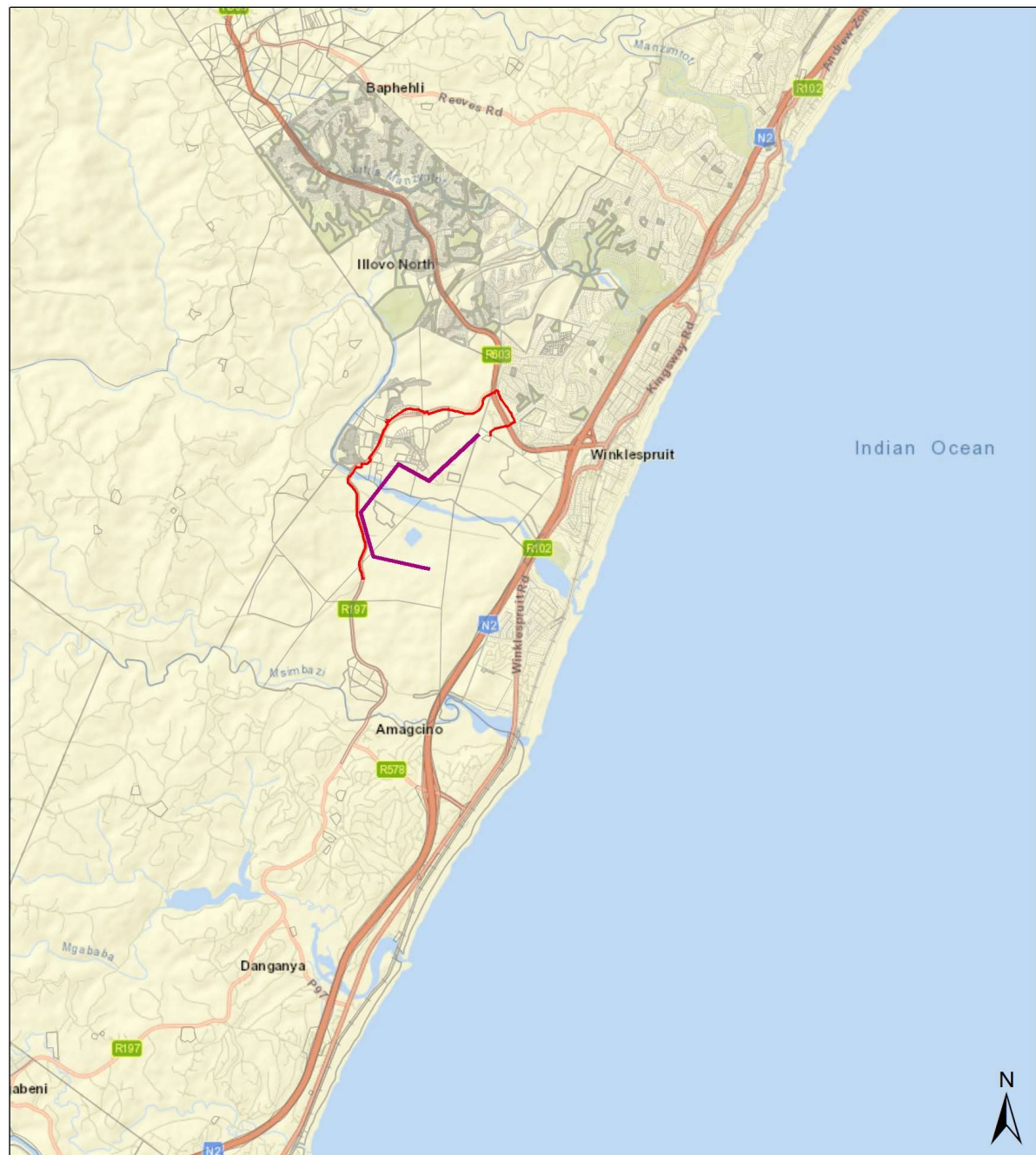
Figure 2-3: Google Earth imagery indicating the positions of the Pump Stations, Collection Box and Stilling Chamber (Google Earth, 2022)

(c) **Proposed 11kV Powerline Alignment (Figure 2-4)**

- **132kV powerline and substation** - eThekweni Electricity have indicated to GIBB that they have approximately 16MVA maximum spare capacity at Kingsburgh Substation. The 16MVA will be fed to the ASP via and Medium Voltage cable (11kV). The total platform for the new substation needs to be prepared in the first phase and then the equipment for the bays can be phased as the loads grows. Based on the demand and the fact that the supply is required over such a vast area, it is essential to establish two x 60MVA substations with two load centres be established. eThekweni electricity has indicated that the supply would be at 132kV, requiring a dual circuit servitude of 35m wide.
- **Current proposal of the 11kV powerline** - eThekweni Electricity would be supplying the 16MVA from Kingsburgh Substation across the Lovu River Bridge via an underground medium voltage cable feed. Presently Dube Trade Port Corporation (DTPC) are applying to Department of Transport to be able to fix the medium voltage cable to the bridge pillars within a steel ducting. The detailed design and route of the 11kV powerline is still to be finalised. Preliminary indications are that eThekweni Electricity will be utilising 3 x 300mm Sq 11kV aluminium cables to convey the power to the ASP development.

Table 2-3: Corridor table detailing the location of the 11kV and 132kV Powerline Route

		Latitude	Longitude
11kV			
Start	Existing Kingsburgh substation	30° 5'36.30"S	30°50'27.23"E
Middle		30° 5'35.69"S	30°49'36.19"E
End	Prelim EE RMU Position	30° 6'36.58"S	30°49'28.08"E
132kV			
Start	Existing Kingsburgh substation	30° 5'36.30"S	30°50'27.23"E
Middle		30° 5'47.55"S	30°49'45.28"E
End	Proposed ASP substation	30° 6'32.92"S	30°50'0.80"E



10 September 2022

Legend

	132kV		11kV new		EIA Application Development Footprint		EIA Application Site		National Jurisdiction Area
	Cadastre		Erven		Farm Portion		Farm		Agri Holding
	Public Place								

0 1.75 3.5 km
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

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Figure 2-4: Locality Map of the proposed 132kV powerline (purple) and 11kV powerline route alignment (red)

2.1.3 Site Access for Phases 1S and 1N

To provide access to the various land use areas, the establishment of a central boulevard with a road reserve of approximately 50m in width and 1,76km in length, running across the site from the P197. There will also be private access-controlled roads that will link off this central boulevard to the various land use areas. Phase 1S of the proposed development requires access from the proposed P197 roundabout at the intersection with the proposed central boulevard on the KZN ASP site. The routes that will be followed to access the KZN ASP site in Phase 1S and 1N will be as follows:

Overview

P578

Re-alignment of a gravel road adjoining the P578 to meet the required safety standards. The road is a provincial road with no reserve but a statutory width, the sidewalks proposed as part of the P578 upgrade will remain within the road reserve.

P578/P197 intersection

A round-about is proposed at the intersection with the D982. The D982 must be realigned for approximately 300m to create a four-legged intersection with the P197 and the ASP Boulevard. The auxiliary lanes of the P197 will be located within the road reserve.

P197/R603

Proposed Intersection upgrade within the reserve

R603

Dualling of the R603 and intersection upgrades

Detailed Description (Figure 2-6)

1. R102/Gordon/Araucaria intersection – no upgrades
2. R603/R102 intersection – Lengthen right turn lane on northern (by 45m) and western approaches (by 65m), add exclusive left turn lane on southern approach (50m) and change slip lane to a continuous lane, ie add lane on southern side of existing R603
3. R603/N2 eastern ramp terminal intersection – Add exclusive right turn lane on northern approach (170m) and add through lane and short receiving lane (200m) for eastern approach, ie on the southern side of existing R603, and signalise when warranted
4. R603/N2 western ramp terminal intersection – Add exclusive left turn continuous slip lane (60m with 120m receiving lane) and signalise when warranted
5. R603/Riet/Uitsig road intersection – add exclusive left turn lanes on southern (40m) and northern (35m) approaches, add exclusive right turn lanes on southern (35m), eastern (25m), northern (35m) and western (30m) approaches and signalise when warranted
6. R603/P197/Cane Road intersection – southern approach: add exclusive left turn lane (55m) and additional short (200m) receiving lane, eastern approach: add exclusive right turn lane (25m), northern approach: add exclusive left (40m) and right (40m) turn lanes, western approach: convert current lane to a right turn lane, add a shared through-left turn lane (55m) and an exclusive right turn lane (70m) and signalise intersection when warranted

7. P197 / ASP Blvd / D982 intersection – re-align D982 (over a distance of 337m) to intersect with proposed ASP Blvd at P197, introduce double lane roundabout, northern approach: add auxiliary lanes (400m) in both directions of travel to/from proposed roundabout, eastern approach: add ASP Blvd 2+2 lanes – re-aligned D982 falls outside of road reserve
Provide a 2m wide sidewalk along the eastern side of the P197 from P578 intersection to a point approximately 400m north of this intersection
10. P197 / P578 intersection – no intersection lane upgrades
Provide a 2m wide sidewalk along both sides of the P578 from the P197 intersection to the P578 / local access intersection 90m west of the P578 / N2 western ramp terminal intersection. Re-align local access road (located approximately 660m east of P197 / P578 intersection) to intersect with adjacent P578 / local access road intersection (35m further east) – re-alignment over a distance of 81m falling outside of road reserve
11. P578 / N2 western ramp terminal intersection – no upgrades
12. P578 / N2 eastern ramp terminal intersection – no upgrades
13. P578 / R102 intersection – no upgrades
15. P197 / P491 intersection – no upgrades
16. R102 / P491 intersection – no upgrades

Phase 1 South plus Phase 1 North upgrades

1. R102/Gordon/Araucaria intersection – no upgrades
Widen the R603 from a 1+1 to a 2+2 cross-section between the R102 and the P197
2. R603/R102 intersection – Implement R603 lane changes due to R603 widening
3. R603/N2 eastern ramp terminal intersection – add a second exclusive right turn lane on northern approach (40m) as well as implement R603 lane changes due to R603 widening
4. R603/N2 western ramp terminal intersection – Lengthen right turn lane on eastern approach (by 35m) as well as implement R603 lane changes due to R603 widening
5. R603/Riet/Uitsig road intersection – Implement R603 lane changes due to R603 widening
6. R603/P197/Cane Road intersection –northern approach: lengthen exclusive right turn lane (by 40m), as well as implement R603 lane changes due to R603 widening
7. P197 / ASP Blvd / D982 intersection – no further upgrades
10. P197 / P578 intersection – re-align collector road to the south-east (over a distance of 71m) to intersect with P578 at P197, upgrade intersection to single lane roundabout – depending on splays allowed at intersection only small portions of roundabout will be located outside of “road reserve” (based on guidance from Rob for latter). Normal splay guidelines would however have entire roundabout located within “road reserve” –
11. P578 / N2 western ramp terminal intersection – southern approach: add exclusive right turn lane (40m)
12. P578 / N2 eastern ramp terminal intersection – northern approach: add exclusive right turn lane (120m) and signalise intersection when warranted
13. P578 / R102 intersection – no upgrades
15. P197 / P491 intersection – no upgrades
16. R102 / P491 intersection – no upgrades



Figure 2-5: Map indicating the access routes for the ASP (Google Earth, 2022)

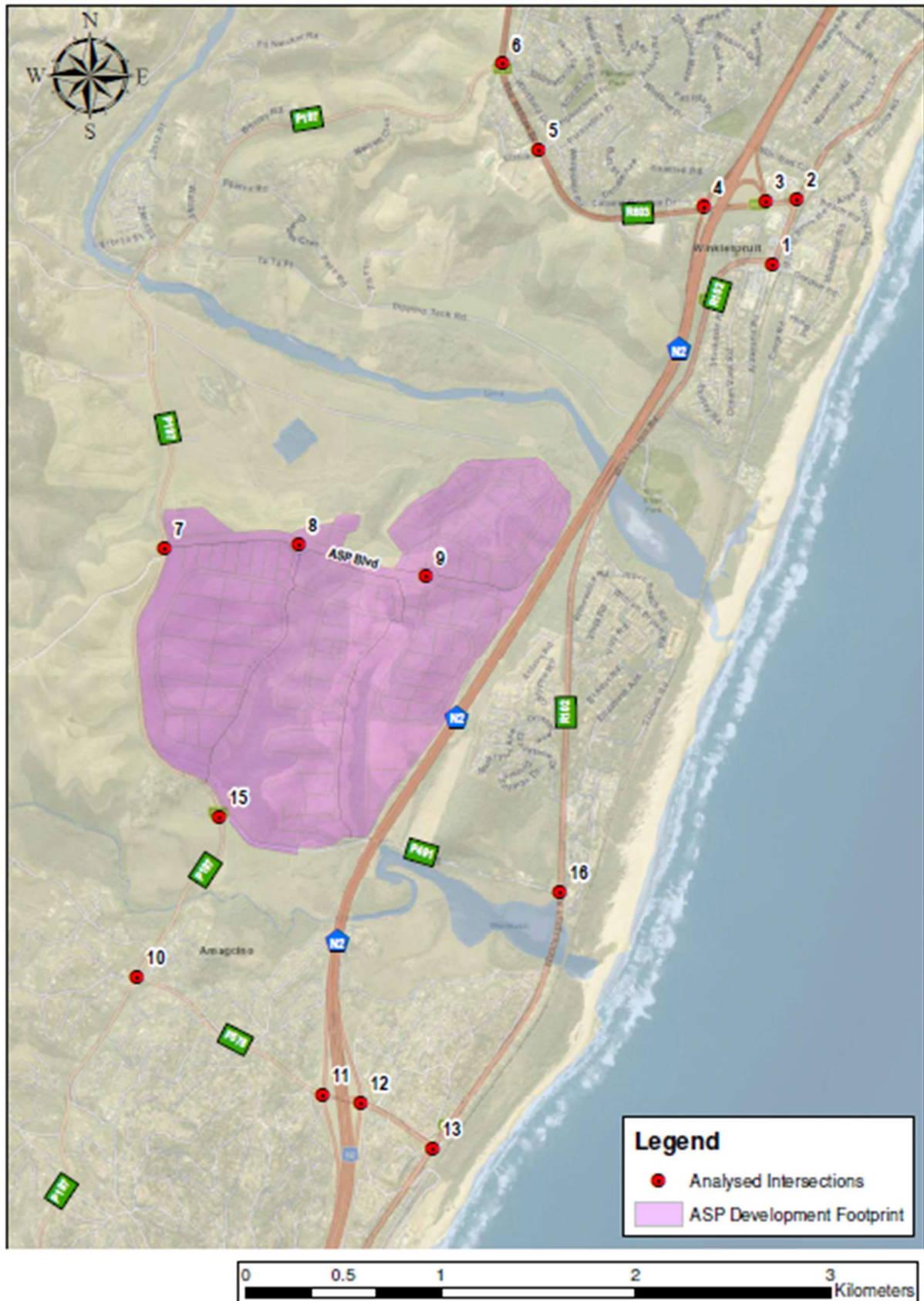


Figure 2-6: Intersection Upgrades at the P578, P197, D982 and R603

2.2 Surrounding land uses

To the north and to the east of the site for the KZN ASP development are the formal urban areas of Kingsburgh, Illovo South, Illovo Beach, and Panorama Park and Larnaco residential areas, with more dispersed, semi-rural dwellings and associated pockets of subsistence farming to the west and south. Natural areas, associated with the iLovu and uMsimbazi Rivers occur to the north and south of the property, respectively.

The existing Illovo Landfill site (55ha footprint) is a 'General Waste Disposal Site' that is located approximately 520m west of the site boundary. The property under consideration is located adjacent to, but outside the boundary of the landfill site's designated 225ha buffer area. This buffer area was established to ensure that development controls are in place on land located in the areas immediately surrounding the landfill site, in order to minimise impacts on surrounding land users, arising from the operational landfill site.

The site earmarked for the proposed KZN ASP, the preferred route of the 11kV transmission powerline, road upgrades, bulk water and sewer line occurs within the Urban Development Line, as per the eThekweni Spatial Development Framework (SDF). Refer to the delineation of the eThekweni Urban Development Line (UDL) in the locality map in Figure 2-13.

The KZN EDTEA has not yet adopted the urban edge as developed by the eThekweni Municipality. However, a site visit was undertaken by GIBB and the KZN EDTEA on 4 September 2019, to determine if the site for development is situated within the edge of built-up areas. Subsequent to this site visit, written correspondence was received from Ms Natasha Brijlal of the KZN EDTEA that the site is perceived to fall within the urban edge. This decision was based on various factors, as follows:

- The site falls within the delineation of the City's UDL;
- The site is abutted by a national freeway (N2) and existing development by approximately 50%;
- Services can be made readily available with pipelines being installed to connection points;
- The site falls out of the Estuarine Functional Zone (EFZ); and
- The site has been used for commercial farming for over 80 years.

The land uses surrounding the proposed KZN ASP site are described in Table 2-4 below.

Table 2-4: Surrounding land uses

Direction	Land Use and Distance
North	Cane lands (Adjacent) Astra Park residential area (2.5km)
Northeast	Winkelspruit residential area (1km across the N2) Kingsburgh residential area (2.7 km)

	R603 Road (2km)
	Natural Area associated with the iLovu River (500m)
East	Panorama Park residential area (200m across the N2) Illovo Beach (700m across the N2 and the R102)
Southeast	The natural area associated with uMsimbazi River (400m)
South	Umgababa residential (2km)
Southwest	Umnini residential area (2km) Illovo DSW Site (2km)
West	Canelands (Adjacent)
Northwest	Nkwali Residential (3km)

Table 2-5 provides a description of the land uses surrounding the proposed sewer line route alignment.

Table 2-5: Surrounding land uses along the length of the proposed sewer line from the proposed sewer pump station 2 to the existing Kingsburgh WWTW

Land Use	Distance
Proposed ASP Boulevard	Adjacent (at start of the proposed sewer line route)
uMsimbazi Estuary	2km (NE)
Canelands	Adjacent South
Canelands	Adjacent SW
Ilovu River Bridge	Pipeline will traverse this bridge in a Westerly direction
Lower Lovu Business Park	Adjacent
R603	Adjacent

Table 2-6 provides a description of the land uses surrounding the proposed powerline route alignment.

Table 2-6: Surrounding land uses along the length of the proposed powerline route

Land Use	Distance
Astra Park residential area	500m (at the end of the route in a Northerly direction)
Lower iLovu Business Park	Adjacent
iLovu River Bridge	The cable line will traverse this bridge
Mother of Peace Orphanage	300m from Pump Station 4 in an easterly direction
Cane-land	Adjacent
Panorama Park residential area	1 200m

2.2.1 Proposed ASP Land Use and Phasing

The intention of the ASP layout is primarily to allow for General Industrial and Commercial land uses associated with the automotive and manufacturing industries and the table below provides a summary of the extent of the various proposed land uses.

Table 2-7: Summary of ASP Land Use

Land Use	Site Area (m ²)	GLA (m ²)
Business	63 101	31 551
Education	38 232	19 116
General Industry	450 305	270 183
Light Industry	62 587	31 294
Municipal and Government Purposes	32 112	16 056

The anticipated phasing of the Study Area is shown in the figure below in six broad implementation horizons viz. 1-2 years, 3-5 years, 6-10 years, 11-15 years, 16-20 years and more than 20 years.

The first four implementation horizons have corresponding anticipated end years of 2024, 2027, 2032 and 2037 respectively. The most remote implementation horizon of more than 20 years encompasses land located within the Lovu Landfill Buffer Area which will only become available for repurposing after the design life of the landfill facility has expired.

Within the TEA it is anticipated that Phases 1 South and 1 North will be developed by 2027 with the first Phase 1 South becoming operational by 2024. The current phasing plan is based on anticipated market demand and developability of the various areas based on accessibility, infrastructure availability as well as environmental sensitivity.

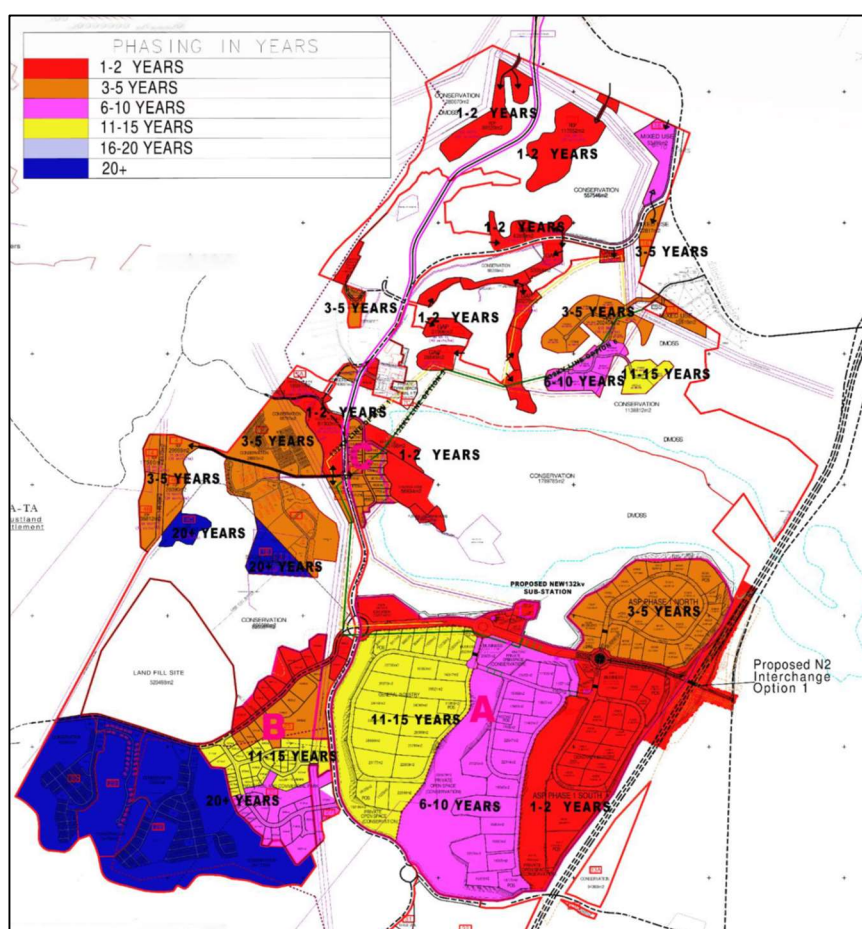


Figure 2-7: Anticipated Implementation Phasing (RK Associates, 2022)

2.3 Solid Waste Management

2.3.1 Construction Phase

The solid waste generated on site during the construction phase will be stored in skips by the appointed contractor. An appointed waste contractor will thereafter remove the general waste to the closest licensed landfill site (Lovu Landfill Site). Small amounts of hazardous waste will be generated during the construction phase (e.g. oily rags, paint containers etc.); these will be disposed of in marked bins and removed to a licensed hazardous waste landfill for disposal.

2.3.2 Operational Phase

The development falls within the jurisdiction of eThekweni Municipality, and therefore Durban Solid Waste (DSW) will be responsible for the provision of waste collection services.

(a) Waste Management and Disposal

An inclusive and comprehensive Waste Management Plan must be developed incorporating all of the individually required plans from prospective tenants. The comprehensive solid waste management plan must include, but the content is not limited to, the following:

- Contribution areas within the development;
- Type of waste generation for the contribution areas;
- Estimation of waste streams identified and waste volumes; and
- Potential recyclable waste streams.

2.4 Traffic Engineering

2.4.1 Recommendations made in the Traffic Impact Assessment

Currently the site is accessed via the P197, the following are recommendations from the Traffic Impact Assessment:

Phase 1 South only:

- Construct ASP Boulevard as 2+2
- Access to the ASP for Class 3 and 4 heavy vehicles (especially off the N2) only via the existing Umgababa interchange, P578 and P197 (south of ASP Boulevard), until the potential new N2 interchange is constructed.
- Access to the ASP for all other vehicles via P197 from both the northern and southern directions, until the potential new N2 interchange is constructed.
- Construct new P197 1+1 lane iLovu River bridge along proposed straightened P197 alignment
- Intersection upgrades be undertaken as summarised in Section 2.1.3, i.e. mainly along the R603.

- Traffic signalisation to only be undertaken when warranted.
- Access control to Phase 1 South development area (also taking phase 1 North requirements into account) be investigated further to determine access control lane requirements when operational data becomes available.
- Prepare conceptual layout design for access control arrangement based on above study findings
- Proposed layout and operations of public transport facility site to be agreed with ETA, e.g facility to provide for minibus taxi operations only and inclusion of ancillary services such as ablution facilities, offices, wash bays, etc. Site to be located adjacent to ASP Boulevard with left in access directly off ASP Boulevard and left out access onto Phase 1 South development access road, or as otherwise agreed with ETA.
- Both temporary and permanent pedestrian and cyclist facilities should be provided to ensure the safety of these vulnerable road users, e.g pedestrian pathways/sidewalks adjacent to roads and links to/from access gates and public transport facilities.
- Provision for pedestrians and cyclists should be considered in the design development of all proposed road upgrades.
- Prepare Safety Management Plan for P578 and P197 (between P578 and 400m north of the intersection) in consultation with the Mnini community - proposed upgrades to include the addition of formal sidewalks with alternative access to residences affected by the addition of the sidewalks.
- Implement Safety Management Plan for P578 and P197
- Prepare road upgrade schedule

Phase 1 South plus Phase 1 North

- Access to the ASP for Class 3 and 4 heavy vehicles (especially off the N2) only via the existing Umgababa interchange, P578 and P197 (south of ASP Boulevard), until the potential new N2 interchange is constructed.
- Access to the ASP for all other vehicles only via P197 from both the northern and southern directions, until the potential new N2 interchange is constructed.
- Upgrade R603 between the P197 and the R102 to 2+2 lanes
- Intersection upgrades be undertaken as summarised in in the TIA
- Access control to future phases be investigated further to determine access lane requirements
- Access control to Phase 1 North development area (also taking phase 1 South requirements into account) be investigated further to determine access control lane requirements when operational data becomes available.
- Prepare conceptual layout design for access to Phase 1 North based on above study findings
- Proposed layout and operations of public transport facility site to be agreed with ETA, e.g facility to provide for minibus taxi operations only and inclusion of ancillary services such as ablution facilities, offices, wash bays, etc. Site to be located adjacent to ASP Boulevard with left in, left out (LILO) access directly off ASP Boulevard, or as otherwise agreed with ETA.

- Both temporary and permanent pedestrian and cyclist facilities should be provided to ensure the safety of these vulnerable road users, e.g pedestrian pathways/sidewalks adjacent to roads and links to/from access gates and public transport facilities.
- Provision for pedestrians and cyclists should be considered in the design development of all proposed road upgrades.
- Implement remainder of Safety Management Plan recommendations for P578 and P197 (between P578 and ASP Boulevard), if not already in place
- Update road upgrade schedule

2.5 Civil Engineering Services

2.5.1 Water

eThekweni Municipality is the Water Services Authority for Study Area. eThekweni Municipality purchases bulk water from Umgeni Water which is distributed to customers by the eThekweni Water Services (EWS). The Amanzimtoti Water Treatment Works (WTW) and Craigieburn WTW are the closest WTW's to the Study Area. Amanzimtoti Water Treatment Works (WTW) receives raw water from the Nungwane Dam, which has a firm yield of 9.04 Mℓ/day, which is supplemented by water from the Umgeni System via the Wiggins WTW. The design capacity of the Amanzimtoti WTW is 22 Mℓ/day. The Craigieburn WTW has been decommissioned; currently the clear wells at Craigieburn WTP receive potable water upstream of the Quarry Reservoir. A new WTW is proposed as part of the Lower Umkhomazi Bulk Water Supply Scheme.

(a) Operational Phase

The proposed Bulk Water Supply to the ASP will be obtained from the existing Lower Illovo 1 offtake located on the existing South Coast Pipeline. This pipeline is currently supplied by the Amanzimtoti Water Treatment Plant and runs alongside the P197 on the western boundary of the development. Umgeni Water can supply up to 2-3 Mℓ/d from this offtake (currently available discharge 34.72 ℓ/s) until 2025 at the earliest when more water will become available on completion of the Lower uMkhomazi Bulk Water Supply Scheme. This scheme will supply 100Mℓ/d from 2025. However not all of this daily volume can be regarded as additional to the supply to the South Coast area as Umgeni Water may reallocate some of the daily volume currently supplied to the South Coast area from the Umgeni System (Wiggins Reservoir) to the central part of Durban. However, there should be sufficient water available to supply the 1.8 Mℓ/d estimated to be required by Phases 1 South and 1 North of the ASP in 2027.

The bulk water demands envisaged for the KZN ASP development are tabulated below.

Table 2-8: Envisaged bulk water demands for the KZN ASP development

Implementation Horizon Year of operation *	Phase	AADD (kℓ/d)	GAADD (kℓ/d)	SDD (Summer Daily Demand) kl/d
--	-------	-------------	--------------	---

1 - 2 (2024)	1South	515	644	966
3 – 5 (2027)	1North	464	581	871
ALL		980	1225	1837

**Year of Operation is the year by when it is anticipated that the bulk service for the particular phase will be required to be operational and is anticipated to be two years after implementation for that phase commences.*

GAADD: Gross Average Annual Daily Demand (GAADD)

Average Annual Daily Demand (AADD)

The estimated storage requirements (assuming these to be 48 hours of Gross Annual Average Demand) for the ASP are given in Table 2-8.

Table 2-9: Estimated Storage Requirements and Proposed Reservoir Capacity for the ASP

Implementation Horizon Year of operation *	Phase	GAADD (Mℓ/d)	Cumulative GAADD (Mℓ/d)	Cumulative Required Reservoir Storage (Mℓ)	Proposed Reservoir Capacity (Mℓ)
1 - 2 (2024)	1South	0.6	0.6	1.3	3.0
3 - 5 (2027)	1North	0.6	1.2	2.5	-

+Note that the eThekweni standard of 48 hours storage allows for operational matters including fire storage.

(b) Internal Reticulation for the ASP

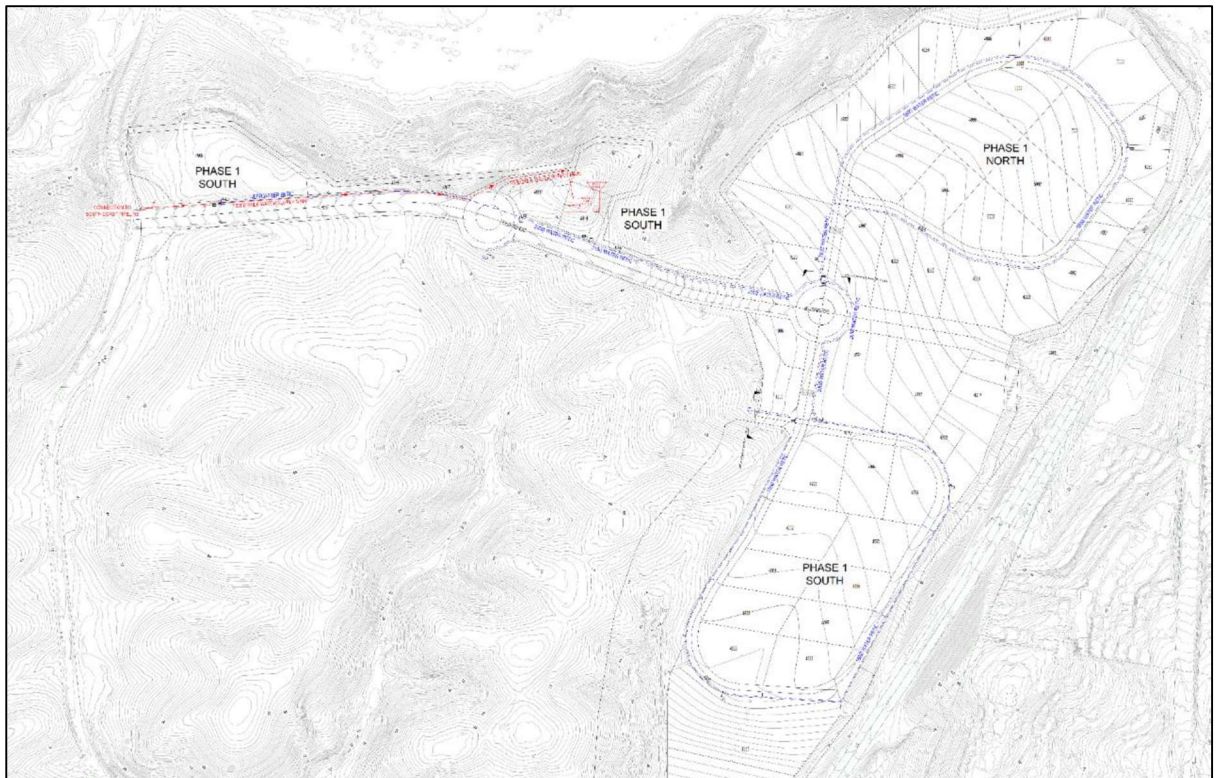


Figure 2-8: Proposed Internal Water Network

(c) Proposed storage for the ASP

The following considerations have been taken into account in determining the storage requirements for the ASP:

- The maximum proposed elevation of the bulk earthworks platforms after cut and fill operations is 62.5masl.
- The lowest proposed elevation of the bulk earthworks platforms after cut and fill operations is 27masl.
- The lowest elevation required for the supply reservoir(s) is 87.5masl to give the required supply pressure of 25m.
- There is no available location on the TEA that is at a high enough elevation.
- Storage equivalent to 48 hours of Gross Annual Daily Demand for the ASP is required.
- In terms of the eThekweni standard this caters for operational matters like fire and hence it is unnecessary to allow additional storage for fire-fighting purposes.
- EWS indicated that the minimum size for a reservoir should be 3Mℓ notwithstanding the above. This would also be prudent bearing in mind that 4 hours of fire demand could potentially draw 1.44Mℓ from the reservoir.

Hence it is proposed that:

- Reservoir(s) be constructed on the proposed Municipal Site on the northern boundary of the TEA with a top water level (TWL) of 77.5masl. The maximum static head difference between this TWL and the lowest point on the proposed bulk earthworks platforms (at elevation 27masl) is 50.5 metres which meets the eThekweni standard requiring that the maximum supply pressure should not exceed 60 metres.
- An adjacent booster installation and water tower also be constructed to provide an additional 21m supply head.

The details of the above storage facilities and their envisaged phasing are:

- By 2024 a 3Mℓ reservoir storage and an adjacent elevated 306 kℓ Water Tower with Standby Pump Station (initial duty flow 122.4 ℓ/s @ 22m, final duty flow 142.5 ℓ/s @ 23m) will be constructed.
- The reservoir storage with a TWL of 77.5masl is sufficient to supply Phases 1South and Phase 1North with their water needs. Providing 3Mℓ of storage would be prudent bearing in mind that 4 hours of fire demand could potentially draw 1.44Mℓ from the reservoir.
- The Water Tower is sized to provide two hours peak demand (in excess of four hours GAADD) to all phases.
- Both the Reservoir and the Water Tower to be supplied directly from the South Coast Pipeline under normal circumstances but with a Standby Pump Station and pumped line from the Ground Reservoir to the Water Tower to enable top up of the Water Tower from the Ground Reservoir in the event of an interruption in the supply from the South Coast Pipeline.

(d) Construction Phase

The appointed contractors will be responsible for the sustainable use of water for construction activities. No water will be abstracted from the estuary, rivers, wetlands or watercourses on and surrounding the site. Rather, a legal source of (preferably non-potable) surface water for construction purposes from an external source (offsite) must be sourced by the Contractor, prior to the commencement of works. The Contractor must ensure that water obtained during construction is from a licensed source. Proof of the source of water being licensed must be a requirement that the Contractor must adhere to.

2.5.2 Sanitation

(a) Construction Phase

Portable chemical toilets will be provided for construction workers. These toilets must be located outside of the 1:100 year flood line and more than 32m from the edge of the delineated wetlands.

(b) Operational Phase

The proposed sewerline follows the existing P197 road, R603 road, 10570 Street, Santo Alberto Avenue and Longacres Drive from the southern end of the ASP site to the site of the Kingsburgh WWTW. It is proposed that along the P197 and R603 the transfer main will be located in a new two-metre-wide servitude adjacent to these roads while elsewhere it will be accommodated within the existing road reserves.

The highest elevation of the proposed Sewage Transfer Main is 101m msl at chainage 4 708m (the total length of the pipeline from the collection chamber (adjacent to the intersection of the Boulevard Road ASP and the P197) to the vicinity of the Kingsburgh Wastewater Treatment Works is estimated to be 6 490m). The proposed Pump Station 2 in the north-east corner of Phase 1 North of the ASP will lift sewage to a stilling chamber at the highest point of the Boulevard Road from where sewage will gravitate via the collection chamber to Pump Station 4 situated some 760 metres km to the north adjacent to the P197. The purpose of this collection chamber is to allow for the entry of possible future sewage flows from other development pockets to the west and south. The sewage will be pumped from Pump Station 4 via an intermediate pump station (approximately 2km from Pump Station 4) to a stilling chamber from where sewage will drain by gravity to the vicinity of the Kingsburgh Wastewater Treatment Works. Information provided by the eThekweni Water and Sewage Department (EWS) regarding the existing sewage network between the Kingsburgh and Amanzimtoti Wastewater Treatment Works will be used to establish a suitable point to discharge the sewage in order for it to reach the Amanzimtoti WWTW at a later stage although it will initially be directed to the Kingsburgh WWTW.

The estimated sewage flows that are expected to be generated from the proposed KZN ASP are tabulated below.

Table 2-10: Estimated sewer flows for the ASP

Year of implementation (2022=year 0)	Phase	Sewer Flow per Phase (Mℓ/d)	Cumulative Sewer Flow per Phase (Mℓ/d)
1 -2 (2024)	1South	0.44	0.44
3 - 5 (2027)	1North	0.39	0.83

The estimate for the Additional Sewage Flow (ADWF) that will be generated by the other areas within the broader precinct is 3.33Mℓ/d giving a total ADWF of 4.16Mℓ/d. These figures are based on the assumption that the average sewage flows are 85% of the average water demands.

The current proposal is to transfer the sewage from the ASP to the Amanzimtoti Wastewater Treatment Works which is reported to have spare treatment capacity of some 8Mℓ/d. The proposed route from the ASP to the Kingsburgh WWTW. A pump station (Pump Station 2) will be required inside the Automotive Supply Park at the north-eastern corner of the site within Phase 1A North. A rising main will be required to pump sewage from Pump Station 2 to a stilling chamber from where it will drain by gravity to Pump Station 4 situated adjacent to the P197.

Bulk sewer infrastructure will be required within the Automotive Supply Park to link the internal sewer network to the proposed pump stations.

- Pump Station 2 in the north-east corner of Phase 1 North will be the initiating pump station for transferring sewage from the ASP to the Kingsburgh WWTW and will be sized to cater for both phases of the ASP.
- Pump Station 2 will take over from Pump Station 3 (which will be a temporary pump station) once both phases are constructed at which stage Pump Station 3 will be decommissioned.
- Pump Station 2 will then pump up to the stilling chamber on Boulevard Road and gravity feed down to Pump Station 4.
- From Pump Station 4 sewage will be pumped to the Kingsburgh WWTW via and intermediate Pump Station with the last section of the line being a gravity main.

There are two options for sizing the transfer main from the collection chamber onwards given the following:

- Assuming a velocity of 0.7m/s and a Peak Sewer Flow of 28.16 ℓ/s for the fully developed KZN ASP Phase 1S and 1n, the required pipe size is 226mm.
- Assuming a velocity of 1.2m/s and an Ultimate Sewer Design Flow for Phases 1 South and 1 North of 42.24 ℓ/s, the required pipe size is 212mm hence 315mm will give us a generous margin for any additional sewer flows that the line may be required to convey.
- Assuming a velocity of 1.2m/s and the Peak Sewer Flow for all areas of 141.71 ℓ/s, the required pipe size is 388mm, but, as most of the other contributing areas are residential, it is unlikely that their peaks will coincide and 355mm should be sufficient.

2.6 Stormwater

2.6.1 Current Conditions (Pre-development)

The site is currently largely covered by agriculture (sugar cane), pockets of grasslands and watercourses. There are several streams within the site boundary with approximately 40% of the site draining south (uMsimbazi River) and 60% to the north (Illovo River). The uMsimbazi estuary is to the south of the proposed development and is rated as a class B estuary within the NBA "11 PES rating and A/B or BAS for the Recommended Ecological Category (REC) and is the highest within the eThekweni Municipality. The conservation importance has a level 5 rating, and the protection status is ranked as 1 (extremely important). The ecological importance rating for the uMsimbazi estuary is 5 (extremely important). The classification of the water with regards to the salinity has a class A rating. Due to the sensitivity mentioned above, the post-development flows generated from the proposed development which discharge into the uMsimbazi estuary which will result from the proposed development cannot be increased. As per information, this is critical for the smaller flows, i.e., 1:5 and 1:10 year storm events.

2.6.2 Proposed Development (Post-development)

The proposed development is such that of the 248ha catchment, which drains to the uMsimbazi River side of the development, 22% (Phase 1-South) is to be developed, while 11% (Phase 1-North) of the 398ha catchment which drains into the Illovo River is to be developed. The proposed development includes for large developed industrial and commercial platforms and road areas. A large portion of these sites will be hardened or impermeable which is a contrast to the current barren site. This development will result in an increase in peak flows which will require attenuation to bring these flows down to pre-development flows.

On these developed areas, all potentially contaminated zones (hazardous chemical substances, petrol and oils) where run-off would be deemed "dirty" will be covered by a roof and bunded to ensure that none of this "dirty" or contaminated run-off will discharge into the storm water drainage system during a storm event. These areas will be required to have intercepting systems in place to deal with the dirty or contaminated water prior to being discharged into the approved system. Sustainable Urban Drainage Systems (SuDs) incorporated into each site and into the road reserves would contribute to reducing pollutants draining into the nearby rivers.

2.6.3 Objectives of the Conceptual Stormwater Management Plan

The conceptual SWMP should address the impact of project operations on the water flow and water quality processes of the hydrological cycle. The objectives of the conceptual SWMP for the proposed development include:

- Protection of property (reduce potential damage to infrastructure) from flood hazards.
- Prevention of land and watercourse erosion (especially during storm events).
- Protection of water resources from pollution.
- Maintaining the effect on downstream water quantity and quality to a minimum.

- Minimising the impact on downstream water users during construction and the operational phase. Potential adverse effects of inadequate storm water management include:
- Flooding, with the resultant damage to property, land and potentially loss of life.
- Erosion of beds and banks of waterways.
- Pollution of water resources.

2.6.4 Minor attenuation

To reduce resultant post-development peak flows to pre-development flows, stormwater attenuation or retention facilities were required. "On-site" retention was implemented on the developed sites using parking areas and a combination of the below listed SuDS option. In the model this was attained theoretically by utilising the following SuDS methods, i.e., permeable parking areas using a kerb along the low points of the sites and restricting the flow of run-off discharging from the site using restrictive outlets.

In the model, the kerb height used which bordering the proposed parking area in the developments was 400mm in height which is a height which would prevent flooding of vehicles. Should a storm event occur where the available attenuation was exceeded, the excess run-off would flow over the kerb bordering the parking area and be directed into the bioretention areas which in turn would allow the water to flow into the industrial bio-swale within the perimeter of the erf these will enhance the surface run-off to infiltrate into the ground and evapotranspiration from vegetation.

In addition, these SuDS system will protect and enhance:

- Water quality (reducing pollution from runoff),
- Natural flow regimes in watercourses,
- Provide an attractive habitat for wildlife in urban watercourses,
- Natural groundwater/aquifer recharge,
- Create better places to live, work and play

For recommended flow discharge from each proposed platform after mitigation measures have been applied (i.e., post-development flows with mitigation measures – reduced to pre-development flows), for both the 1:10 and 50 years storm events. It should be noted that the required attenuation for both storm events is achievable on each of the ERFs.

2.6.5 Major attenuation

In events where the minor attenuation facilities on the developed sites are not sufficient to fulfil the attenuation requirements for the development, additional larger facilities ('wet' pond) have been located to receive the flows which are discharged from each developed site, open undeveloped areas (outside of the property) and the impermeable road network. They will also attenuate the post development flows back to pre-development flows from the undeveloped sites where insufficient runoff controls are in place. They will serve as a temporary run-off control structure and accommodate the required attenuation.

The use of the wet ponds will improve or enhance the pollutant treatment process and allow groundwater/aquifers to recharge. Wet ponds will also provide a habitat for wildlife within the urban watercourse.

The location of the major attenuation facilities would generally be found in nearby watercourses, however, due to environmental restrictions for this development, no attenuation facilities are permitted in the watercourses. Due to this restriction, and due to the major attenuation requirements for this development, a total of 5 No. proposed properties from the proposed development were required for attenuation.

These major attenuation facilities were located in areas where the low point of the road network was located so as to easily drain run-off to these locations (overland flow routes).

2.6.6 Sustainable Drainage Systems (SuDS)

SuDS is the management of surface and sub-surface water run-off which includes the water quantity (flooding), water quality (pollution), biodiversity (wildlife and plants) and amenity. SuDS mimics nature and typically manages rainfall run-off close to where it falls. This results in attenuation and water quality (polishing) being greatly improved through cascading stormwater flow from control structure to control structure by transporting (convey) surface water runoff, slowly down before it enters watercourses, this is achieved by providing areas to store water in natural contours, which further promotes water to soak (infiltrate) into the ground or evaporated from surface water and lost or transpired from vegetation (known as evapotranspiration) further mitigating pollution risks to sensitive watercourses such as the wetlands and estuaries.

Advantages of SuDS are listed below:

- Reduce the likelihood of pollutants reaching watercourses.
- Reduce runoff by reducing impermeable areas.
- Store runoff through attenuation.
- Allow water to infiltrate into the ground.
- Convey water slowly on the surface (where it is easy to inspect and can provide local amenity and habitat for wildlife).
- Allow sediments to settle out.
- Only then, and only if it cannot be dealt with on site, conveying runoff off site, but even then, doing so slowly.

A summary of various SWMP options that integrate SuDS into their philosophy are listed below and can be used as multiple combination to attain positive results.

For the properties:

- Permeable Paving within each ERF.
- Bioretention Areas within each ERF.
- Industrial bio-swales on the perimeter of each ERF.
- Rainwater harvesting tanks for each ERF.

- For the road reserve:
- Permeable Paving in Main Roadways.
- Enhanced swales adjacent to main roads.
- Multiple discharge locations.
- Bioretention Areas at selected locations.

The use of bioretention ponds is highly recommended due to their infiltration and evapotranspiration capabilities. Multiple discharge locations ensure that the pre-development natural flows are mimicked (more or less) off the developed ASP pre-developed flows and also ensure that inevitable overtopping, in higher order storms, occurs throughout the development and not only at concentrated points which will reduce impact.

Like all drainage systems, SuDS components should be inspected and maintained. This ensures efficient operation and prevents failure. Usually, SuDS components are on or near the surface and most can be managed using landscape maintenance techniques.

2.6.7 Dirty Water

All potential “dirty” water areas are to be covered and bunded to prevent this water from contaminating the clean water from each developed site. The “dirty” water collected would need to be treated and disposed of to a system separate to the clean stormwater system.

2.7 Power Requirement for the KZN ASP Development

In negotiations with eThekweni Electricity (EE) it has been established it will take in the region of 5 -10 years for EE to get a 132kV infeed to the ASP, however until then the ASP will be fed from a 11kV source. Further to this Eskom is busy with an investigation on the upgrades required to be able to transfer the required capacity (102.2841.19MVA, of the 41.19MVA – 21.43 is for the South Phase which is scheduled for 2025 and 19.76 is for the North scheduled for 2029) on their overhead transmission lines. The future forecasted loading has been delayed by environmental issues which they may be resolved in the future by ASP. Future loading size (MVA) will depend on the town planning plot sizes.

eThekweni Electricity have indicated that they have approximately 16MVA spare capacity at eThekweni’s Kingsburgh Substation presently which they could utilise to feed the initial 1 South phases of the ASP.

eThekweni Electricity would be supplying the 16MVA from Kingsburgh Substation across the river Bridge via a medium voltage cable feed (11Kv). Presently Dube Trade Port are applying to Department of Transport to be able to fix the medium voltage cable to the bridge pillars within a steel ducting. The detail of this has not been finalised. EE have also not finalised their routing of this cable. Preliminary indications are that EE will be utilising 3 x 300mm SqSq. 11kV Aluminium cables to convey the power to the ASP development.

Table 2-11: Estimated power requirement for the ASP Phase 1S and 1N

DUBE TRADE PORT - ASP DEVELOPMENT	
Phase	Power Req(MVA)
1 South 2025-2025	21.43
1 North 2027 - 2029	19.76
TOTAL POWER REQUIREMENT	41.19

2.8 Need and Desirability of Proposed Development

The main objective of the proposed KZN ASP is to support Toyota SA Motors, who is the only (Original Equipment Manufacturer) OEM based in KZN, and to further attract other OEMs to the region. This would unlock investment opportunities, provide sustainable jobs and advance the OEMs growth trajectory in KZN.

The site earmarked for the proposed KZN ASP is located in Illovo South. Due to the availability of land as well as its strategic location, Illovo South is being viewed as an area that holds the potential to contribute to industrial / manufacturing and retail opportunities (Black Balance Projects, 2014). The eThekweni South area is advantageous in terms of the location of the proposed KZN ASP at Illovo, as automotive manufacturing currently occurs at Prospecton, with a relatively dominant advantage in the Transport equipment sub-sector. Toyota SA Motors' presence in the eThekweni South region is likely to be the key driver of the comparative advantage, with many of its supply chain role-players also located in this region to take advantage of this.

The development site is referred to as District 4 in the Illovo South Local Area Plan (ISLAP). As per the ISLAP, District 4 is the primary manufacturing hub. The development and land use proposals for District 4 are based on the requirements of the KZN ASP.

In terms of the eThekweni Municipality, Spatial Development Framework (SDF) (2018 – 2019), the site earmarked for the proposed development is located in an area earmarked for industrial development. Refer to Figure 2-22 which provides an illustration of the location of the site and its future allocation for industrial development.

The SDF is an integral component of the Integrated Development Plan (IDP) and a key spatial transformation tool which guides how the implementation of the IDP should occur in space. The SDF, therefore, guides the desirable spatial distribution of land uses within a Municipality in order to give effect not only to the spatial vision, goals and objectives of the Municipality but by directing where the city should intervene in space to achieve its transformational objective. This is achieved through the identification of metro-wide spatial priorities and spatially targeting interventions in these key areas. The SDF is also aligned with provincial and municipal sector plans and strategies as a way of ensuring that the desired spatial form and outcomes of the Municipality are achieved both horizontally and vertically (eThekweni Municipality, 2018).

The SDF (2018, p. 164) specifically notes that the City has a number of priorities that it will pursue, most of which align with national government's focus on infrastructure development and job creation, and that this includes "the development of a logistics park in Illovo to support the automotive sector".

The SDF map shows the Need and Desirability of the Proposed Development in the Context of the Preferred Location.

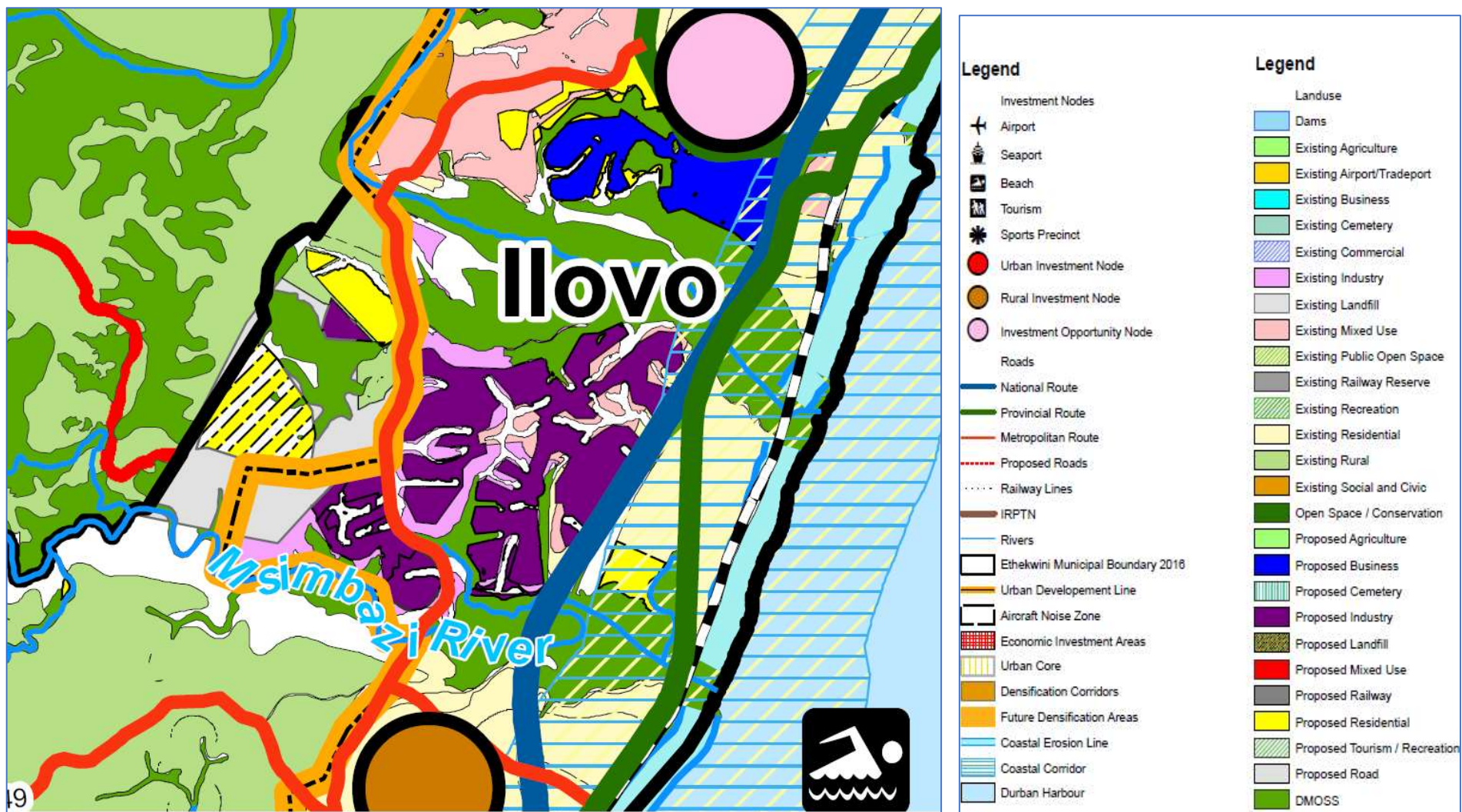


Figure 2-9: Spatial Development Framework (SDF) demarcation for the site

Furthermore, the SDF (2018, p. 332) identifies Strategic Investment Areas to help prioritise and guide development initiatives to be located in areas where the greatest impact and positive spin-offs from a city-wide scale can be achieved.

Illovo is identified in the SDF (2018, p. 332) as such a Strategic Investment Area and it notes that “The Port expansion plans, the Back of Port Plan, the Dedicated Freight Route and the Automotive Supply Park (ASP) are all integral elements of Strategic Infrastructure Project (SIP2) and will be crucial to the economy of eThekweni and the Province”.

2.8.1 The Manufacturing Sector in South Africa

The manufacturing sector is considered to be a key sector for delivering the economic growth required to tackle the triple challenge of poverty, inequality and unemployment, with the automotive industry viewed as having a significant role to play, both as employer and stimulator of economic development. Cluster development is viewed as an imperative to enhance the country’s global competitiveness, with a supportive macroeconomic environment of appropriate tariffs and incentive schemes in core industries necessary to enhance competitive and comparative advantages and thereby positively impact the country’s trade balance.

Clustering is also seen as the geographical concentration of related economic activities, in order to create economies of scale that provide benefits such as access to shared resources, larger customer bases and other suppliers, which might result in higher productivity and efficiency of business activities.

Clustering in the automotive industry is further viewed as pivotal to promoting the competitiveness of the industry, as this approach facilitates the establishment of economies of scale. This allows South African OEMs and their suppliers to compete with foreign suppliers that have much greater economies of scale in locations in Western Europe, Asia and the United States.

In terms of sectoral focus, the Industrial Policy Action Plan, 2017/18-2019/20 (IPAP) views the automotive sector as a key industry for driving manufacturing output and narrowing the country’s trade deficit.

In recent times, the relationship between OEMs and their suppliers has also changed considerably, with OEMs pushing much of their pre-assembly work out of their plants and favouring an outsourcing model, with individual suppliers each focusing on their core competency. The concept of Just-in-Time (JIT) has become a critical manufacturing process strategy as it reduces OEMs’ need for stockpiling of components, thus freeing up valuable factory space for productive activities.

“In many instances this has led to the fostering of relationships between supply chain partners which supports increased levels of outsourcing and modular production combined with JIT deliveries, ultimately leading to an increased demand for logistical coordination of

manufacturing processes. In light of this, the supplier park concept allows the concentration of dedicated production, assembly, sequencing and warehousing facilities managed by suppliers or a third party in a single location or at least within close proximity to OEMs in order to achieve synergies. It has the potential to improve the production environment and services, lower costs and take advantage of the latest advances and practices in the automotive manufacturing chain” (Nieuwoudt, 2014).

As automotive sales are a growing source of government revenue, governments in all major countries have become active automotive industry stakeholders. Their regulations on the usage of resources and environmental policies will have a strong impact on a country’s automotive industry in the years to come. The SA government has played a definite role in the development of the domestic automotive industry through programmes such as the Motor Industry Development Programme (MIDP), the Automotive Production and Development Programme (APDP).

The Automotive Production and Development Programme (APDP) is a programme set up by the national government to assist in reaching the goal of the South African automotive industry of producing 1.2 million vehicles by 2020. This is to be achieved through creating an environment that will enable registered light motor vehicle manufacturers to significantly grow production values, and component manufacturers to significantly grow value addition, with the main objective of creating new sustainable employment opportunities across the automotive value chain and enhancing the trade balance of SA.

The proposed development will, therefore, present an opportunity for the clustering of automotive manufacturing industries in the region, thereby facilitating the potential for the manufacturing sector to deliver economic growth. The automotive industry is seen as having a significant role to play, both as employer and stimulator of economic development. Overall, the proposed KZN ASP and associated land-use present opportunities for the surrounding community in terms of economic development, social investment and physical sustainability.

2.9 Feasible and Reasonable Alternatives

In terms of the EIA Regulations, 2014 (as amended), consideration needs to be given to all possible alternatives. The assessment of alternatives allows different approaches and ways of meeting the need, purpose and objectives of a proposed activity to be explored, allowing for the identification and selection of the best practicable environmental option for implementation. Alternatives for consideration may include location or route alternatives, site alternatives, design/layout alternatives, activity alternatives and process or technology alternatives, etc.

2.9.1 Location Alternatives

There are no site alternatives as the Applicant purchased the property earmarked for the KZN ASP, specifically for the proposed development of the KZN Automotive Supplier Park and its associated uses. The applicant considers the site included in this Application for Environmental Authorisation as the most suitable for the proposed development, as it is

strategically located between automotive-related manufacturing industries in Prospecton and associated facilities being planned at Illovo, which is 17km from the site. There are also no other vacant properties of the size required for the proposed KZN ASP within the eThekweni Municipality.

Toyota Production System (TPS) has a production line for just in time (JIT) manufacturing, also known as just-in-time production, which is aimed at primarily at reducing times within the production system, as well as response times from suppliers and to customers. Therefore, the site is strategically located in relation to Toyota's manufacturing plant in Prospecton, thereby maximising on the JIT delivery of automotive goods.

2.9.2 Activity Alternatives

(a) Proposed ASP (incorporating industrial land uses)

According to the Illovo South Local Area Plan (ISLAP), 2014, the site is referred to as District 4 in the ISLAP and is earmarked as an industrial/ manufacturing zone, with a specific mention of the KZN ASP and supporting service industries. Therefore, the proposed KZN ASP (incorporating industrial development) is compatible with the ISLAP. Given the influx of people from rural areas to the south of the city, the eThekweni SDF and the ISLAP has considered the area for industrial development as a needed economic generator in the south.

(b) Sugar Cane Cultivation

The current activity on site is commercial sugar cane cultivation, operated under Illovo Sugar. According to the findings of the Agricultural Impact Assessment (Appendix D3), there are no high yield potential arable soils at the site earmarked for the proposed development, and the fact that sugar cane is an industrial crop with a poor level of employment per hectare, there is no apparent reason why favourable consideration should not be given to alternate usages of the remaining few hundred hectares. This will generate, amongst other benefits, a higher employment rate per hectare of land. Permanent employment is the most widespread provider of food security (Msanzi Agriculture, 2018).

Taking a long term view, it is therefore imperative that alternative incomes be found for those currently dependent on the sugar cane industry for their livelihoods. As an alternative to sugar cane cultivation on site, activities such as industrial development will create jobs in the region.

2.9.3 Sewer Rising Main Route Alternatives

(a) Initial Alternatives proposed as part of the Original Proposal

Two sewer rising main route alignments **were originally investigated** as part of the initial ASP Development which consisted of four phases i.e., Phases 1A, 1B, 1C and 1D.

Sewer rising main route Option 1 was to be routed along the western boundary of the KZN ASP site, occurs adjacent to the road reserve of the P197 and R603, and along the municipal road (Santo Alberto Road) and Longacres Drive to the existing Kingsburgh Wastewater Treatment Works (WWTW).

Sewer rising main route Option 2 was a route that followed the road reserve of the existing N2 along the eastern boundary of the site. This route alignment was not a feasible route alignment as it would require a new pipe bridge to be constructed within the iLovu River (*which is an estuary at the proposed crossing point*). Furthermore, there are other road upgrades envisaged along the N2 including road widening and new interchanges to provide access to the site. Option 2 was therefore deemed to not be a feasible and reasonable alternative and eliminated as part of the 2019 Basic Assessment Process.

(b) Current Proposal for the Sewerline

The above options for the sewer were associated with the initial proposal, however, for the current ASP proposal of Phases 1S and 1N only, the route will start in Phase 1N (in the vicinity of Pump Station 2), travel along the proposed ASP boulevard in a westerly direction for approximately 1.5km, then in a northerly direction across the existing Lovu River Bridge along P197 then along the R603 until it reaches the Kingsburgh WWTW. The length of the route is approximately 5.8km.

This route was investigated based on the reduced extent of the ASP and the need to eliminate the initially proposed pump station in the south of the site as there is only a need to service Phase 1S and 1N. The new main pump station 4 is located to the west of the site. This is the most feasible and reasonable route for the sewerline as it will travel along existing roads for majority of the route and will cross the Lovu River along the existing bridge.

There are no alternative routes associated with the proposed sewerline.

2.9.4 Alternatives for the Proposed Powerline

(a) *Initial 132kV transmission powerline route alternatives (previous application)*

There were three alternative powerline route alignments that were considered for the proposed development. Alternative route Option 1 was selected in consultation with eThekweni Electricity and UW and was the preferred alternative and this is the only alternative investigated in this Basic Assessment Process.

During the consultation with eThekweni Electricity, key factors in selecting the most technically feasible powerline route alignment were as follows:

- Pylons must be located out of the 1:100 year flood line;
- Crossing of the powerline by the existing 132kV powerlines must be avoided;
- The pylons should ideally be located close to existing roads for accessibility during construction and operational phases (for maintenance);

- Property ownership over which the proposed powerline traverses should ideally be owned by DTPC, as a servitude would need to be registered for the proposed powerline corridor;
- Powerline routes should be kept as straight as possible (to avoid too many bends);
- Road crossings are allowed, but conductors should be at least 35m from the existing main roads (i.e., P197); and
- Proposed powerlines should not traverse fixed structures.

(b) Current Proposal of the 11kV Underground Powerline

The initially proposed routes of the 132kV powerline were considered when deriving a route for the 11kV powerline. Based on the comparative analysis and the timeline associated with the 132kV powerline, a new 11kV powerline is proposed. The following were considered when establishing a route for the 11kV powerline.

- Length of the route is similar to Option 1 of the 132kV powerline i.e., approximately 4.2km.
- With an exception to the first 800m of the route, and the last 300m of the route where it ties into the Kingsburgh WWTW, the route follows the existing P197 road and associated with existing impacts.
- There is no sub-station associated with the 11kV proposed powerline.
- There will be no pylons located within any of the watercourses or wetlands on site.
- The route will not traverse privately owned property.
- Power available immediately to supply the initial phases demand - In negotiations with eThekweni Electricity (EE) it has been established that it will take in the region of 2-3 years for EE to get a 132kV infeed to the ASP should the load demand require it, however until then the ASP will be fed from an 11kV cable. eThekweni Electricity have indicated that they have approximately 16MVA spare capacity at eThekweni's Kingsburgh Substation presently which they could utilise to feed the initial phases of the ASP.
- Underground cable therefore there are no visual impacts.

2.9.5 Site Layout Alternatives

Through several engagements at length (spanning 2 years) with the Project Team comprising of the Applicant, EAP, Traffic, Civil, Stormwater and Electrical Engineers, the Town Planner, Hydrologist, Estuarine, Terrestrial and Wetland Ecologists, one Site Layout Plan has been agreed as the preferred Site Layout Plan. Refer to the Site Layout Plan in Appendix B. This Site Layout Plan is referred to as Alternative 1 and is the preferred alternative.

Through Specialist Study findings, engagement with the Project Team and authority consultation, cognisance of environmental sensitivities such as the iLovu and uMsimbazi Estuaries, wetlands and watercourses, 1: 100-year floodlines, natural forest areas and sensitive neighbouring communities had to be taken into consideration in the development of the Site Layout Plan.

The development site layout for the proposed KZN ASP has undergone a detailed, iterative process, with input from the Town Planners, Engineers, and Environmental team, in order to avoid and minimise impact on the existing natural areas on site as far as possible, and to try and maintain a degree of landscape connectivity through the development of ecological corridors to link the Msimbazi Estuary with the Lovu Estuary. These natural areas within the study area provide essential ecosystem services such as water filtration, flood attenuation, ecological corridors and habitat for biodiversity. These habitats have high potential for rehabilitation. Ecological corridor between the two estuaries have been incorporated into the Site Layout Plan for the proposed development.

To allow movement of fauna through the landscape, the natural areas in the valleys between the platforms that form ecological corridors between the two estuaries must not be fenced. Fences must rather be erected around each platform and the boulevard.

The layout is designed to keep the platforms to the higher lying, sugar cane covered crests of the hills, and avoid the deep valleys in between, which support natural vegetation, wetlands and drainage lines. These natural areas will be connected by the proposed installation of large box culverts under the portion of the boulevard and other roads where the valleys will join.

The majority of the site is currently used for sugar cane cultivation and these areas are therefore transformed. Areas of high ecological significance/biodiversity value (natural coastal forested areas that provide high habitat diversity for flora and fauna) within the proposed KZN ASP site is steep and unsuitable for development. The vegetation will therefore not be impacted.

In order to enhance ecological infrastructure and strengthen ecosystem services in the landscape, the natural areas that fall within the development site can be rehabilitated and habitat restored to structurally sound forest and wetland. This restoration process must include the removal of all existing alien plant infestations from the wooded drainage lines, coastal thicket, and wetland areas, and include planting of appropriate indigenous species. This can become a positive impact, should the proposed development be authorised, and could help compensate for negative impacts.

Wetlands occurs within the development footprint, some of which will be retained within the proposed development as open spaces and will be rehabilitated as part of the on-site wetland rehabilitation plan for the proposed development.

Due to extensive engagement with the commenting authorities, the ASP was reduced from its original extent i.e. a four phased development to only Phase 1S and 1N as per the information in this BAR, for the following reasons:

- Comments raised in the initial PPP associated with the application for EA for all four phases i.e. Phase 1A, 1B, 1C, 1D and also the urgency to meet the deadlines for the anchor tenant Toyota. These comments pertained to the impacts on the wetlands that occur within the then proposed development footprint.
- An assessment was undertaken to determine the point at which the impacts cannot be mitigated i.e. “the tipping point”.
- As a result of this assessment, Phases 1C and 1B were excluded pending adequate mitigation measures being agreed with DFFE.
- A separate application will be submitted for these phases at such time that the mitigation measures and/or offsets are acceptable to the competent and commenting authorities.

2.9.6 No-go alternative

The “No Go” alternative refers to the alternative of not embarking on the proposed project. This alternative would imply that the current biophysical and socio-economic environment will prevail. Should the project not go ahead, there would be no negative impacts in terms of noise, visual, ecological, wetlands, air quality, traffic and other socio-economic impacts.

Without the proposed establishment of the industrial township for the proposed ASP and associated land uses, the status quo as it currently exists, would remain. Thus, in the absence of the proposed development, there would be no provision to realise the goals of the South African Automotive Masterplan (SAAM) to 2035. This Masterplan is intended to develop a clear, strategic roadmap for the development of the South African automotive industry through to 2035 (Barnes & Black, 2017).

The SAAM’s 2035 vision is the achievement of “a globally competitive and transformed industry that actively contributes to the sustainable development of South Africa’s productive economy, creating prosperity for industry stakeholders and broader society.”

The four components of global competitiveness, industry transformation, sustainable development, and societal contribution represent the aspirational heart of the SAAM vision (Barnes & Black, 2017).

However, should the no-go alternative be implemented, there will be no initiative for the South African automotive industry to be globally competitive (relative to leading international automotive producers). The second component relates to the industry’s contribution to the transformation of the South African economy. This encompasses multiple elements, from

employment equity to the greater inclusion of Black-owned firms within the automotive value chain. The no-go alternative will not lead to an impetus for this to be realised.

The third component relates to the sustainable development of the South African economy. The critical elements encompassed within this component relate to the growth of the industry, employment provided, skills developed, and the improved environmental impact of products and production processes. The final component relates to the shared prosperity created by the industry, with the critical elements here comprising the financial health and wellbeing of firms within the value chain, fair employee remuneration, and the broader contribution of the value chain to the South African fiscus. In light of the vision of SAAM, the no-go option is therefore not feasible at this stage.

The Automotive industry plays a significant role in social and economic development and therefore the Government has recognised that vehicle production and component manufacturing are important in creating new sustainable employment opportunities across the automotive value chain and enhancing the trade balance of SA. Should the proposed development not be approved, these objectives would not be attained.

2.10 Environmental Legal Requirements

2.10.1 Environmental Impact Assessment

In terms of NEMA and the associated EIA Regulations, 2014 (as amended in April 2017), Environmental Authorisation must be obtained from the relevant decision-making authority, the DEFF. This must be done prior to the commencement of certain listed activities that may result in potential negative impacts on the environment. The proposed project involves the following listed activities, as per GNR. 983 and 985 of the EIA Regulations, 2014 (as amended).

Table 2-12: Table of Listed Activities

Number and date of the relevant notice	Activity No(s) and description (in terms of the relevant notice)	Describe each listed activity as per the project description (and not as per the wording of the relevant Government Notice)
Listing Notice 1: GNR. 983 (dated 7 April 2017)	Activity 19: <i>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.</i>	As far as possible, the applicant has followed the mitigation hierarchy to avoid, minimise, mitigate, rehabilitate and/or offset as the last resort with regard to impact on wetlands. However, in instances where the development layout will encroach on wetlands, there will be more than 10m ³ of material that may be infilled or excavated as a result of the proposed development activities. The infilling is with regards to earthworks for the construction of the various platforms and roads and services infrastructure.
Listing Notice 1: GNR. 983 (dated 7 April 2017)	Activity 27: <i>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.</i>	There may be areas of indigenous vegetation that will need to be cleared to make way for the proposed development activities, but it will not exceed 20ha in extent. The majority of the site is currently used for sugar cane cultivation and these areas are therefore transformed. Areas of high ecological significance within the proposed KZN ASP site is steep and unsuitable for development. The vegetation will therefore not be impacted. Cumulatively, there will be a clearance of more than 1ha of indigenous vegetation for the construction of the sewer line, powerline, road upgrades and bulk water infrastructure.
Listing Notice 1: GNR. 983 (dated 7 April 2017)	Activity 28: <i>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: will occur inside an urban area, where the total land to be developed is bigger than 5 hectares.</i>	The proposed development of the automotive supplier park (incorporating industrial land uses) will occur on land previously used for sugar cane cultivation. The proposed development layout is approximately 264.82ha in extent and occurs within an urban area.
Listing Notice 3: GNR. 983 (dated 7 April 2017)	Activity 12: <i>The clearance of an area of 300m² 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, in</i> <i>d) KZN,</i> <i>(iv) 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,</i>	The proposed sewer line and powerline will entail the clearance of more than 300m ² of indigenous vegetation.

Number and date of the relevant notice	Activity No(s) and description (in terms of the relevant notice)	Describe each listed activity as per the project description (and not as per the wording of the relevant Government Notice)
	<p><i>within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004. (v) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</i></p>	
<p>Listing Notice 3: GNR 983 (dated 7 April 2017)</p>	<p>Activity 14: <i>The development of:</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</i></p> <p><i>Where such development occurs-</i></p> <p><i>(a) Within a watercourse; [or]</i></p> <p><i>(c) If no development setback exists, within 32 meters of a watercourse, measured from the edge of the watercourse;</i></p> <p><i>d. KwaZulu-Natal</i></p> <p><i>vii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</i></p> <p><i>xi Inside urban areas, in (aa) areas zoned for use as public open space.</i></p>	<p>The proposed development of the KZN ASP, sewer line and powerline exceeds 10m² in extent and in some instances, occurs within the watercourses and in other instances occurs within 32m of a watercourse. The study area falls within the CBA's and in D'MOSS areas.</p>

2.10.2 Water Use Licence

A specialist Wetland Assessment was undertaken by GIBB (Pty) Ltd represented by Ms. Salicia Gounden and peer-reviewed by Mr. Adam Teixeira-Leite (completed August 2019) for the proposed development of the KZN ASP project (a copy of the specialist report is attached in **Appendix D**). The findings of this assessment indicate that Wetlands found on site included the numerous seeps, three channelled valley bottoms, an unchannelled valley bottom and two riparian areas.

In terms of the National Water Act (Act No 36 of 1998) [NWA], a Water Use License Application (WULA) is required. This is a legislative process governed by the Department of Water and Sanitation (DWS) for the authorisation of all water uses defined in section 21 of the NWA (Table 2-11 below for the associated triggers).

Table 2-13: Water Uses triggered in terms of Section 21 of the National Water Act

Activity No	Description
Section 21 (c)	Impeding and diverting the flow of water in a watercourse
Section 21 (i)	Altering the bed, bank, course or characteristics of a watercourse

A pre-application meeting for the WULA process took place with DWS on 11 October 2018, 16 January 2020 and 8 June 2020. Construction of the proposed development may not commence until such time as the necessary authorisation has been obtained.

2.10.3 Other Applicable Legislation, Policies and/or Guidelines

Legislation	Applicability To The Project
The Constitution of the Republic of South Africa, Section 24 (Environmental Right):	<p><i>"Everyone has the right -</i></p> <ul style="list-style-type: none"> <i>a. to an environment that is not harmful to their health or well-being; and</i> <i>b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i> <ul style="list-style-type: none"> <i>i. prevent pollution and ecological degradation;</i> <i>ii. promote conservation; and</i> <i>iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."</i> <p>The NEMA was enacted as "a reasonable legislative measure" to give effect to the Environmental Right. The fact that the proposed development is undergoing an application process for Environmental Authorisation, in compliance with the requirements of the NEMA, will ensure the protection of this right.</p>
National Environmental Management Act, 1998 (Act no. 107 of 1998) (NEMA) and the EIA Regulations, 2014 (as amended).	NEMA is the key environmental management legislation and states in section 2(4)(k) that "the environment is held in public trust for the people, the beneficial use of resources must serve the public interest and the environment must be protected as the people's common heritage" thereby paving the way for an EIA process to assess developments that may have a harmful impact on the environment.

Legislation	Applicability To The Project
	<p>Section 28 of NEMA ensures that environmental screening is incorporated into each activity, although it is not formally termed as such. Section 28 (1) imposes a duty which requires that:</p> <p>“Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment”.</p> <p>The EIA regulations describe the EIA process to be followed including the public participation process and the listed activities that may have a harmful impact on the environment and must be assessed. For the purpose of this project a BA and associated specialist studies will be undertaken.</p>
National Environmental Management: Waste Act, 2008 (Act no. 59 of 2008) (NEM: WA)	<p>This Act provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. Also to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities.</p> <p>Although none of the proposed activities is likely to trigger activities in terms of the Waste Act, waste will still be generated on site and needs to be managed accordingly. By undertaking this BA and associated EMPr, certain mitigation measures will be implemented to reduce potential impacts of waste generation in all its forms.</p>
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004); (NEM: AQA)	<p>Crucially, in terms of section 21 of the NEM: AQA the relevant authority may promulgate a list of activities which result in atmospheric emissions which are reasonably believed to have a significant detrimental effect on the environment. No person may conduct an activity so listed without a provisional atmospheric emission licence (AEL).</p> <p>As potential tenants are not known for the proposed development activities, an AEL will not be required for the project. However, potential tenants must apply for an AEL should their activities the need for this. Prior to establishment on site, the AEL must be approved by the Local Municipality.</p>
National Water Act, 1998 (Act no. 36 of 1998) (NWA)	<p>This Act provides for the protection and management of water resources. A Water Use License Application (WULA) is made to authorise water use activities pertaining to the altering of the bed, bank, course and characteristics of the watercourse and for impeding and diverting the flow of water in a watercourse (where applicable).</p> <p>A WULA has been commissioned for the project.</p>

Legislation	Applicability To The Project
National Heritage Resources Act, 1999 (Act No. 25 of 1999); (NHRA)	<p>The NHRA serves to introduce an integrated and interactive system for the identification, assessment and management of the heritage resources of South Africa. The NHRA promotes good governance and the empowerment of civil society to preserve their heritage for future generations and states the principles of heritage resource management while making provision for legislation protecting national heritage.</p> <p>The potential impact to heritage resources through the implementation of the proposed development site for the KZN ASP is very low considering the majority of the site is on sugar cane plantation already.</p> <p>There are no heritage resources along the various access options proposed for the development, the proposed sewer line and Option 1 and 3a and 3b powerline route options.</p> <p>Option 2 powerline route alignment traverses a cemetery. However, this is not the preferred powerline route alignment.</p>
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA)	<p>The National Environmental Management: Biodiversity Act (NEM: BA) has as an objective to provide for the management and conservation of biological diversity within the Republic and of the components of such biological diversity. As such the focus of this legislation is on the preservation of species and ecosystems irrespective of whether or not they are situated in protected areas.</p> <p>Chapter 4 of the NEM: BA is particularly relevant and provides for:</p> <ul style="list-style-type: none"> • The protection of threatened or protected ecosystems, with particular emphasis on critically endangered, endangered, vulnerable and protected ecosystems. – List of Threatened Ecosystems (Notice 1002 of Government Gazette 34808 dated 9 December 2011); • Listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival. - Threatened or Protected Species Regulations (Regulation 152 of 2007). • The protection of our natural systems from invasive species. <p>Chapter 5 of this Act specifically deals with Species and Organisms Posing Potential Threats to Biodiversity. To summarise, the purpose of Chapter 5 is to:</p> <ul style="list-style-type: none"> • Prevent the unauthorised introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur; • To manage and control alien species and invasive species to prevent or minimise harm to the environment and to biodiversity in particular; and • To eradicate alien species and invasive species from ecosystems

Legislation	Applicability To The Project
	<p>and habitats where they may harm such ecosystems or habitats.</p> <p>Furthermore, Section 73 (2) states that a person who is the owner of land on which a listed invasive species occurs must:</p> <ul style="list-style-type: none"> • Notify any relevant CA, in writing, of the listed invasive species occurring on that land; • Take steps to control and eradicate the listed invasive species and to prevent it from spreading; and • Take all the required steps to prevent or minimise negative impacts on biodiversity. <p>As such, an Ecological Assessment (floral, faunal and avifaunal components) was undertaken for the KZN ASP development site, the electrical powerline route alignments and the proposed sewer line route alignment. Plant species of conservation concern, including nationally and provincially protected species were recorded within the coastal thicket on the ASP site, on the edges of the coastal thicket and sugar cane on the KZN ASP site.</p> <p>For cutting, destroying, removal or relocation, species of conservation concern and provincially protected species will require a permit from the provincial authority (EKZNW), and nationally protected trees will require a permit from the national authority (DAFF).</p> <p>The recommendation is that just prior to construction, a botanical walk-through must be conducted in the entire construction footprint to identify any such species for permitting requirements. <i>(This cannot be determined at this stage as some plants might establish in new areas between now and prior to the commencement of construction).</i></p>
Occupational Health and Safety Act, 1993 (Act no. 85 of 1993) (OHSa)	<p>While consideration for management of health and safety falls outside the purpose of this document, there are a number of overlaps and synergies that are relevant in terms of environmental management.</p> <p>The OHS Act imposes various duties on employers to ensure the health and safety of their employees, including taking steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the health and safety of their employees, providing the necessary information, instructions, training and supervision, as well as not permitting any employee to do any work or to produce, process, use, store, handle or transport any article or substance or to operate any plant or machinery unless the precautionary measures have been taken. In addition, there is a veritable myriad of regulations promulgated under the OHS Act which may have relevance to the depot project, in regard to safe working conditions in that context. They include the General Administrative Regulations, General Safety Regulations, Construction Regulations and the Environmental Regulations for Workplaces.</p> <p>The Dube TradePort Corporation (DTPC) needs to consider the general</p>

Legislation	Applicability To The Project
	duties of employers to their employees with regards to Health and Safety on site during construction. DTPC also needs to consider general duties of employers and self-employed persons to persons other than their employees.
Hazardous Chemical Substance Regulations 1995	<p>These regulations stipulate requirements for storage and handling of hazardous chemical substances and provide guidelines for the training of staff.</p> <p>Any hazardous chemical substances used during construction must be identified, stored used and disposed of in accordance with this legislation.</p>
Environmental Regulations for Workplaces 1987	These regulations specify optimal working conditions for staff including thermal conditions, illumination requirements, requirements for ventilation; noise levels etc. and also specify requirements for housekeeping.
General Administrative Regulations 2003	These regulations stipulate the administration of the various Occupational Health and Safety regulations incusing designation of health and safety committees, reporting and recording of incidents and occupational diseases.
Construction Regulations 2003	These Regulations apply to any persons involved in construction work and are therefore applicable to the construction phase. The regulations provide guidelines for safe operation during construction.
Environment Conservation Act (Act 73 of 1989)	<p>The Act outlines general prohibitions for noise control. It also specifies noise management during construction. Specifically, section 3(i) states that no person shall use any power tool or power equipment for construction, earth drilling or demolition works, or allow it to be used, in a residential area during the following periods of time:</p> <ul style="list-style-type: none"> i) Before 06:00 and after 18:00 from Monday to Saturday; and ii) At any time on any Sunday, Good Friday, Ascension Day, Day of the Covenant and Christmas Day, or any other day as may be determined by a local authority; <p>The provisions of the regulations may not apply if any person may by means of a written application, in which the reasons are given in full, apply to the local authority concerned for exemption from any provision of these Regulations.</p>
Noise induced Hearing Loss Regulations 2003	These regulations specify safe working conditions in environments where noise levels exceed safe levels and give guidelines for assessment of noise, training measures, provisions of information to staff etc.
National Environmental Management: Air Quality Act (No. 39 of 2004)	The aim is to reform the law regulating air quality in order to protect and enhance the quality of air in South Africa.
Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)	<ul style="list-style-type: none"> • Part IV: Dust Control; and • Part V: Air Pollution by fumes emitted by vehicle emissions.
National Environmental Management Waste Act (No. 59 of 2008)	Section 20 of the NEM: WA states that no person may commence, undertake or conduct a waste management activity except in accordance with a WML. A list of waste management activities that require a WML

Legislation	Applicability To The Project
	<p>was published in GNR 921 (29 November 2013). GNR 921 states that a person who wishes to commence with a waste management activity must undertake the required BA or S&EIR process in accordance with GNR 326 stipulated under NEMA.</p> <p>GIBB undertook a detailed analysis of the listed activities contained in GNR 921 none of the activities is applicable to the current project stage.</p>
National Forest Act (Act No. 84 of 1998)	<p>To reform the law on forests; to repeal certain laws: and to provide for related matters.</p> <ul style="list-style-type: none"> • everyone has the constitutional right to have the environment protected for the benefit of present and future generations; • natural forests and woodlands form an important part of that environment and need to be conserved and developed according to the principles of sustainable management; • plantation forests play an important role in the economy; • plantation forests have an impact on the environment and need to be managed appropriately; • the State's role in forestry needs to change; and • the economic, social and environmental benefit of forests has been distributed unfairly in the past.
Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)	To provide for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
KwaZulu-Natal Environmental, Biodiversity and Protected Areas Management Bill, 2014 (Gen N4, PG1314, 25 February 2015)	To provide for the establishment, functions and powers of Ezemvelo KZN Wildlife; the protection and management of the environment and biodiversity; the protection and conservation of indigenous species, ecological communities, habitats and ecosystems; the management of the impact of certain activities on the environment; the sustainable use of indigenous biological resources; the declaration and management of protected areas; and to provide for matters connected therewith.
National Spatial Biodiversity Assessment	The NSBA establishes protection and conservation priority status for terrestrial, inland water, estuarine and marine ecosystems at a 1:250,000 scale nationally and suggested implementation options for priority areas. It provides the national context for the development of biodiversity plans at the sub-national and local scale.
The Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000)	<ul style="list-style-type: none"> • Definitions (Section 1); • Procedural Fairness (Section 3, 4 and 6); • Right to Reasons for Decisions (Section 5); and • Judicial Review (Section 6 and 8).
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)	The purpose of the Promotion of Access to Information Act ("PAIA") is to give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights, and to provide for matters connected therewith.
National Environmental	In 2010, the Minister gazetted a new set of regulations on the

Legislation	Applicability To The Project
Management Act (Act No. 107 of 1998) Public Participation Guideline (GN.R807 of 2012)	requirements for conducting EIAs in terms of Chapter 5 of NEMA. In order to assist potential Applicants, interested and affected parties and environmental assessment practitioners to understand their role, the DEA has produced a series of guidelines. These guidelines must be read in line with NEMA and the EIA Regulations of 2010 as they do not substitute primary legislation. The guideline updates and revises the draft integrated environmental management guideline which was developed in 2005. The public participation guideline provides for inter alia: the minimum legal requirements for public participation processes (PPP); the steps of a PPP; guidelines for planning a PPP; and a description of the roles and responsibilities of the various role-players.
Provincial Spatial Economic Development Strategy (PSEDS)	<p>The PSEDS is aimed at transforming the structure of the economy and narrowing and eventually eliminating the gap between the first and second economies. The four pillars of the strategy are as follows:</p> <ul style="list-style-type: none"> • Increasing investment in the province; • Skills and capacity building; • Broadening participation in the economy; • Increasing competitiveness; • The PSEDS identifies the sectors of the provincial economy which will drive the growth of the province and address unemployment and poverty as follows: <ul style="list-style-type: none"> • Agriculture - including agri-industry (with opportunities to impact considerably on the economic needs of the poor through Land Reform); • Industry - including heavy and light industry and manufacturing; • Tourism - including domestic and foreign tourism; and • The service sector - including financial, social, transport, retail and government.
Accelerated Shared Growth Initiative for South Africa (ASGISA)	ASGISA resulted from Government's commitment to halve unemployment and poverty by 2014 and was launched in February 2006. ASGISA is not a government programme but a national initiative supported by key groups in the economy viz, Business, Labour, State-owned enterprises, Government economic agencies, Entrepreneurs and all spheres of government.
2035 KwaZulu-Natal Provincial Growth and Development Strategy and Plan (PGDSP)	<p>The 2035 KZN PGDS and PDGP seeks to support and promote industrial growth of development of the automotive sector as a key job creating and productive sector of the provincial economy.</p> <p>In the context of the PGDP, an infrastructure Catalytic Project is defined as a project of significant scale (i.e. its reach) and scope (i.e. impact on employment, services, economic and social investment, and/or rates), thereby displaying some or all of the following characteristics:</p> <ul style="list-style-type: none"> • It makes a substantial impact, • It provides leverage and/or creates multiplier effects, • It has the power to radically activate development (social, economic or both), • It significantly impacts spatial form,

Legislation	Applicability To The Project
	<ul style="list-style-type: none"> • It creates jobs, and increase land value; and • Contributes to the achievement of the vision and goals of the Province <p>The proposed ASP project is identified as a catalytic project that is intended to meet the Province’s strategic goals and is funded by the KZN EDTEA (Economic Development Unit). This Catalytic Project forms an integral part of the PGDP.</p> <p>There are different categories of Catalytic Projects. Some are mostly government projects driven through social need and demand, whilst others are largely private sector driven to capitalise on economic development opportunities. In this context three types of catalytic projects have been identified (KZN Provincial Planning Commission, 2017):</p> <ul style="list-style-type: none"> • Game Changers – This applies to projects that will structurally change the economy and the way we interact with it; • Major enablers – This applies to projects that will unlock downstream infrastructure services; and • Major Needs – This applies to projects that are meant to address wide-scale regional needs or significant private sector projects. <p>The significance of a project being awarded “Catalytic” status is that it will confirm that such a project had been subjected to a screening and prioritisation process of the Provincial Planning Commission (PPC) and the Infrastructure Master Plan (IMP) Team. As such, Catalytic Projects will receive preferential facilitation support and guidance, in recognition of the contribution such a project can make to achieve the growth targets of the Province. These Catalytic Projects, therefore, form an integral part of the PGDP (KZN Provincial Planning Commission, 2017).</p> <p>According to the PGDP, the KZN ASP is classified as a game-changer public sector catalytic project that will have an impact on a metropolitan scale (KZN Provincial Planning Commission, 2017).</p>
National Development Plan (NDP), 2030	<p>South Africa’s first National Planning Commission was set by President Jacob Zuma and inaugurated in May 2010. The objective posed to the National Planning Commission was to take an independent view of South Africa, and from that, derive a Vision and a Plan that is focused on enabling a much better quality of life for all South Africans by 2030. The primary channels through which improvement in the quality of life are likely to come about, are through eliminating poverty and reducing inequality - the two single biggest problems in South Africa. These aspects affect every other aspect of development and every aspect of life for the citizens of this country. As both a cause and result of these primary problems, the NDP has identified nine specific and predominant challenges:</p> <ol style="list-style-type: none"> 1. Too few people work;

Legislation	Applicability To The Project
	<p>2. The quality of school education for black people is poor; 3. Infrastructure is poorly located, inadequate, and under-maintained; 4. Spatial divides hobble inclusive development; 5. The economy is unsustainably resource-intensive; 6. The public health system cannot meet demand or sustain quality; 7. Public services are uneven and often of poor quality; 8. Corruption levels are high; and 9. South Africa remains a divided society.</p> <p>The manufacturing sector is considered to be a key sector for delivering the economic growth required to tackle the triple challenge of poverty, inequality and unemployment, with the automotive industry viewed as having a significant role to play, both as employer and stimulator of economic development. Cluster development is viewed as an imperative to enhance the country's global competitiveness, with a supportive macroeconomic environment of appropriate tariffs and incentive schemes in core industries necessary to enhance competitive and comparative advantages and thereby positively impact the country's trade balance.</p>
Industrial Policy Action Plan (IPAP), 2017/18-2019/20	<p>The Industrial Policy Action Plan (IPAP) (DTI, 2017) sets out in detail key actions and time frames for the implementation of industrial policy in South Africa. It is the apex policy document of the Department of Trade and Industry (DTI) and is drawn from a range of visions set out by successive industrial policies such as the NDP, New Growth Path (NGP), and National Industrial Policy Framework (NIPF). The IPAP sets out an industrial policy framework with overriding interventions that will prevent industrial decline and support growth, as well as diversifications of South Africa's manufacturing sectors. IPAP will ultimately lead to a restructured economy with more value-adding, labour intensive, and environmentally sustainable industrial activities.</p> <p>The IPAP sets out transversal and sectoral focus areas to guide the implementation of the policy. Of particular importance to the KZN ASP is the transversal focus of Industrial financing through incentive schemes, which is intended to support private sector investment and broad-based black economic empowerment (B-BBEE) in critical industrial sectors. A key instrument of which is the Automotive Incentive Scheme (AIS) (see the overview of the Automotive Production and Development Programme in the following section). In terms of sectoral focus, the IPAP views the automotive sector as a key industry for driving manufacturing output and narrowing the country's trade deficit.</p> <p>Clustering in the automotive industry is viewed as pivotal to promoting the competitiveness of the industry as this approach facilitates the establishment of economies of scale, allowing South African OEMs and their suppliers to compete with foreign suppliers that have much greater economies of scale in locations in Western Europe, Asia and America.</p>
The South African Automotive	The aim of the South African Automotive Masterplan (SAAM) is to

Legislation	Applicability To The Project
Masterplan to 2035	<p>develop a clear, strategic roadmap for the development of the South African automotive industry through to 2035 (Barnes & Black, 2017).</p> <p>The SAAM recognizes that the South African automotive industry's vision will only be realized through the achievement of a set of key development objectives. Six have been identified as being central to the SAAM's success (Barnes & Black, 2017):</p> <ol style="list-style-type: none"> 1. Grow South African vehicle production to 1% of global output (projected to reach 140 million units annually by 2035); 2. Increase local content in South African assembled vehicles to 60% (from a 38.74% base); 3. Double total employment in the automotive value chain (from 112,000 to 224,000); 4. Improve automotive industry competitiveness levels to that of leading international competitors (such as Turkey and Thailand); 5. Achieve transformation of the South African automotive industry through the employment of Black South Africans, upskilling of Black employees, empowerment of dealerships and authorised repair facilities, and substantially increasing the contribution of Black-owned automotive component manufacturers within the automotive supply chain; and 6. Deepen value addition within South African automotive value chains (across selected commodities/technologies).
eThekweni Municipal Spatial Development Framework (MSDF) 2018-2019	<p>The MSDF is an integral component of the Integrated Development Plan (IDP) and a key spatial transformation tool which guides how the implementation of the IDP should occur in space. The MSDF, therefore, guides the desirable spatial distribution of land uses within a Municipality in order to give effect not only to the spatial vision, goals and objectives of the Municipality but by directing where the city should intervene in space to achieve its transformational objective. This is achieved through the identification of metro-wide spatial priorities and spatially targeting interventions in these key areas. The MSDF is also aligned with provincial and municipal sector plans and strategies as a way of ensuring that the desired spatial form and outcomes of the Municipality are achieved both horizontally and vertically (eThekweni Municipality, 2018).</p> <p>The MSDF (2018, p. 164) specifically notes that the City has a number of priorities that it will pursue, most of which align with national government's focus on infrastructure development and job creation, and that this includes "the development of a logistics park in Illovo to support the automotive sector".</p> <p>Furthermore, the MSDF (2018, p. 332) identifies Strategic Investment Areas to help prioritise and guide development initiatives to be located in areas where the greatest impact and positive spin-offs from a city-wide scale can be achieved.</p> <p>Illovo is identified in the MSDF (2018, p. 332) as such a Strategic</p>

Legislation	Applicability To The Project
	<p>Investment Area and it notes that “The Port expansion plans, the Back of Port Plan, the Dedicated Freight Route and the Automotive Supply Park (ASP) are all integral elements of Strategic Infrastructure Project (SIP2) and will be crucial to the economy of eThekweni and the Province”.</p> <p>The SDF map shows the location of the ASP as proposed industrial development.</p>
Illovo South Local Area Plan, 2014	<p>The Illovo South Local Area Plan (ISLAP) was developed “to provide a strategic framework and clear phasing and implementation plan to manage development and develop a land use scheme in a manner that maximises land value {and} promotes integration and sustainability” (Black Balance Projects, 2014). The area covered by the ISLAP largely correlates with the borders of the study area.</p> <p>The ISLAP identifies the study area as a vital catalytic area with the potential to contribute towards industrial/ manufacturing and retail opportunities combined with higher density housing. The TEA is referred to as District 4 in the ISLAP and is earmarked as an industrial/ manufacturing zone, with a specific mention of the ASP and supporting service industries, which are proposed for District 5. The development and land use proposals for District 4 are based on the assumed requirements of the KZN ASP. There are significant environmental constraints limiting the availability of land for development in both of these Districts, with less than half the land in these Districts considered suitable for development (165.83ha).</p>
Municipal Bylaws	<p>The eThekweni Municipality may have certain requirements in terms of bylaws and trade permits, and a few of these may be applicable to this project, namely the following:</p> <ul style="list-style-type: none"> • Water and Sanitation Bylaw • Waste Management Bylaw • Municipal Health Bylaw <p>The proposed project needs to consider the above during the implementation of the project.</p>

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3 DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Biophysical Environment

3.1.1 Climate

The study area falls within the warm fully humid frost-free climate of the subtropical Indian Ocean Coastal belt isotherm for which temperature and precipitation seasonality is low and held relatively constant by the warm Mozambique current. Due to the site's proximity to the ocean temperatures do not fluctuate drastically, with average monthly maximum and minimum temperatures of 28 °C and 13 °C respectively. The estimated annual evaporation is $\leq 1400\text{mm}$ annually. The hottest times of the year occur from January to April. The coldest periods are experienced from June to September with a monthly minimum of 13 °C. This is also usually the driest time of the year with an average monthly rainfall ranging from 9mm to 38mm. The wettest times of the year take place from October to April (summer) with a mean annual rainfall of 1148mm taken from March 2013 – February 2014 (www.accuweather.com).

3.1.2 Soils

An Agricultural Potential Assessment was undertaken by Mzansi Agriculture for the proposed conversion of land use from a sugar cane farming activity to an industrial park (Appendix D). This assessment was carried out in order to determine whether the agronomic or agribusiness potential of this land parcel precludes or permits a change of land use from zoning as agricultural land to zoning for industrial land usage. Key findings from this study are described below.

Due to difficult terrain and shallow soils this farm would be marginal arable agricultural land if it were commercially owned. However due to the capital costs and operating structure of the sugar milling industry a poor yielding farm owned by a miller is still viable as volume throughput is critical to the profitability of a sugar mill. Poor or negative farming margins are offset by enhanced milling profits.

The site lies within the Coastal Sands and the Coastal Lowlands Soil System. Table 3-1 below provides a descriptive summary of the main features of the Soil Forms encountered at the site.

Phase 1S, 1N, the site for the proposed sewerline and powerline is characterised by non agricultural arable land with sparse areas of marginal arable land. The proposed powerline and sewerline will follow the route of existing roads in the area and therefore will not significantly impact the soils.

Table 3-1: Description of soil families on site

Soil Family	Features
Bonheim	Bonheim soils are characterised by a black blocky clay (Melenic A-horizon) topsoil over a yellow-brown or red blocky clay with variegated colours (Pedocutanic B-Horizon). These soils are usually found on the lower slopes and footslopes.
Dundee	The Dundee soil form is found on flood plains. It is created by recent alluvial deposits. Where the topsoil is stratified, deep ploughing or ripping is required in order to mix the strata for uniform rooting. Preference in these areas should be given to high yield, high-value crops.
Fernwood	Fernwood is named after the farm Fernwood between Mtubatuba and Hluhluwe. It is fine unstructured sand that was deposited along parts of the South African coastline as sediment from the Great Flood which took place some 10,000 years ago. It is first found a narrow strip in the southern KZN and then gradually widens as it moves northwards, reaching a width of 30-40 km on the Maputaland coast. This soil does little more than hold the plant upright.
Glenrosa	Glenrosa soils are widespread throughout the KZN South Coast Lowlands Soil System. Topsoil, comprising of grey loamy sand to clay is typically 200mm to 400mm deep. However, tongues of soil do penetrate into a substrate of weathering rock, thus permitting some root, moisture and nutrient penetration to a deeper level. They carry a high erosion hazard.
Katspruit	This soil is typically found in or near wetlands, seepage areas, foot slopes and valley bottoms where there is a high water table. A loamy sand to sandy loam occurs at a depth seldom exceeding 300 to 400 mm over deep mottled clay with a water table. This land is technically not arable but is often planted to sugarcane by dropping the water table through the digging of drainage ditches or the now illegal use of cambered beds.
Kroonstad	Kroonstad soils are usually found in valley bottoms and wetlands fringes where there is a gentle slope which has resulted in the latching of nutrients and organic matter, typically at a depth of 500-700mm. This is evidenced by a bleached grey or white strata technically referred to as an E-Horizon. Below this, there is a wet, grayed mottled technically as a G-Horizon.
Mispah	Mispah soils are also highly erodible with exceptionally good surface water management required. Topsoil depth is often less than 200 mm, covering a stratum of densely bedded shale or solid rock. Often found in proximity to Glenrosa soils or merging into them, depending on highly localised weathering, Mispah soils also carry a high erosion hazard.
Oakleaf	At this particular site, the Oakleaf soil form is a light sandy soil derived from alluvium. The texture at this site is such that it is borderline between the Sezela soil series (0-6 % Clay) and the Levubu soil form (6-15 % Clay). Further inland clay contents become higher. It is an easy soil to work with.
Swartland	This Soil Form is characterised by a grey to dark grey-brown sandy loam over blocky clay with variegated colours. The third stratum consists of soft decomposing rock. Although Swartland topsoil depths are typically 400 mm to 600 mm, in this instance the topsoil depth reached 1 200 mm.

The land capability class (LCC) for the majority of the site is non-arable agricultural land (LCCVI class). Small portions of the site are marginal arable agricultural land (LCCIV class). Only soils complying with Land Capability Classes I to III (LCCI to LCCIII) are readily acceptable for arable

crop cultivation: LCC IV soils may be cultivated under certain stringent and well-managed conditions. Refer to the land capability of the site in Figure 3-1.

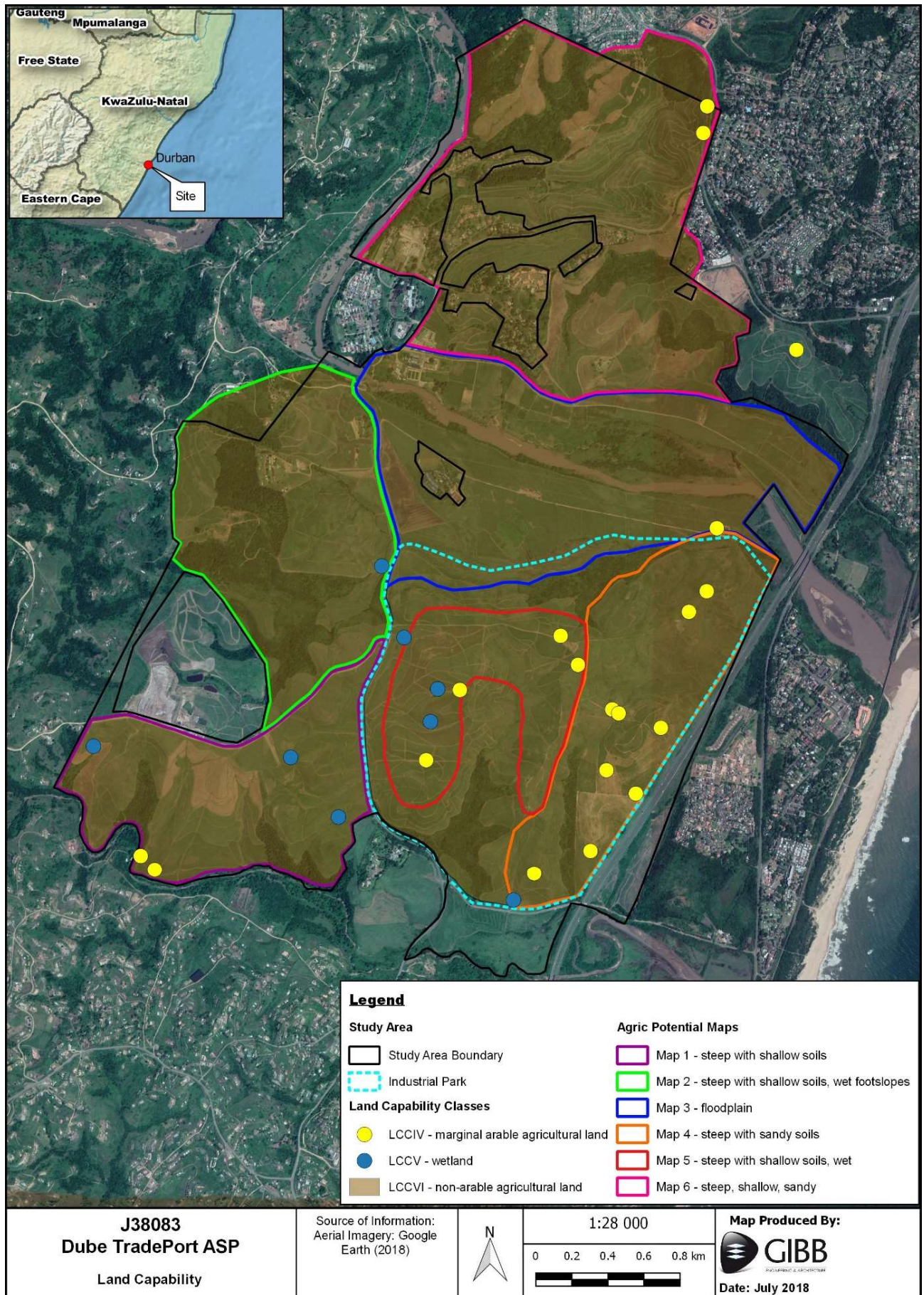


Figure 3-1: Land capability of the site

3.1.3 Geology

(a) Proposed KZN ASP site

A Geotechnical Assessment was undertaken by Syncline Geotechnical Engineers for the KZN ASP site (refer to Appendix D). The eastern portion of the study area is characterised by Quaternary age Aeolian (wind-blown) sands of the Berea Formation. The Berea sands generally extend to depths in excess of 3.0 metres below Existing Ground Level (EGL).

The central and western portions of the study area are underlain by shale bedrock of the Ecca Group – Pietermaritzburg Formation. This sedimentary unit has been intruded by Karoo-age dolerite in the form of sills and dykes (refer to Figure 3-2 which shows inferred geological boundaries). Figure 3-2 is the reduced extent of the ASP i.e. Phase 1S and 1N, a section of the sewer (orange and the internal bulk water).

Approximately 29 Hectares of Phase 1S and 11.4 Hectares of Phase 1N (including a section of the ASP Boulevard and the proposed sewerline is situated on Berea Formation Sand and is considered to have a high collapsible potential (refer to Appendix D for the full Geotechnical Report including mitigation measures associated with development on this type of geology).

Berea Formation Sand

The subsoils encountered in the areas underlain by Quaternary age aeolian (windblown) sands are described as follows:

- Slightly moist to moist, moderate brown to dark brown, loose to medium dense/soft to firm, shattered, moderately clayey, fine-grained, silty SAND to slightly sandy silty CLAY – COLLUVIUM; and
- Slightly moist to moist, orange-brown to reddish-brown with depth, loose to medium dense, slightly to moderately clayey, fine-grained, silty SAND – BEREa FORMATION. This layer extends to depths in excess of 3.0 metres below EGL.

It is well documented and understood that the Berea Formation sands exhibit a collapsible fabric. Even relatively lightly loaded structures such as single storey houses and light steel framed structures may be subjected to excessive settlements as a result of collapse occurring in the founding soils.

As collapse settlement may take place years after construction, buildings may show no signs of deformation until large settlements suddenly take place following the triggering mechanism of water penetrating into the founding soils – such as beneath foundations adjacent to leaking pipes which can result in very severe differential movement.

The angle of repose for the Berea sands is anticipated to be in the range 27 to 32 degrees. As such, all cut slopes on site should be formed to batters of 1 vertical to 2 horizontal (26 degrees) and to a height not greater than 1.5 metres. Cut batter angles and heights steeper and higher than which are recommended above will likely fail (especially after heavy rains or if additional surcharge loads are imposed on the banks).

Considering the above, it is imperative that all temporary cut slopes on site be shored or supported immediately, at the same time when the bank is being cut (and not be left exposed for even short periods). In addition to the above, the Berea Formation sands generally exhibit a low soil bearing capacity in the upper 1.5 metres below EGL and, as such, appropriate foundations should be considered and designed for the anticipated building loads.

Pietermaritzburg Formation Shale

The subsoils encountered in the areas underlain by Pietermaritzburg Formation Shale are described as follows:

- Slightly moist to moist, moderate brown to dark brown, loose to medium dense/soft to firm, shattered, moderately clayey, fine-grained, silty SAND to slightly sandy silty CLAY – COLLUVIUM;
- Slightly moist, dark greyish brown to olive-grey and yellowish-brown, soft to firm, intact, slightly gravelly, SANDY SILTY CLAY to slightly sandy silty CLAY – RESIDUAL SHALE; and
- Olive grey to dark grey, stained yellow, orange and reddish-brown, completely to highly weathered (becoming progressively moderately weathered with depth), fine-grained, intensely laminated, very highly to highly fractured, very soft to soft rock – SHALE BEDROCK.

Shale bedrock occurs at depths typically in the range 0.7 to 2.5 metres below EGL, and greater than 2.5 metres near drainage courses/valley lines.

These soils of the Pietermaritzburg Formation have been intruded, in the form of sills and dykes, by Karoo-age dolerite. These areas of intrusion have colluvial, residual dolerite and dolerite bedrock subsoils.

The bedding planes in the shale bedrock dip at angles of 5 to 15 degrees towards the east/southeast i.e. the bedrock will likely daylight out of slope in east/southeast facing cut embankments, and may be prone to sliding if not formally retained/supported. Furthermore, the intrusion of dolerite into the shale would have likely upset the natural orientation of the beds, opened up the discontinuities to allow for the latter ingress of water and the development of clay gouge along joints and bedding planes. The combination of clay gouge filled joints/bedding planes and high hydrostatic forces induced by rainwater could give rise to slope stability problems even on relatively flat bedding dips of between 2 and 10 degrees.

Considering the above, it is imperative that east/southeast facing cut embankments be inspected by a competent Engineering Geologist or Geotechnical Engineer during earthworks operations and prior to development, to ensure that adequate measures are taken to promote future stability of the site.

Karoo Age Dolerite

The subsoils encountered in the areas underlain by Karoo age Dolerite are described as follows:

- Slightly moist to moist, moderate brown to dark brown, loose to medium dense/soft to firm, shattered, moderately clayey, fine-grained, silty SAND to slightly sandy silty CLAY – COLLUVIUM;
- Slightly moist, reddish-brown, stained orange and yellow, soft to firm, intact, SANDY SILTY CLAY to silty sandy CLAY (containing dolerite gravel and corestones) – RESIDUAL DOLERITE; and
- Olive grey, speckled white, stained yellow and orange, highly to moderately weathered, fine to medium-grained, highly to very highly fractured, soft rock – DOLERITE BEDROCK.

Recommendations (Syncline, March, 2020)

- It is recommended that foundations comprise reinforced concrete strip footings (1000mm wide x 300mm thick). Foundations should be placed on soft, shale/dolerite bedrock at depths typically in the range 1.0 to 1.5 metres below final platform level (FPL) provided that the building structure is situated in cut.
- Reinforced concrete spread footings can also be considered for the proposed building structures. Foundations should be placed on soft, shale/dolerite bedrock at depths typically in the range 1.0 to 2.5 metres below final platform level (FPL) provided that the building structure is situated in cut.
- Where specialist structures with heavy loads are required (such as towers, tanks etc.), then piled foundations will be feasible. Details and recommendations for piling cannot be provided at present as this will depend on actual soil conditions and location of the structure in relation to cut to fill platforms. However, it is considered that pressure grouted Continuous Flight Auger (CFA) piles are most suitable for use on the site.
- The Berea sands are deemed feasible for stormwater disposal by subsoil percolation method, however, the residual clays (which cover the majority portion of the study area) exhibit low permeability rates and not recommended for stormwater disposal.
- Due to the presence of low permeability clayey soils and shallow bedrock across the majority portion of the study area (generally less than 3.0 metres), the use of stormwater soakpits is not recommended for the proposed development. As such, all stormwater should be led to discharge to the road hardening in a controlled manner (attenuation tank/ponds to Engineer's detail) or directly into the municipal stormwater system which should be designed to cater for such runoff.

(b) Proposed sewerline (Syncline, August, 2019)

A geotechnical investigation was carried out by Syncline Geotechnical Engineering (Pty) Ltd for the proposed new sewer rising main (Appendix D). The findings of the study are described below (please refer to Figure 3.3 and 3.4).

The northern portion of the pipeline route (IP1 – IP6) is underlain by sandy/clayey fill and colluvial soils, residual silty soils and tillite bedrock of the Dwyka Group. Weathered bedrock occurs at depths generally in the range 0.7 to 3.5 metres below EGL. In addition, a small section of the northern portion (IP7 – IP8) is characterised by sandy soils of the Berea Formation.

The central and southern portions of the pipeline route (IP9 – IP20) are underlain by sandy/clayey fill and colluvial soils, clayey residual soils and shale bedrock of the Pietermaritzburg Formation. Weathered bedrock occurs at depths generally in the range 1.3 to 3.5 metres below EGL.

Dwyka Group Tillite

- Slightly moist to moist, moderate brown to greyish brown, loose to medium dense, slightly clayey, fine-grained, silty SAND (containing builders' rubble and domestic waste) – FILL;
- Slightly moist to moist, moderate brown to greyish brown, loose to medium dense/soft to firm, intact, moderately clayey, fine-grained, silty SAND to very sandy CLAY – COLLUVIUM;
- Slightly moist to moist, yellowish-brown to orange-brown, soft to firm, intact, moderately clayey, SANDY SILT– RESIDUAL TILLITE; and
- Pale yellow, stained orange and grey, completely to highly weathered, fine-grained, very highly to highly fractured, extremely soft to very soft rock –TILLITE BEDROCK.

Berea Formation (IP7 – IP8)

The following subsoil horizons can be recognised along the portion of the route, underlain by Berea Formation sand (IP7 – IP8):

- Slightly moist to moist, moderate brown to greyish brown, loose to medium dense/soft to firm, intact, moderately clayey, fine grained, silty SAND to very sandy CLAY – COLLUVIUM.
- Slightly moist to moist, dark red to reddish brown, loose to medium dense (becoming dense with depth), moderately clayey, fine grained SAND (with boulders) – BEREa FORMATION.

Pietermaritzburg Formation Shale (IP9 – IP20)

The following subsoil horizons can be recognised along the central and southern portions of the route, underlain by shale of the Pietermaritzburg Formation (IP9 – IP20):

- Slightly moist to moist, moderate brown to greyish brown, loose to medium dense, slightly clayey, fine grained, silty SAND (containing builders rubble and domestic waste) – FILL.
- Slightly moist to moist, moderate brown to greyish brown, loose to medium dense/soft to firm, intact, moderately clayey, fine grained, silty SAND to very sandy CLAY – COLLUVIUM.
- Slightly moist to moist, dark olive, mottled orange, yellow and grey, soft to firm, intact, silty sandy CLAY – RESIDUAL SHALE.
- Dark olive, stained orange/red and grey, completely to highly weathered, very fine grained, intensely laminated, very highly to highly fractured, extremely soft to very soft rock – SHALE BEDROCK.

Recommendations (Syncline, August, 2019)

- The use of a tractor loading backhoe (TLB) or equivalent excavator should enable removal with relative ease of materials classified as SOFT in terms of SANS 1200DA. Plant with greater hydraulic power e.g. CAT 220, Hitachi EX 220 should be considered where materials resembling INTERMEDIATE are anticipated (generally where weathered bedrock is encountered). Approximately 10% of HARD ripping is anticipated along the pipeline route. Allowance should be made for using pneumatic rock hammers or a “Woodpecker” excavator where HARD materials are anticipated.
- Based on laboratory tests results, visual assessment and past experience working with similar materials the insitu subsoils are not suitable bedding material for Pipe Bedding Cradle and/or Select Fill Blanket. The subsoils and weathered bedrock can be used as Main Fill.
- It is recommended that where the pipeline trench floor comprises fill, colluvium, Berea Formation sand or residual soils, that the materials below the base of the pipeline trench be boxed out a further 300mm and replaced with a selected inert granular material (G7 or similar) compacted to achieve 95% Modified AASHTO maximum dry density.
- The angle of repose of fill, colluvium and Berea Formation subsoils is anticipated to range from 27 to 30 degrees. As such, battering back of the trench sidewalls to at least 1 vertical: 2 horizontal (26 degrees) will be required to prevent collapse of the trench sidewalls.
- Where residual clayey/silty soils occur, trenches can be battered at 1 vertical: 1.5 horizontal (34 degrees).
- Where weathered bedrock occurs, trenches can be battered at 1 vertical: 1 horizontal (45 degrees).
- Lateral restraint measures (shoring) will need to be considered for those sections of the pipeline which lie in very close proximity to existing services.
- Details for pipe jacking were not provide at the time of reporting, however, pipe jacking is anticipated to take place beneath services i.e. roads and access routes that will be in operation at all times. It is therefore necessary to carry out the thrust and reception pits and pipe jack to the very best standards to ensure that existing surfaced roads and any underground services are totally unaffected by the pipe jacking and associated operations.

(c) Proposed 11kV Powerline (Syncline,2022)

The northern portion of the powerline route is underlain by sandy soils of the Berea Formation (refer to IP1 to IP6). The remainder majority portion of the route is underlain by residual clayey soils and shale bedrock of the Pietermaritzburg Formation (which is sometimes intruded by Karoo age dolerite in the form of sills and dykes).

Alluvial clay and sand (generally extending to depths in excess of 3.0 metres below EGL) occur in the vicinity of the Lovu River and adjacent floodplain areas (refer to IP12 to IP15).

Recommendations (Syncline, September, 2022)

- Considering the above, drainage of the powerline trench is fundamental to development and construction with respect to both surface water and subsurface water movement.
- The site is generally stable and suitable for development provided that the recommendations given in the report are adhered to.
- No signs of inherent ground instability such as slip scars, tension cracks or sloughing of the subsoils were evident during the fieldwork. However, it is important to consider that the sandy soils occurring on site (Berea Formation and Alluvium) are potentially collapsible and considered susceptible to erosion by stormwater.
- The use of a tractor loading backhoe (TLB) or equivalent excavator should enable removal with relative ease of materials classified as SOFT in terms of SANS 1200DA.
- Plant with greater hydraulic power e.g. CAT 220, Hitachi EX 220 should be considered where materials resembling INTERMEDIATE are anticipated (generally where weathered bedrock is encountered).
- Approximately 10% of HARD ripping is anticipated along the powerline route.
- Allowance should be made for using pneumatic rock hammers or a “Woodpecker” excavator where HARD materials are anticipated.
- Based on laboratory tests results, visual assessment and past experience working with similar materials the insitu subsoils are not suitable bedding material for Pipe Bedding Cradle or Select Fill Blanket, however, the soils can be used for Main Fill.
- It is recommended that where the powerline trench floor comprises sandy soils, that the materials below the base of the trench be compacted thoroughly with a heavy rammer or similar to limit settlement.
- Where the trench floor comprises clayey residual/alluvial soils, the materials below the base of the trench should be boxed out a further 300mm and replaced with a selected inert granular material (G7 or similar) compacted to achieve 95% Modified AASHTO maximum dry density.
- The angle of internal friction of the sandy subsoils is anticipated to range from 27 to 30 degrees. As such, battering back of the trench sidewalls to at least 1 vertical: 2 horizontal (26 degrees) will be required to prevent collapse of the trench sidewalls.
- Where there are tight space constraints (due to the close proximity of roads, buildings and services) and the above batter angle cannot be achieved for some reason, then lateral restraint measures (shoring) will have to be considered.
- Where residual clay occurs, trenches can be battered at 1 vertical: 1 horizontal (45 degrees). Where weathered bedrock occurs, trenches can be battered steeper at 1 vertical: 0.6 horizontal (60 degrees).
- Consideration would need to be given to the invert levels of the proposed powerline in relation to the invert levels of the existing services. If the invert levels are deeper

than nearby existing services/pipelines, then consideration would need to be given to lateral support measures (such as sheet piling) for the trench sidewalls.

- It is further recommended that construction work of the proposed powerline should stay well clear of existing service boundaries. Consideration should also be given to the type of plant and compaction equipment being utilised on site as well as the compaction effort used.

(d) Proposed 132kV Powerline (Syncline, 2022)

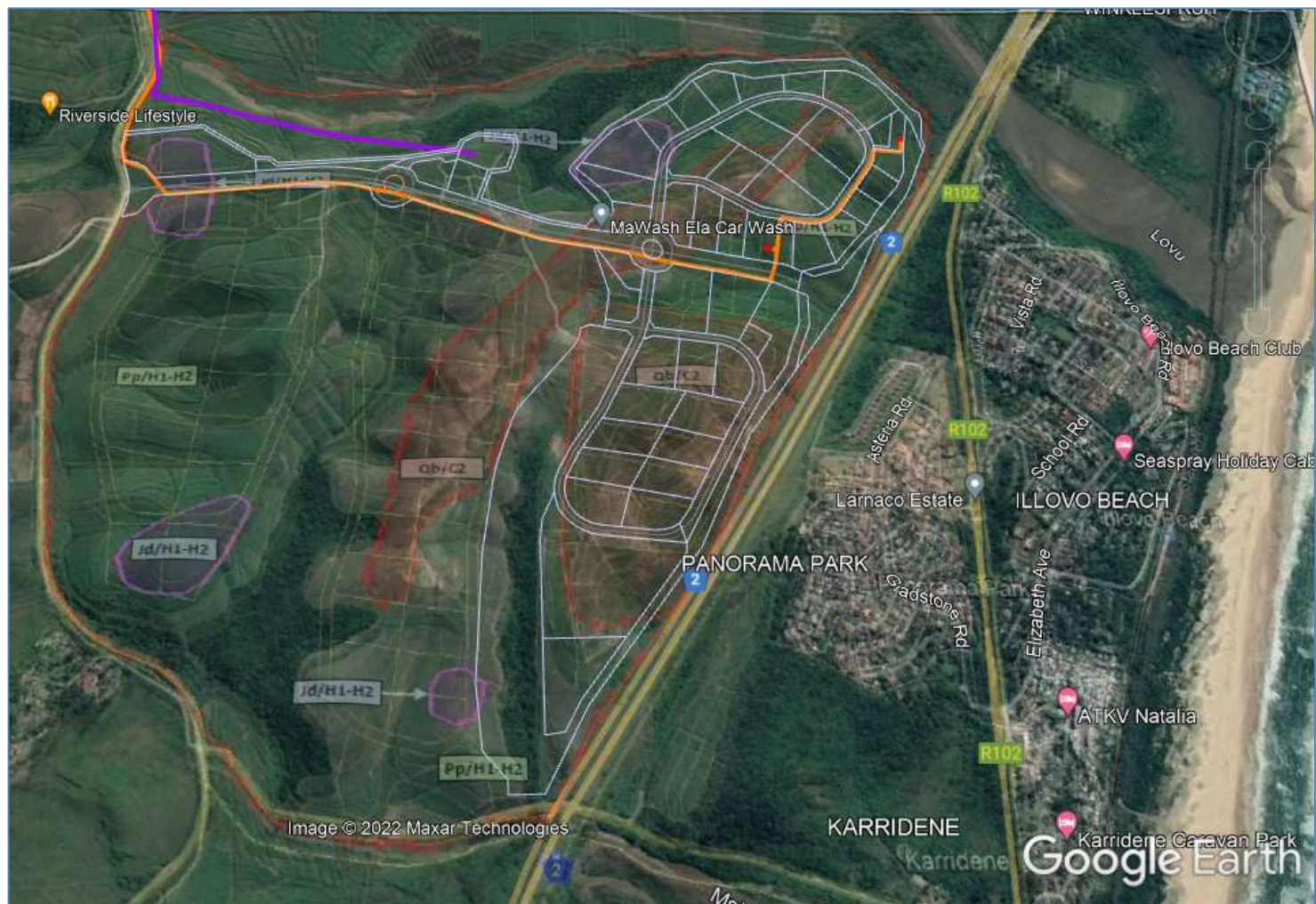
The study area is underlain by sandy fill and colluvial soils, clayey residual soils, and shale bedrock of the Eccu Group – Pietermaritzburg Formation. Bedrock occurs at depths typically in the range 0.5 to 2.0 metres below EGL, but may extend deeper in localised portions along the powerline route. The shale bedrock is intruded in some areas by Karoo age dolerite in the form of sills and dykes. The sandy residual soils which overlie the dolerite bedrock are generally in excess of 2.5 metres thick.

The permanent groundwater table was not encountered during the course of the field investigation, and is anticipated to occur at a depth in excess of 10.0 metres below EGL.

Recommendations (Syncline, September, 2022)

- The bedding planes in the shale bedrock dip at angles of 5 to 15 degrees towards the east/southeast i.e. the bedrock will likely daylight out of slope in east/southeast facing cut embankments, and may be prone to sliding if not formally retained/supported.
- It is considered that the subsoils from 0.0 to 2.0 metres depth will classify as SOFT in terms of SANS 1200DA criteria. It is anticipated that excavations from 2.0 to 4.0 metres will classify as INTERMEDIATE. Excavations below 4.0 metres (or where shallow shale bedrock occurs) classify as HARD and will require the use of pneumatic tools and possibly blasting.
- All earthworks should be carried out in a manner to promote stable development of the site. It is recommended that earthworks be carried out along the guidelines given in SANS 1200 (current version).
- The clayey subsoils (residual shale) and completely to highly weathered shale bedrock do not satisfy the criteria for a G9 quality material should this be a required subgrade. The sandy subsoils (residual dolerite) and moderately to slightly weathered shale bedrock classifies as very good to good materials (G7 – G9 in terms of TRH14, 1985).
- According to the guidelines provided by the NHBRC, it is considered that the site generally classifies as H1/H2 (potentially low to medium expansive clayey soils).
- It is likely that the foundations for the powerline pylons will comprise reinforced concrete spread footings/pad bases. Considering the above, all foundation loads should be placed on competent weathered shale bedrock at depths typically in the range 1.5 to 2.5 metres below EGL. Where the pylon is situated in areas of fill and/or thick residual soils (generally greater than 2.5 metres) then piled foundations are recommended.

- Taking into account the subsoil geology of the study area, it is considered that all piles will need to be designed to act in end-bearing, founded in the underlying competent, medium hard, shale bedrock. It is considered that pressure grouted Continuous Flight Auger (CFA) piles are suitable for use on the site.
- Earthworks and drainage measures should be designed in such a way as to prevent ponding of, or high concentrations of, stormwater or groundwater anywhere on the site, both during and after the development.



- | | |
|----------|--|
| Qb/C2 | – Inferred area underlain by Quaternary-age sandy soils of the Berea Formation (potentially compressible and collapsible as per NHBRC) |
| Pp/H1-H2 | – Inferred area underlain by Pietermaritzburg Formation Shale bedrock, (potentially low to medium expansive clay as per NHBRC) |
| Jd/H1-H2 | – Inferred area underlain by Karoo-age Dolerite bedrock, (potentially low to medium expansive clay as per NHBRC) |

Figure 3-2: Inferred geology and National Home Builders Registration Council (NHBRC)(Syncline and Google Earth, 2022)

NORTH



Test Position	Latitude (S)	Longitude (E)
IP1/DCP1	S30° 04' 32.5"	E30° 51' 20.6"
IP2/DCP2	S30° 04' 30.0"	E30° 51' 14.1"
IP3/DCP3	S30° 04' 27.1"	E30° 51' 04.7"
IP4/DCP4	S30° 04' 35.4"	E30° 50' 55.0"
IP5/DCP5	S30° 04' 44.3"	E30° 50' 49.6"
IP6/DCP6	S30° 04' 47.4"	E30° 50' 37.6"
IP7/DCP7	S30° 05' 01.4"	E30° 50' 34.4"
IP8/DCP8	S30° 05' 15.2"	E30° 50' 32.2"
IP9/DCP9	S30° 05' 25.6"	E30° 50' 20.4"
IP10/DCP10	S30° 05' 23.7"	E30° 50' 06.0"
IP11/DCP11	S30° 05' 27.0"	E30° 49' 48.6"
IP12/DCP12	S30° 05' 38.7"	E30° 49' 35.9"
IP13/DCP13	S30° 05' 47.6"	E30° 49' 25.0"
IP14/DCP14	S30° 06' 03.3"	E30° 49' 24.9"
IP15/DCP15	S30° 06' 23.0"	E30° 49' 28.8"
IP16/DCP16	S30° 06' 38.6"	E30° 49' 27.1"
IP17/DCP17	S30° 06' 54.5"	E30° 49' 21.6"
IP18/DCP18	S30° 07' 07.6"	E30° 49' 23.4"
IP19/DCP19	S30° 07' 25.5"	E30° 49' 37.8"
IP20/DCP20	S30° 07' 27.0"	E30° 49' 53.7"

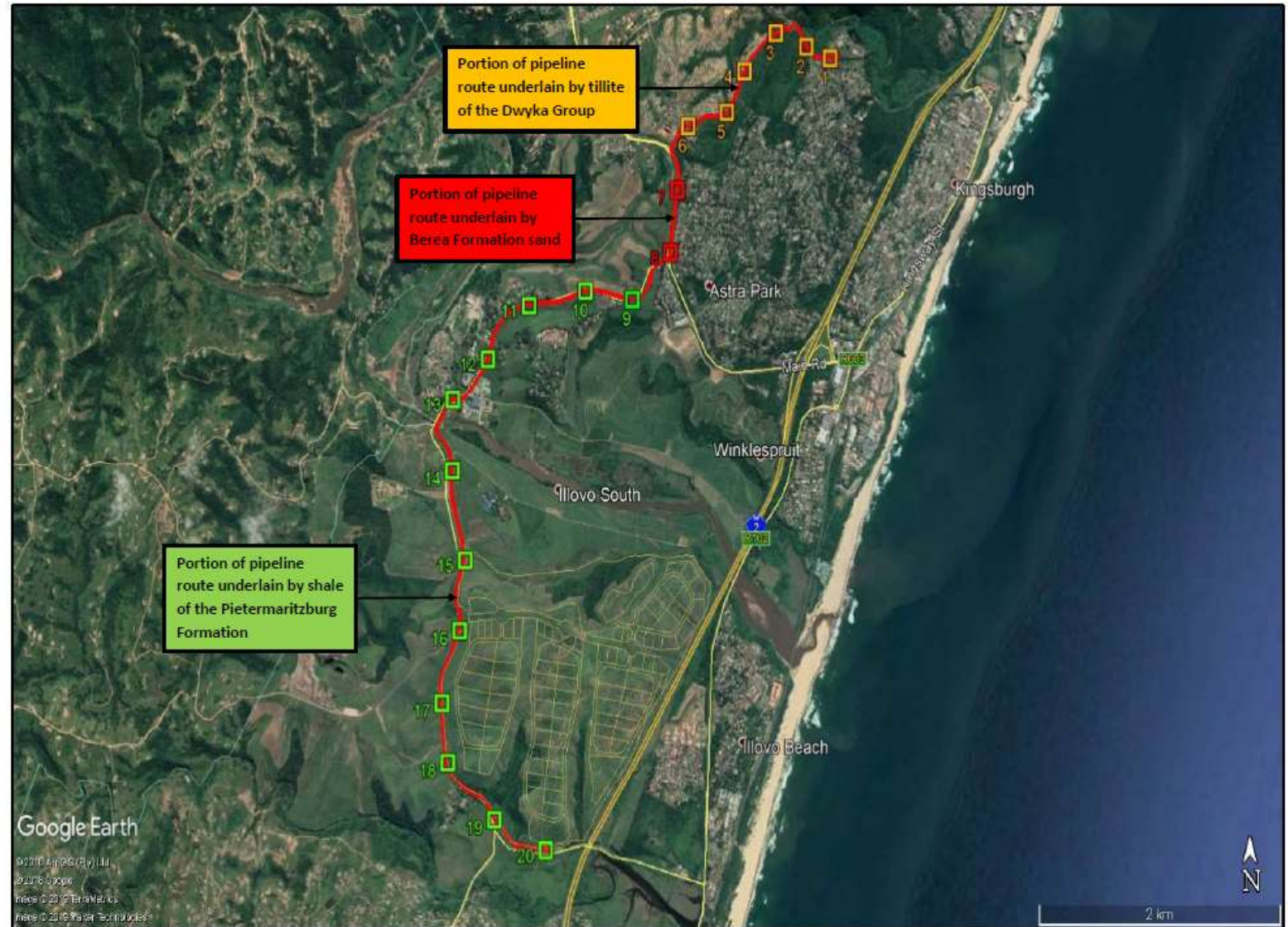


Figure 3-3: Geology map for the proposed sewer line route (Syncline, 2019) and Google Earth, 2022)

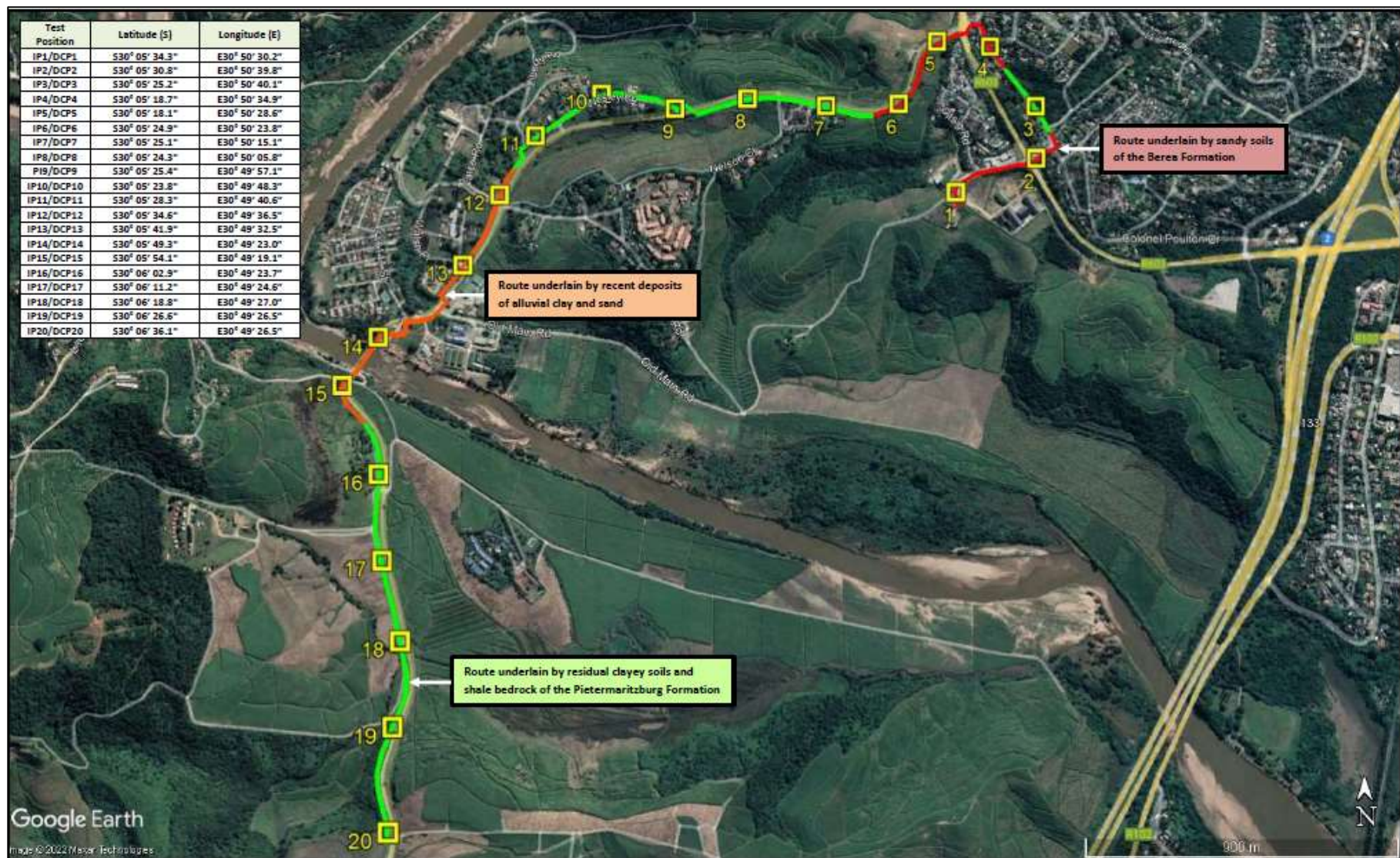


Figure 3-4: Geology map for the proposed 11kV powerline (Syncline,2022)

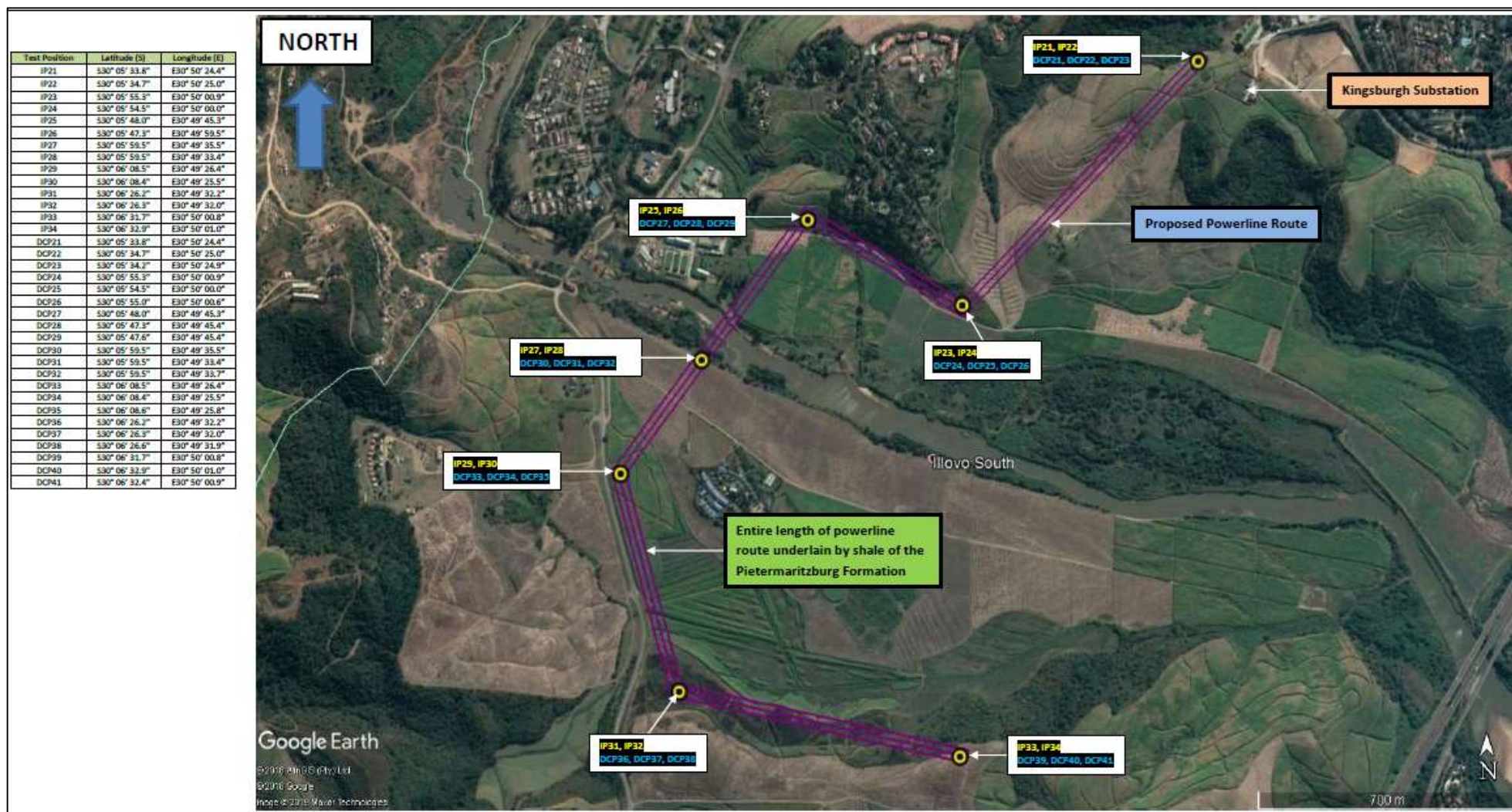


Figure 3-5: Geology map for the proposed 132kV powerline (Syncline,2022)

3.1.4 Groundwater (GCS, 2022)

(a) Proposed KZN ASP site

A Geohydrological Assessment was undertaken by GCS Consulting for the proposed KZN ASP development (refer to Appendix D). The findings of this study described below.

Desktop Findings

The regional geological map indicates that dolerite dyke and sill structures occur in the region (DMEA, 1998). Intrusive dolerite is generally associated with the Pietermaritzburg sediments. Depending on the degree of fracturing and weathering associated with the sills, the dolerite may inhibit or promote seepage and groundwater flow. However, this can only be determined by drilling into the rock.

The geotechnical investigation¹ undertaken by Syncline Geotechnical Engineering (Pty) Ltd (2018) indicated that dolerite occurs towards the north, south and west of the study area.

Available literature and site observation data further suggests that three (3) aquifers exists in the area:

- A shallow unconfined aquifer system associated with alluvium deposits, specifically in the floodplain areas of the iLovu and uMsimbazi Rivers;
- A shallower semi-confined aquifer system associated with weathered to partly consolidated sedimentary rock as well as moderately to partially weathered dolerite rock (underlying the ASP site); and
- A deeper confined fractured aquifer network associated with sediments of the Ecca and Dwyka Groups (underlying the above mentioned aquifers).

The aquifers can be referred to as being fractured with intergranular aquifer zone occurrences (King *et al.*, 1998²):

- The aquifer host rock comprises alluvium (area near the iLovu River), shale and siltstone (arenaceous rock of the Ecca group) and mafic intrusive rocks (dolerite);
- The aquifer has a low to medium hydraulic conductivity (K-value) and porosity (n-value); and
- The aquifer is mainly of secondary nature.

The aquifer in the study area is classified as a minor aquifer system (Parsons, 1995³) and is poorly exploited.

¹ Geotechnical Investigation for Proposed Dube Tradeport KZN Automotive Supplier Park Township Establishment on the Remainder of the Farm Nogi No. 17469 in Illovo South, eThekweni Municipality.

² King, G. Maritz, E. and Jonck, F. 1998. 2829 Durban - 1:500 000 Hydrogeological map series of the Republic of South Africa.

³ Parsons, R. 1995. A South African Aquifer System Management Classification. Water Research Commission Report No. KV 7795.

- This aquifer underlying the site has maximum reported yields ranging from 0.1 to 0.5l/s; and
- Yields may increase to a range > 2 l/s for successful boreholes drilled into geological contacts or deeper fractured aquifer zones (Ecca Group).

Recharge to the underlying aquifer is estimated to be in the order of 7.6 to 10 % (average 83 mm/yr) of the MAP (900 - 1000 mm) which falls within quaternary catchment U70E (DWAF, 2006⁴). A review of the GRIP (2016⁵) and NGA (2018⁶) databases indicated that there are several groundwater boreholes within a 5km radius of the Site. However, water level and chemistry data for the boreholes are limited:

- Only ten (10) boreholes have data available. No field level groundwater boreholes could be located during the field hydrocensus. Hence, only desktop database boreholes were available for this assessment.

(i) Field Investigation

The field investigation took place on the 29th of November 2018 and again in June 2022. The following summarises the findings and work completed:

- A hydrocensus was completed in the area. However, no field-level groundwater boreholes could be located. Correspondence with several residents indicated that municipal water is readily used in the area;
- All non-perennial drainage lines which fall in the ASP development area were dry during the site walk-over assessment. Hence, no surface water samples could be obtained. The only flowing water bodies were the iLovu and uMsimbazi Rivers; and
- A geophysical investigation, with the use of magnetic methods, was completed in the area. The survey aimed to trace dolerite sill contact areas or intrusive dolerite dyke structures. These structures are known to either inhibit or promote groundwater flow depending on their degree of fracturing, dip and strike direction.

Based on the geophysical survey data obtained:

- Intrusive dolerite occurs in the northern, southern and western areas of the ASP project area; and
- Depending on the degree of fracturing and weathering associated with the sills, the dolerite may inhibit or promote seepage and groundwater flow. However, this can only be determined by drilling into the rock.

Based on the numerical flow model and available groundwater level data:

⁴ DWAF. 2006. Groundwater Resource Assessment II (GRA2) - Task 3aE Recharge. Access Site: <https://www.dwaf.gov.za/Geohydrology/gra2/3aEFinalReportA.pdf>.

⁵ GRIP. 2016. Groundwater Resource Information Project data.

⁶ NGA. 2018. National Groundwater Archive.

- According to available data, the groundwater levels within the region are expected to range from 2 to 120 (on average 19.3) metres below ground level (mbgl). However, a shallow perched groundwater table is likely to occur in close proximity to drainage courses and rivers, at depths typically in the range of 0.5 to 3.5 mbgl. According to the Geotechnical Assessment by Syncline (2018) no groundwater seepage was encountered during the excavation of several test pits in the study area (pits ranged from 1 to 3 mbgl);
- Available data suggest that the groundwater table mimics the topography; and
- The flow model indicates groundwater flow velocities ranging from 0.01 (minimum) to 0.06 (max) m/day. Those above suggest very slow-moving groundwater in the study area.

(ii) Hydrochemistry

Limited groundwater quality data is available for the study area. However, available literature (King *et. al.*, 1998) suggest that the electrical conductivity (EC) for the underlying aquifer generally range between 0 – 300 mS/m and the pH ranges from 6 to 8. In context, this means that groundwater can generally be used for domestic, irrigation and recreational use.

Hydrogeological Impacts

No groundwater users were identified downstream of the ASP area. Hence, impacts on groundwater users are low to insignificant. However, based on the source-pathway-receptor principle, the following receptors of potential pollution are noted:

- The vadose zone and subsequent aquifer; and
- The various non-perennial drainage streams, Lovu and Msimbazi Rivers.

Based on the Intermediate Groundwater Reserve Determination (IGRD) conducted for the site, the groundwater balance indicates a surplus-value in the order of + 5 093.88 m³/d (1 859 266.2 m³/a) on a sub-catchment scale – pre-development. o Considering the proposed development plan and an estimated recharge reduction in the order of 54%, the development is estimated to have an impact in the order of 6.24 % on the reserve.

The impact can be considered low.

Based on available data, the aquifer can be considered unstressed or at a low level of stress (Category A) based on the estimated groundwater use on a sub-catchment scale.

Limited groundwater quality data could be obtained for the ASP area. However, available literature data suggest that:

- Groundwater generally exhibits natural pH conditions.
- Groundwater samples typically plot within an EC range of 70 to 300 mS/m, which is expected for samples obtained from boreholes situated close to/in a marine environment.

Considering the methodological approach the potential future impacts associated with the ASP site, in terms of groundwater, were considered and likely to be low. This is based on the nature of the project (primarily land development) and the assessment of the likely risk associated with the project activities. Groundwater and surface water risk can further be managed by routine monitoring and implementation of mitigation measures (as outlined in Section 6).

Concerning the above-mentioned, it is our opinion that there are no reasons for the development not to proceed from a hydrogeological perspective.

Recommendations

- All waste generated during construction on site (this is temporary waste i.e., building rubble, garden refuse, used oil and paint containers etc.) must be stored in designated areas which are isolated from surface drains. Waste storage facilities should be covered to prevent dust and litter from leaving the containment area and rainwater accumulation.
- Minimise the amount of exposed ground and stockpiles of building material (i.e., sand, cement, wood, metal, paint, solvents etc.) to prevent suspended solid transport loads and leaching of rocks/materials. Stockpiles can be covered, and sediment fences constructed from a suitable geotextile.
- It is recommended that a hydrogeologist be appointed during construction activities to periodically inspect the earthworks and site development activities. This will allow confirmation of groundwater-related risks and mitigation measures as presented in this report. Moreover, the geohydrologist will be able to site the monitoring borehole drilling positions and supervise the drilling of the boreholes.
- Monitoring should be implemented according to the monitoring plan, outlined in Section 6 of the report.

(b) Proposed sewer line and powerline

GCS Water and Environment (Pty) Ltd conducted a geohydrological investigation to assess any existing and likely future groundwater-related impacts by the proposed ASP power and sewer lines development (Appendix D). The findings of the study are described below.

Available literature and site observation data suggest that three (3) aquifers exist in the area:

- A shallow unconfined aquifer system associated with alluvium deposits, specifically in the floodplain areas of the Lovu, Msibanzi and Little Manzimtoti Rivers.
- A shallower semi-confined aquifer system associated with weathered to partly consolidated sedimentary rock as well as moderately to partially weathered dolerite rock; and
- A deeper confined fractured aquifer network is associated with sediments of the Ecca and Dwyka Groups.

The aquifers underlying the ASP sewer & power lines has maximum reported yields ranging from 0.1 to 0.5 l/sec – Class D2 Aquifer.

GW is typically encountered in:

- Dolerite dyke and sill contacts with the argillaceous rock;
- Fractures recharged through overlying weathered dolerite; and
- Dolerite dyke contacts with competent rock such as crystalline rock, sandstone and diamictite (King et al., 1998).

Based on available GW levels within the region are expected to range from 2 to 30 mbgl; Recharge to the underlying aquifer is estimated to range from 3 to 7.6 % (average 5.3 %) of the MAP (average 997 mm/yr).

The aquifer is an important contributor to GW baseflow to streams and rivers (King et al., 1998).

The aquifer present can be classified as a Minor Aquifer system (Parsons, 1995).

Hydrochemistry

No field sample data is available for the site. However, GCS has GW monitoring data [internal GCS monitoring data] for the Lovu Landfill site, situated west of the ASP project area. Based on available data, extrapolated to the ASP site, GW typically exhibit neutral pH conditions (range from 7 to 8) and electrical conductivity (EC) ranges between 58.7 to 153.1 mS/m indicating fresh to brackish groundwater is present in the area. This indicates that GW abstracted from the aquifer can generally be used for domestic and recreational use (DWAF, 1998).

Hydrogeological Impacts and Risk Assessment

Based on the SPR model, the following receptors are noted for the project area:

- The vadose zone and the subsequent aquifer; and
- Non-perennial drainage systems, Lovu, Msibanzi and Little Manzimtoti Rivers.

No GW users were identified downstream of the proposed ASP sewer & power lines.

The risk and impact assessment that was undertaken suggests that the GW impact at the site (quantity and quality) is low to moderate. Moreover, impacts on groundwater dewatering and reduced baseflow at the site are anticipated to be zero – due to there not being a borehole on site.

The development is unlikely to have an impact on the groundwater quantity (i.e. reduction of groundwater recharge), due to its small scale.

The DRASTIC evaluation of the study area indicated that aquifer vulnerability for the Lovu River area is high to very high, and the remaining area is very low to moderate. In context, this means that pollution at the Lovu River and associated floodplains should be prevented at all costs. The proposed power line substation will be situated in a low to moderate vulnerability area.

There are no major GW risks associated with the construction and operational phase of the proposed ASP Sewer Line & Power Line. The risk rating undertaken shows a low to moderate rating with mostly revisable impacts, and will likely change to very low after implementation of the proposed mitigation measures (refer to Section 3). GW risk can further be managed by routine monitoring and implementation of the proposed mitigation measures.

Recommendations

The following recommendations are made:

- All waste generated during construction on-site (i.e. building rubble, used oil and paint containers etc.) must be stored in designated areas which are isolated from surface drains.

Waste storage facilities should be covered to prevent dust and litter from leaving the containment area, and to prevent rainwater ingress.

- Minimise the amount of exposed ground and stockpiles of building material (i.e. sand, cement, wood, metal, paint, solvents etc.) to prevent suspended solid transport loads and leaching of rocks/materials. Stockpiles can be covered, and sediment fences constructed from a suitable geotextile.
- Routine inspection along the sewer line should be conducted to visually check for possible oil spills from machinery and equipment.
- The Department of Environmental Affairs (DEA) published a generic Environmental Management Plan (EMP) for substations and powerlines (22 March 2019). It is proposed that the mitigation and monitoring plan presented in this report be further supplemented by the generic EMP document.

3.1.5 Hydrology (Flood lines)

(a) Proposed KZN ASP site, Sewerline and Powerlines (GroundTruth, 2022)

GroundTruth carried out hydrological modelling of the catchments contributing to flows within the watercourses adjacent to the proposed ASP powerline and sewer line routes. Two different hydrological modelling techniques were used for the vastly different sized catchments. In summary, the results obtained from the Unit Hydrograph method were used for the Lovu River's catchment with a 1:100-year peak discharge of 1156 m³/s, while the results of the Rational Method were used for the smaller watercourses, where the 1:100-year peak discharges are shown in Table 4-6 of the Hydrology Report in Appendix D of the BAR.

Following the hydrological modelling, a HEC-RAS two-dimensional model was set up and used to update the initial floodline model using updated dimensions surveyed from a recent site visit to the Lovu River as well as existing minor road culverts along the proposed routes. Backwater effects of the reasonably considered worst case scenario tidal elevations were also used in order to cater for any backwater effects that may influence the 1:100-year floodlines. The updated hydraulic model was run for all rivers and tributaries that cross, or are near the proposed powerlines, sewer line, or the new development layout, in which the previous model either did not cover, or where the terrain of these study areas has varied over the years. The stability of the model was checked using the courant number and it was concluded that the model was stable.

The floodline modelling exercise concluded that there are a few instances where the alignments of the sewer line, the powerlines and the development layout fall within the modelled 1:100-year flooded extents. Depending on the infrastructure in place, mitigation measures may be required to reduce the flood risk within these areas. GroundTruth carried out hydrological modelling of the catchments contributing to flows within the watercourses adjacent to the updated proposed ASP powerline and sewer line routes. Two different hydrological modelling techniques were used for the vastly different sized catchments. In summary, the results obtained from the Unit Hydrograph method were used for the Lovu River's catchment with a 1:100-year peak discharge of 1156 m³/s, while the results of the Rational Method were used for the smaller watercourses, where the 1:100-year peak discharges are shown in Table 4-6 of the Hydrology Report (Appendix D).

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development layout, in which the previous model either did not cover, or where the terrain of these study areas has varied over the years. The stability of the model was checked using the courant number and it was concluded that the model was stable.

The floodline modelling exercise concluded that there are a few instances where the alignments of the sewer line, the powerlines and the development layout fall within the modelled 1:100-year flooded extents. Depending on the infrastructure in place, mitigation measures may be required to reduce the flood risk within these areas. These mitigation measures are presented within the Stormwater Management Plan in Appendix E of this BAR.

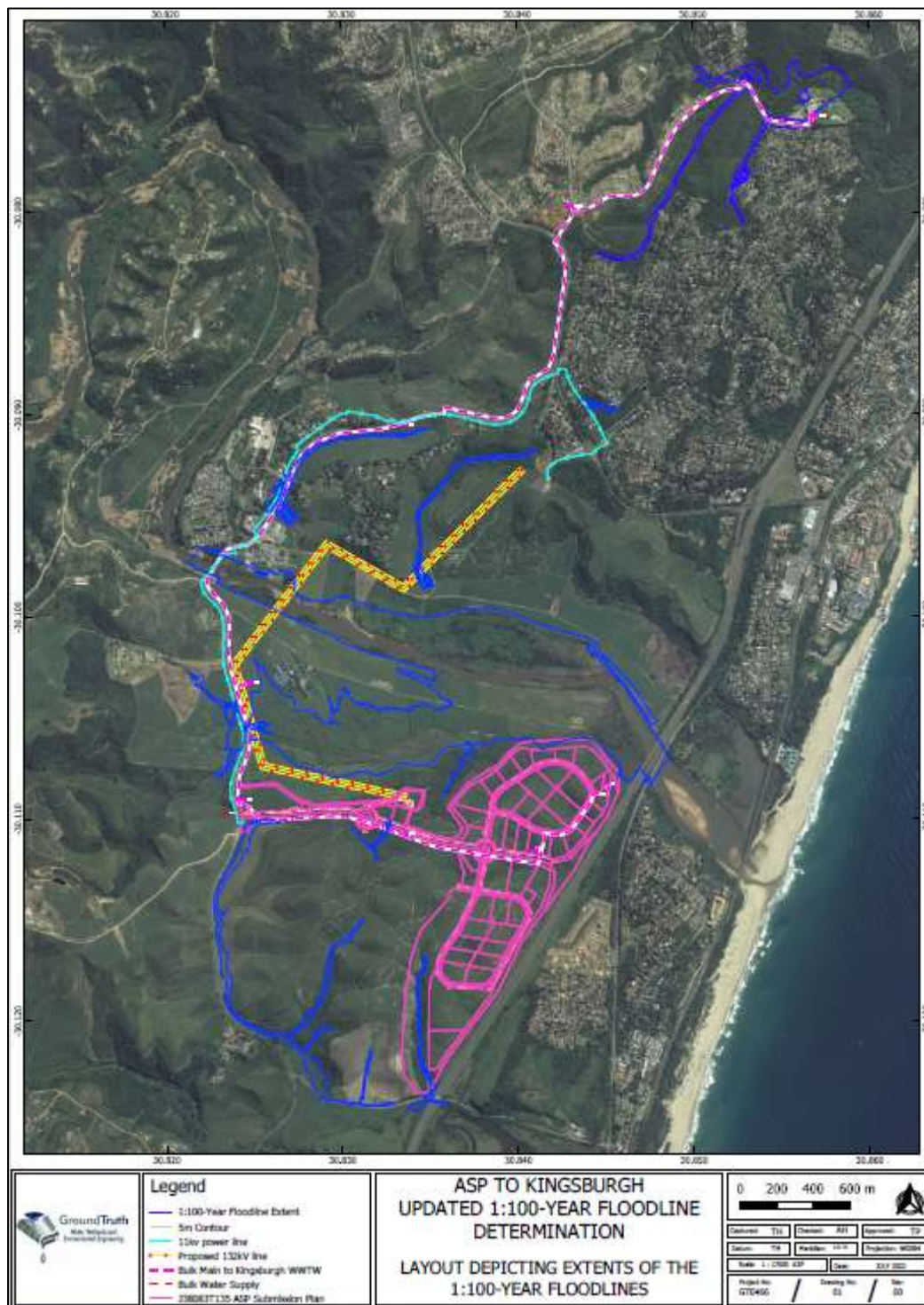


Figure 3-6: 1:100 year flood lines for the proposed ASP Site, associated powerlines and sewerline

3.1.6 Freshwater Environment (GIBB, 2019 and GroundTruth, 2022)

The study site is situated in Illovo which places it in tertiary catchment U70 and quaternary catchments U70D which has an annual runoff of 11.9 million m³ and comprises of an area of 208 km², and U70E, covering an area of 87 km², which forms a part of the uMsimbazi River and iLovu River Catchments. Freshwater wetlands were present on the site connected to the local drainage network leading to the Illovo and uMsimbazi estuaries.

As per the findings by Umgeni Water, the uMsimbazi and iLovu Rivers suffer from a turbidity problem as a result of improper farming practices and overgrazing occurring within the catchment, which has given rise to soil erosion. Additional problems affecting the catchment includes; high *E. Coli* levels within watercourses due to inadequate infrastructure of the surrounding informal settlements, as well as high phosphate levels which are attributed to over fertilisation of the agricultural lands.

A number of wetlands within 500m of the study site were not assessed due to there being no hydrological link to the development site. The systems have been transformed by extensive sugar cane cultivation and encroachment of alien invasive species.

(a) Proposed KZN ASP site

A wetland assessment report was undertaken by GIBB (2019) to determine the anticipated impacts of the proposed development of the ASP on the receiving wetland environments.

Based on the review of the site, a suite of hydrogeomorphic (HGM) units were identified, which included inter alia seeps, valley-bottoms, floodplains and riparian zones, which covered an area of 117.4ha. Of this area, it was estimated that 21.9ha of wetland habitat would be lost, which was equivalent to approximately 48% of the wetland area within the proposed development site. The loss associated with the proposed development was translated into functional and habitat equivalents, assuming a 'Best Practical Rehabilitated State', and as such the loss of 21.9ha of wetland habitat was considered to be equivalent to 20.2ha of functional wetland habitat and 13.9ha of habitat equivalents. Although the wetlands are generally considered to be degraded, "the significance of loss of wetland areas exceeding 20ha in extent is considered 'high' given the extent of the development (GIBB 2019, pp. 54)". This was further supported by the fact that the development is located within the eThekweni Municipality and coastal zone where the loss of wetland habitat is considered to be at critical levels. In order to mitigate the loss of wetland habitat associated with the proposed development, suitable offsets would have to be identified to compensate for the loss of wetland habitat and the regulating and supporting services supplied by these wetlands (GIBB 2019).

The rehabilitation of the remaining wetlands onsite provided limited opportunity for the mitigation of the impacts associated with the proposed development, i.e. due to having to account for the reasonable rehabilitated state prior to being able to account for any gains; and as such offsite opportunities to mitigate the impacts needed to be identified. Such a study was undertaken by Eco-Pulse in 2019, in which wetland offset receiving areas were identified.

A review of the Wetland Assessment Report and the on-site wetland rehabilitation strategy was undertaken by GroundTruth (June, 2022).

- (b) GroundTruth Review of the Wetland Assessment Report and the on-site Wetland Rehabilitation Strategy (GroundTruth, 2022)

In order to determine the impact of the proposed ASP development, it was necessary to 1) review and classify the lost freshwater ecosystems (riparian or wetland habitat) (predominantly undertaken by Eco-Pulse 2019a) and 2) understand the ecological state of the freshwater ecosystems following the proposed construction activities.

Phases 1-North and 1-South of the development are located along the eastern study site boundary, along the western boundary of the N2 highway and fall within the iLovu and the uMsimbazi catchments. The most recent development layout indicates that this phase of the development will largely incorporate general industrial land uses, with smaller areas prioritised for business and light industry. Open areas have been assigned to the remaining natural areas buffering the development footprint, which is anticipated to be utilised for recreational purposes. Considering only the Phase 1-South development, it is anticipated that 7.4ha and 2.5ha of wetland habitat will be lost within the iLovu and uMsimbazi catchments, respectively (Figure 3-13). The wetlands within the iLovu catchment are considered to be equivalent to 2.2hectare of functional wetland habitat, whilst the wetlands within the uMsimbazi catchment are considered to be equivalent to 1.2ha of functional habitat. Based on the reasonable attainable rehabilitated state approach (i.e. opportunity lost) – as advocated by the relevant authorities, the functional hectare equivalents for the iLovu system would be 5.1hectare equivalents, whilst for the uMsimbazi system it would be equivalent to 2.2 hectares. Based on Eco-Pulse's (2019) assessments, the functional and habitat hectare equivalent targets were calculated for the two catchments. For the iLovu catchment, the functional hectare equivalent target is 6.4, whilst the habitat hectare equivalent target is 3.8. For the uMsimbazi catchment, the functional hectare equivalent target is 2.2, whilst the habitat hectare equivalent target is 1.2.

For the Phase 1-North development, the impacts are located within the iLovu catchment and the 2.2 hectares of wetland that will be lost as a result of the development is equivalent to 1.0 hectares of functional wetland habitat. Based on the reasonable attainable rehabilitated state approach, the functional hectare equivalents for the systems would be 1.4 hectares, i.e. opportunity lost. Both the functional and habitat hectare equivalent targets are 1.8 and 1.2 hectares, respectively.

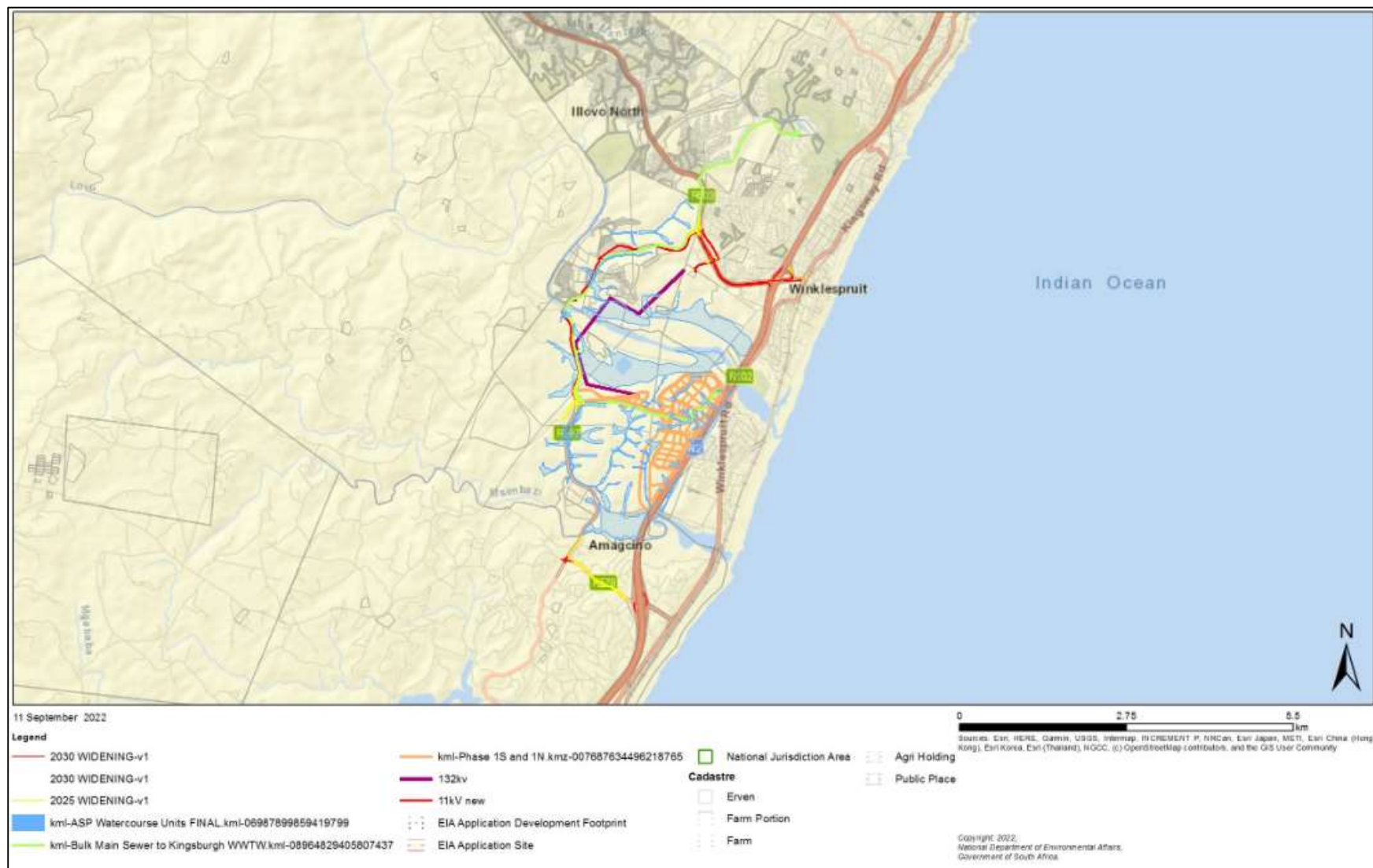


Figure 3-7: Wetlands in relation to the proposed ASP (orange), Sewerline (green), 11kV powerline (red), 132kV powerline (purple) and road upgrades (yellow/red) (Google Earth, 2022)

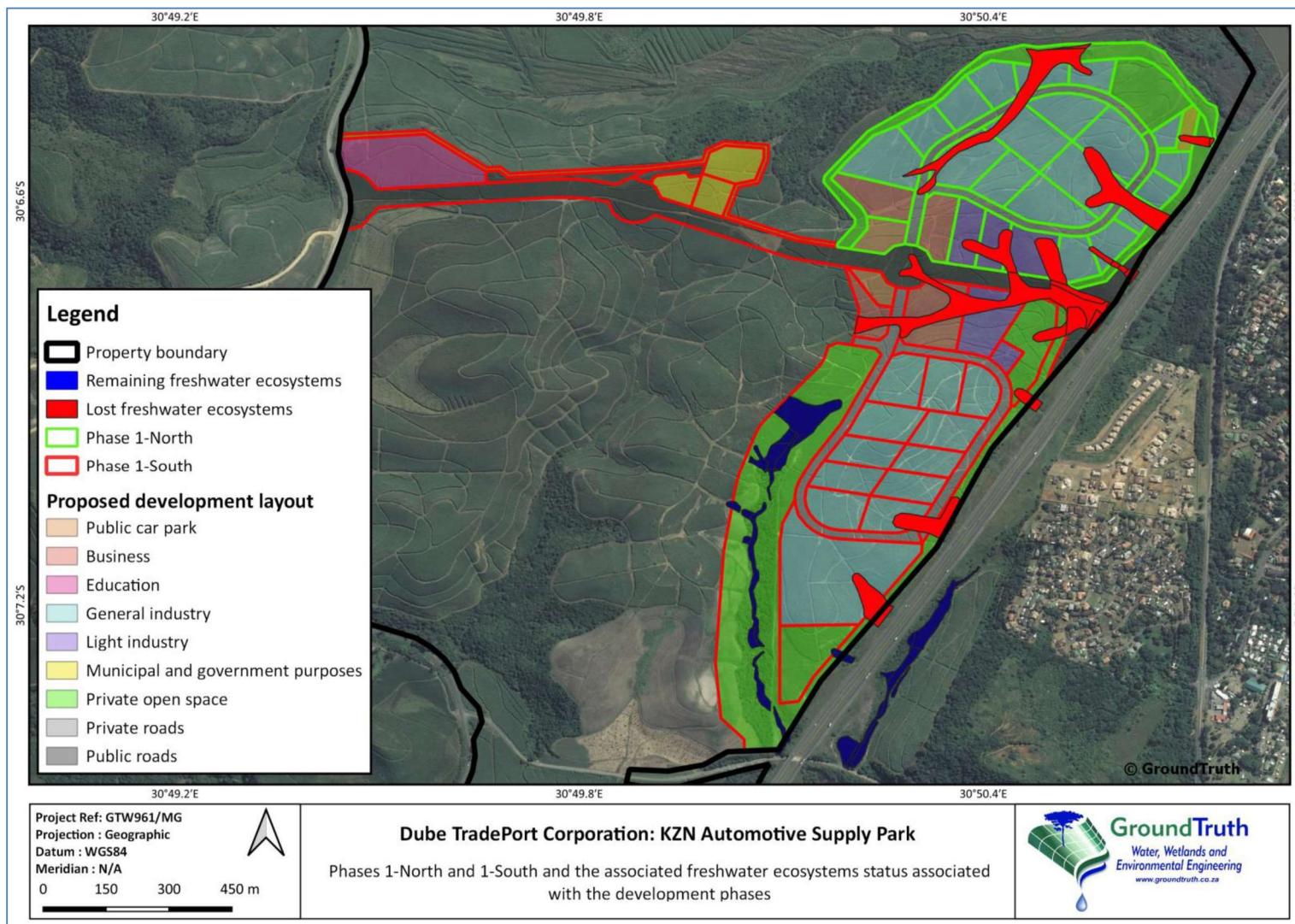


Figure 3-8: Anticipated freshwater ecosystem losses associated with the Phase 1-North and 1-South development footprint

(c) Proposed sewer line and powerlines

A final wetland delineation identified numerous wetlands within and 500m of the proposed site of the ASP sewerline. Wetlands found on site included the numerous seeps, three channelled valley bottoms, and unchannelled valley bottoms. The total area of all wetlands encompassing the site of the proposed development is approximately 98.40ha (Table 3-2).

The proposed sewerline and the 11kV powerline follows the same route for the majority of the route and the same wetlands will be impacted upon by each of these infrastructure developments as confirmed in a letter from the specialist in Appendix D.

Furthermore, no additional wetlands than those identified will be impacted upon by the proposed upgrades.

Table 3-2: Process unit classification of the Proposed Sewerline and powerline developments

HGM UNIT ID	PROCESS UNIT	HGM CLASSIFICATION	GPS LOCATION	AREA (ha)
U70E-C5-CVB2	CVB2	CVB	30° 7'16.15"S 30°49'37.97"E	0.170
U70D-C4-CVB5	CVB5		30° 6'14.00"S 30°49'19.07"E	2.990
U70E-C5-CVB1	CVB1		30° 7'21.11"S 30°49'42.49"E	1.620
U70D-C4-CVB7	CVB7		30° 6'29.80"S 30°49'21.02"E	4.090
U70E-C5-CVB7d			30° 6'41.74"S 30°49'27.33"E	0.580
U70E-C5-CVB7b			30° 6'59.42"S 30°49'23.48"E	0.310
U70D-C5-S4	S4	SEEP	30° 5'55.12"S 30°49'22.03"E	0.340
U70D-C9-S5a	S5		30° 5'20.64"S 30°49'56.75"E	0.300
U70D-C9-S5b			30° 5'4.84"S 30°50'26.83"E	0.140
U70D-C9-S7a	S7		30° 5'20.45"S 30°50'13.99"E	0.760
U70D-C9-S7b			30° 5'12.20"S 30°50'22.17"E	0.680
U70E-C3-S7			30° 7'20.19"S 30°49'53.27"E	1.640
U70E-C5-S7a			30° 7'5.23"S 30°49'23.91"E	0.220
U70E-C5-S7e			30° 6'54.44"S 30°49'22.31"E	0.150
U70E-C5-S7d			30° 6'59.52"S 30°49'22.78"E	0.220
U70D-C9-UCVB1a	C9-UCVB1a	UCVB	30° 5'18.45"S 30°49'45.91"E	0.680
U70D-C9-UCVB1b	C9-UCVB1b		30° 5'11.10"S 30°50'16.39"E	1.380
U70E-C6-UCVB	C6-UCVB1		30° 7'29.90"S 30°49'47.74"E	21.100
U70D-C4-UCVB	C4-UCVB1		30° 6'21.78"S 30°49'53.92"E	56.600
U70D-C6-UCVB1a	C6-UCVB1a		30° 5'43.32"S 30°49'37.43"E	1.950
U70D-C6-UCVB1c	C6-UCVB1b		30° 5'37.34"S 30°49'36.70"E	0.180
U70D-C6-UCVB1c	C6-UCVB1c		30° 5'28.32"S 30°49'49.59"E	1.240
U70D-C9-UCVB1a	C9-UCVB1a		30° 5'17.53"S 30°49'51.08"E	0.680

- CVB1 – valley bottom with a channel, sandy/ sandy loam soils, steep slope and partial drainage.

- CVB5 – valley bottom with a channel, clay soils, steep slope and partial drainage.
- CVB7 – valley bottom with a channel, clay soils, moderate slope and partial drainage.
- S4 – seep, sandy/ sandy loam soils, moderate slope and extensive drainage.
- S5 – seep, clay soils, steep slope and partial drainage.
- S7 – seep, clay soils, moderate slope and partial drainage.
- UCVB – valley bottom with no channel.

Most wetlands associated with the study area were considered to be in a Poor (D category) to Seriously Modified (E category) in terms of PES. Only two wetlands were considered to be in a Moderate/Fair condition (C category PES). The major impact affecting these wetlands included the practice of sugar cane farming which has led to the transformation of these systems. The state and functionality of these wetlands are summarised in Table 3-3 below.

Table 3-3: Summary of wetland process unit functionality for the proposed sewerline and 11kV powerline developments

PROCESS UNIT	PES	EIS	PRIMARY ECOSERVICE	RMO
U70E-C5-CVB2	C – Moderate	Moderate	Cultivated foods	Maintain
U70D-C4-CVB5	D – Large	Low	Cultivated foods	Maintain
U70D-C4-CVB7	D – Large	Low	Cultivated foods	Maintain
U70E-C5-CVB7	C – Moderate	Moderate	Cultivated foods	Maintain
U70D-C5-S4	E – Very large	Low	Cultivated foods	Maintain
U70D-C9-S5a	D – Large	Low	Cultivated foods Food for livestock	Maintain
U70D-C9-S5b	E – Very large	Low	Cultivated foods Food for livestock	Maintain
U70D-C9-S7a	C – Moderate	Low	Erosion control Carbon Storage	Maintain
U70D-C9-S7b	C – Moderate	Low	Erosion control Carbon Storage	Maintain
U70E-S7	E – Very large	Low	Cultivated foods	Maintain
U70D-C4-UCVB1	E – Very large	Moderate	Cultivated foods	Maintain
U70E-C6-UCVB1	D – Large	Moderate	Cultivated foods Food for livestock	Maintain
U70D-C6-UCVB1a	D – Large	Low	Streamflow regulation	Maintain
U70D-C6-UCVB1c	D – Large	Low	Cultivated foods	Maintain
U70D-C9-UCVB1	E – Very large	Low	Cultivated foods Carbon Storage	Maintain

Table 3-4: Summary of wetland process unit functionality for the proposed 132kV powerline route

PROCESS UNIT	PES	EIS	PRIMARY ECOSERVICE	RMO
U70D-C4-CVB5	D – Large	Low	Cultivated foods	Maintain
U70E-C4-CVB5	C – Moderate	Low	Cultivated foods	Maintain
U70D-C4-CVB7	D – Large	Low/Negligible	Cultivated foods	Maintain
U70D-C8-S1	D – Large	Low/Negligible	Cultivated foods	Maintain
U70D-C5-S7	E – Very large	Low	Cultivated foods Food for livestock	Maintain
U70E-C5-S7	E – Very large	Low	Cultivated foods Food for livestock	Maintain
U70D-C7-UCVB1b	E – Very large	Negligible/Low	Erosion control Carbon Storage	Maintain
U70D-C7-UCVB1	C – Moderate	Negligible/Low	Erosion control Carbon Storage	Maintain

Impacts - Sewerline and 11Kv Powerline

From the impact assessment conducted, construction phase impacts are likely to be low-moderate but can be mitigated to low / very low significance levels, with operational impacts linked mainly to water quality risks associated with potential sewage leaks (pump station and pipeline design will need to address this risk).

Impacts – 132kV Powerline

Although the proposed development was regarded to be a medium risk to the wetland systems, further degradation of these systems could occur if proper mitigation measures are not implemented. In order to ensure that the development has minimal impact on the wetlands, special attention should be given to the implementation of the above mentioned mitigation measures.

The proposed option for the 132kV powerline was the preferred option initially assessed in the previous BA Process as it has the least impact on the surrounding wetlands. For the proposed option and only option in this BA process, all pylons remain outside of the wetland and transverses over the least number of wetlands therefore causing minimal to no disturbance of the surrounding wetland systems.

3.1.7 Estuarine Environment (Anchor Environmental, 2022)

The development is proposed to occur in two phases with a portion of Phase 1-South, occurring within the uMsimbazi Catchment and the remaining portion of Phase 1-South and Phase 1-North located within the iLovu catchment. Whilst the ASP is planned on a formerly cultivated sugarcane plantation, its location directly between the iLovu and uMsimbazi Estuaries will result in the transformation of some wetland habitat and impacts to the functioning of the remaining downstream wetland habitat. This could in turn affect the health of the two estuaries. The Environmental Assessment required that specific estuarine impacts associated with each phase of the proposed ASP development be considered.

Anchor Environmental Consultants (Pty) Ltd (Anchor) was appointed by the DTTC to undertake an Estuarine Specialist Study to review and update an existing estuarine report pertaining to the impacts of the proposed ASP on the uMsimbazi and iLovu Estuary. This assessment focuses on the development of Phases 1-South and 1-North only.

Site assessments were conducted in September and October of 2021.

The figure below indicates the proposed ASP site in relation to the iLovu and uMsimbazi estuaries.



Figure 3-9: Proposed layout of KZN APS and the phased platforms relative to the relative to the uMsimbazi and iLovu EFZ.

a) Baseline for the iLovu Estuary

The iLovu Estuary is located approximately 32 km south of Durban and is classified as a Subtropical Large Temporarily Closed estuary which is open to the sea ~77% of the year. The iLovu River (135 km) is fed by four quaternary catchments and has a total catchment area of approximately 950 km². In 2019, natural Mean Annual Runoff (nMAR) was estimated as 119.6 x10⁶ m³ and present MAR (pMAR) estimated at 89.6 x10⁶ m³. The system has been subject to significant anthropogenic modification including construction of multiple bridges over the estuary, the development of holiday accommodation at the mouth, urban development near the Illovo business Park, sugarcane cultivation across approximately 31.7% of the EFZ, and sand mining operations in the upper reaches.

A gradient of sediment particle size has been reported up the system, with muddy sand in the lower reaches, medium to coarse sand and ~25% mud in the middle reaches, yielding a mixture of medium to coarse sand with a low percentage of mud (<5%) in the upper

reaches. The high sandbar and narrow mouth lead to restricted tidal intrusion and the presence of strong stratification of both salinity and oxygen in the estuary. Like many estuaries on the east coast, turbidity ranges from low during closed conditions, to semi turbid when the mouth is open, and very high during flood events.

Nutrient enrichment and high bacterial counts have been recorded in the system, but fair water quality conditions have also been recorded. Therefore, water quality in the system has been rated as moderately modified. The macrophyte community of the estuary has been substantially modified by sugarcane plantations, urban development and by the invasion of alien invasive plants (AIPs). Invertebrate species richness and abundance varies seasonally and in response to the state of the estuary mouth, with species richness generally being highest in the middle reaches. Individual bird survey counts peak at 28 waterbird species recorded in the summer of 2008. Fish species richness peaked at 34 taxa of fish reported in the system in 1998/1999, with fewer species recorded in 2007/2008.

The iLovu Estuary is considered an Endangered, biodiversity priority estuary, and of medium importance as a nursery area for fish and some macroinvertebrate species with a marine life cycle phase. Overall, the system is considered to be under a higher level of anthropogenic pressure than the uMsimbazi Estuary. The iLovu Estuary's present ecological state (PES) is listed as "C/D" (somewhere between "Moderately" and "Heavily" disturbed). Government Gazette notice 41306, no. 1386 of 2017 stipulates that the estuary's target ecological category (TEC) is a "B/C". This category represents an overall health score that ranges between roughly 72-78% of pristine estuarine health, while the current state is between 57 and 63%. Achieving this mandated Ecological Category (EC) will require the improvement of several of the individual components.

b) Baseline for the uMsimbazi Estuary

The relatively small uMsimbazi Estuary lies approximately 2 km south of the iLovu Estuary mouth. Unlike the iLovu, the entire Msimbazi River is located within a sub-quaternary catchment which is considered to be in a largely natural state. The estuary is not significantly affected by flow modifications and the pMAR is estimated to be ~97% that of the natural state. Despite this, the state of the mouth has changed from being closed 91% of the time historically to being closed only 82% currently.

Results from the October 2021 survey show that the lower reaches of the system were sandy (98%, consisting predominantly of fine to medium sand), while the middle reaches were composed of medium to coarse sand. Both the lower and middle reaches contain very little mud (2 and 1%, respectively), with no gravel present in the lower reaches and only 1% gravel in the middle reaches. In contrast, the upper reaches of the system had significantly more gravel (49%), sand and 3% mud. The increased gravel content in the upper reaches is likely a result of unregulated sand mining operations which commenced in the estuary from ~2018. The total organic content (TOC) in sediment samples was fairly low and varied across the estuary zones, with the highest TOC values in the upper reaches where mud content was highest. The concentrations of all except one trace metal (Nickel)

were well below the recommended guideline levels at all three sites in the uMsimbazi, with concentrations generally highest in the upper reaches of the estuary where mud content was highest.

Historical reports suggest that salinity levels in the estuary fluctuate widely during the year (2-30) depending on the state of the mouth and the volume of freshwater inflow. During the October 2021 survey, the system was in flood, the estuary mouth was open, and the system was dominated by freshwater inflow, the resulting salinity being <1 throughout all three zones. Water temperature in temporarily closed estuaries (TOCEs) is mainly influenced by river inflow, solar radiation, and ambient air temperature rather than by seawater, as marine intrusion is limited and short lived. Temperatures recorded in October 2021, ranged from 20.5°C at the mouth to 29.9°C in the upper reaches and was well within the range of temperatures historically reported for the uMsimbazi. Dissolved oxygen (DO) levels in the uMsimbazi Estuary displayed a gradient from the mouth to the head, a condition that is typical of TOCEs. Historic data on dissolved oxygen suggests that levels range from 0.3-11.8 mg/l, but that the system is generally well oxygenated, averaging ~6 mg/l. In October 2021, DO concentrations were uniformly high (>8 mg/l) across all three estuary zones, likely a result of faster flowing flood waters aerating the system.

In the 1970s and early 1980s, pH values ranged from 7.7-8.6, while more recent studies report an average pH of 7.9 in 2007/2008 and 7.7 in 2015/2016. The average pH in the uMsimbazi Estuary during the 2021 survey was slightly higher at 8.2, likely a response to waters with a higher pH entering the system in the flood waters. Similarly, the turbidity in the estuary was high in the lower and upper reaches, and very high in the shallow middle reaches, as a result of fast flowing flood waters.

While ammonia and nitrates have been low and below recommended water quality guidelines throughout the estuary since 1964, values for Nitrates and Phosphates frequently exceed the resource quality objective (RQO) guideline values proposed for the estuary. This is likely the effect of agricultural return flows from the surrounding sugarcane fields and nutrient enrichment from the dung of pastoral animals grazed alongside the river in the catchment and on the estuarine floodplain. This increase in nutrient levels will lead to a change in the microalgal community composition within the estuary.

The EFZ is dominated by modified KZN coastal grassland habitat and coastal forest, but is heavily invaded by alien plants. In fact, the level of invasion in sections of forest was estimated to be as high as 70%. A total of 10 alien plant species were recorded in the EFZ during the October survey. Although estuaries are known to have low species diversity relative to marine and freshwater environments, the benthic macrofauna results from the October 2021 survey, suggested a depauperate community with low species diversity and abundances. At the time of sampling, the uMsimbazi Estuary was in flood and the mouth of the system was open, mimicking the conditions present in river-dominated permanently open estuaries, which are known for their lower macrobenthic densities.

However, changes in hydrodynamics (period of time the mouth is open), physical habitat (especially sediment particle size distributions), water quality and microalgal biomass alterations have all likely negatively influenced the invertebrate communities and remaining biotic components of the estuary.

In the past 15 years, fish species richness has dropped by more than half, as evidenced by surveys conducted in summer and winter, during a drought and during a flood event (October 2021). It is possible that declines of invertebrate species and abundance, resulting in a drop in available food resources, has had a cascading effect on fish community abundance and community composition. Similarly, while waterbird species richness has fluctuated with time, dropping at times to half that of historical data and then returning to similar numbers in subsequent surveys, the abundance of birds within the system has clearly declined over time. This is possibly due to habitat alterations, the extent of the invasive plant species outcompeting natural species and the reduction in food availability.

c) Updated Status for the uMsimbazi Estuary

The uMsimbazi Estuary was assessed during the classification study for the Mvoti-uMzimkhulu Water Management Area in 2015, during a study undertaken for Environmental Planning and Climate Protection Department (EPCPD) of the eThekweni Municipality in 2015/2016, as well as in the 2011 and 2018 National Biodiversity Assessments (NBA). Here we provide an updated PES score based on an intermediate level assessment. The results from the October survey were compared to previous and historical data and were scored in terms of the Estuary Health Index (EHI) to provide an updated Present Ecological Score (PES).

Results from our updated assessment agree more closely with the 2018 NBA assessment than that of MER (2016), with the overall health of the estuary gauged to straddle the “B/C” category. The health of individual components ranged from natural (A) to largely modified (D), with the health of three aspects, namely: water quality, microalgae and invertebrate populations, having dropped from a “B” to a “C” in recent years. These changes relate mainly to changes in the physical habitat wrought by sand mining operations, decreases in water quality, the poor state of macrophytes in the EFZ and a decline in the health of invertebrates which has had a cascading negative effect on fish and bird populations.

Table 3-5: Estuarine Health Scores of the uMsimbazi Estuary as determined in 2016 (MER 2016), for the 2018 NBA (Van Niekerk *et al.* 2019) and in this study.

Variable	MER (2016)	NBA (2018)	Anchor (2021)
Abiotic health score			
Hydrology	A	A	A
Hydrodynamics	A	A	B
Water quality	A	B	C
Physical habitat alteration	B	C	C
Biotic health score			
Microalgae	B	B	C
Macrophytes	B	D	D
Invertebrates	A	B	C
Fish	B	D	D
Birds	A	C	C
Ecological Category	B	B/C	B/C

Impacts

The uMsimbazi and iLovu Estuary are both important systems from a biodiversity perspective and are listed as ‘Endangered’ in the 2018 NBA. The delivery of both direct and indirect ecosystem services by the systems is dependent on the ecological wellbeing of these estuaries, specifically the quality and quantity of water in the system. A number of potential impacts associated with the development of Phase 1-South and 1-North on the uMsimbazi and iLovu Estuary were identified as part of this study. These fall into two main categories:

- Construction and Operational impacts, including impacts of waste generation, hazardous substance spills and noise pollution as well as impacts on water quantity and quality and the loss of important ecological support habitats; and
- Cumulative impacts, where the environmental effects of individual activities or projects can interact with each other in time and space to cause incremental or aggregate effects. The impact of the development of Phases 1-South and 1-North of the ASP on the Present Ecological Status (PES) of the two estuaries was determined.

Cumulative impacts associated with the development of the Phase 1-South portion of uMsimbazi catchment were assessed as having no measurable residual effect on the Estuarine health Index (EHI) score for this system. However, given the importance of the estuary, the knowledge that some impacts on estuary health as a result of the development are inevitable, the limited confidence in this assessment, and the established target of restoring this estuary to a ‘B’ category, an estuarine offset has been proposed. This offset will entail restoration of a portion of natural vegetation in the upper reaches of the estuary that was previously under sugarcane. The restoration of natural vegetation and wetland functioning in this area is expected to result in a change in the EHI score from 74 to 76%, and while this still leaves the estuary straddling a ‘B/C’ category, it is an improvement from the current state and is a clear step towards achieving the gazetted TEC (“B” category).

The development of Phase 1-South and 1-North is also not expected to have any measurable residual impacts on the EHI score of the iLovu Estuary, with the system remaining in a ‘C/D’

category. However, the proposed wetland offset/rehabilitation plan which has been designed to mitigate the impact of the loss of wetland habitat on-site, is expected to achieve a significant habitat gain which, once implemented, will lead to an increase in the health status of the iLovu Estuary. The implementation of this offset is expected to elevate the system from the current 'C/D' to a 'C' category, and is again an important step toward the target 'B/C' category for the system.

Recommendations

Essential mitigation measures to be applied during Phase 1-South and 1-North of the construction of the Dube TradePort Corporation's Automotive Supplier Park should include the following:

- Inform all staff about sensitive aquatic species and the responsible disposal of construction waste.
- Suitable handling and disposal protocols must be clearly explained, and sign boarded.
- Waste management and storage areas should be maintained on-site with appropriate controls to prevent wind and water dispersal of waste.
- Reduce, reuse, recycle.
- Intentional disposal of any substance into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported immediately.
- Implementation of a rigorous environmental management and control plan (including procedures for remediation).
- All fuel and oil is to be stored with adequate spill protection.
- No leaking equipment or vehicles are permitted on site.
- All hazardous substances must be accompanied by a permit, a hazard report sheet, and a first aid treatment protocol and may only be handled by suitably trained operators.
- Subject mobile equipment, vehicles, and power generation equipment to noise tests at commencement.
- Businesses and industries that are expected to generate high levels of noise and/or utilise emergency power supplies should operate these within sound dampening infrastructure.
- Wetland rehabilitation to be undertaken prior to development activities.
- An independent Environmental Control Officer (ECO) must be employed to monitor construction activities and to oversee aquatic habitat integrity for the duration of the construction phase.
- Implementation of the proposed integrated SuDS approach.
- Monitoring of water quality within the estuaries during and post-development to ensure the efficacy of the SuDS structures.
- Limit the movement of construction vehicles to within the development footprint.
- Constrain spatial and temporal extent of impacts to the minimum required.
- Areas cleared during construction should be revegetated with local indigenous plants species.
- Implement the on-site rehabilitation plan for the uMsimbazi Catchment proposed by Eco-Pulse (2019a).
- Undertake clearing of Invasive Alien Plants (IAPs) within the Estuarine Functional Zone (EFZ).

- Ensure that rehabilitation of wetlands occurs prior to the initiation of any development activities.
- Implement the offset area rehabilitation plan for the iLovu catchment proposed by Eco-Pulse (2019b).
- Ensure wetland offset occurs prior to the initiation of development activities.

The proposed development of Phases 1-South and 1-North is expected to have a very low overall impact on the uMsimbazi and iLovu Estuaries and with mitigation, rehabilitation and offset activities, could in fact have a slight positive impact on the health of both systems. Therefore, the specialist recommends that the proposed implementation of these two phases be permitted to go ahead provided that the essential mitigations are strictly implemented and that environmentally responsible practices are adopted. To this end, it is recommended that an Environmental Control Officer be employed for the duration of the construction phase.

The approval should also be conditional on the completion of an alien invasive clearing plan for the entire EFZ to ensure that estuarine health is maintained in the long term, and that natural vegetation is no longer smothered or outcompeted by these problem plants. Additionally, a complete, updated baseline assessment for each estuary should be undertaken prior to the onset of any development and a comprehensive monitoring programme as presented in this report should be implemented. This monitoring will help to detect any cause for alarm regarding changes in water quality and/or changes in the system related to the development and operation of the ASP. It will also serve as an indication of how effective the proposed SuDS methods have been in mitigating the effects of the runoff from the platforms during the operational phase.

3.1.8 Terrestrial Ecology (Cossypha, 2022)

An Ecological Assessment was undertaken by GIBB (Pty) Ltd for the KZN ASP development (refer to Appendix D), sewer line (Appendix D) and powerline (Appendix D). The field surveys were undertaken on 13 and 14 December 2018, 15 February 2019, 5 and 6 March 2019, 4 June 2019, and 1 August 2019.

These reports were revised in August 2022 for the purposes of the reduced ASP extent and associated infrastructure including the sewerline, powerlines and road upgrades.

(a) Proposed KZN ASP Site and associated road upgrades

Regional Biodiversity

The study site is located within the Indian Ocean Coastal Belt biome and falls mostly within the KwaZulu-Natal Coastal Belt Grassland vegetation type. KwaZulu-Natal Coastal Belt Grassland is classified as Endangered at a national level and is Critically Endangered in KwaZulu-Natal. The proposed development site is located within two ecosystems that are listed in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), the Interior South Coast Grasslands (KZN7), and the Southern Coastal Grasslands (KZN18), both listed as Critically Endangered.

According to the 2018 NBA the study area falls within the KwaZulu-Natal Coastal Belt Grassland ecosystem, which is listed as Endangered. The justification for the classification is that KwaZulu-Natal Coastal Belt Grassland has experienced extensive spatial declines of approximately 89% since 1750 and is narrowly distributed with high rates of habitat loss in the past 28 years placing the ecosystem type at risk of collapse.

According to the KZNBS, portions of the study area are classified as CBA: Irreplaceable. Such areas of the site include remnants of natural bush on the main section of the site, coastal forest vegetation located in the north-eastern corner of the study area, as well as natural areas within the iLovu and uMsimbazi Estuaries and floodplains to the north and south of the site respectively. The proposed development layout and the sections road proposed for widening mostly avoid these areas as well as natural areas defined as D'MOSS.

Local Biodiversity

Most of the study area and surroundings, which occur within the original extent of the KwaZulu-Natal Coastal Belt Grassland, are modified or highly disturbed by agricultural activities. The majority of the proposed development site for the Automotive Supplier Park occurs in sugar cane fields that are not considered ecologically sensitive. Remaining natural vegetation in the study area was classified as coastal thicket/scrub confined to steep valleys where farming activities have been restricted, small pockets of secondary indigenous forest, riparian and wetland associated vegetation, and natural vegetation associated with the iLovu and uMsimbazi Estuaries that border the site on either side.

Important faunal habitat in the study area included wooded areas provided by the coastal thicket and coastal forest, wetland habitat and drainage lines supporting riparian habitat, as well as the riparian and estuarine habitat associated with the two major river systems bordering the site to the north and to the south. Plant and animal species of conservation concern, including nationally and provincially protected species were recorded around the study area. Plant species of conservation concern were recorded on the edges of the coastal thicket, within the coastal thicket, and in the coastal forest.

Fauna

Important faunal habitat in the study area included wooded areas provided by the coastal thicket and coastal forest, wetland habitat and drainage lines supporting reeds and other riparian habitat, as well as the riparian and estuarine habitat associated with the two major river systems bordering the site to the north and to the south. Plant and animal species of conservation concern, including nationally and provincially protected species were recorded around the study area. Plant species of conservation concern were recorded on the edges of the coastal thicket, within the coastal thicket, in the coastal forest, and along roadsides.

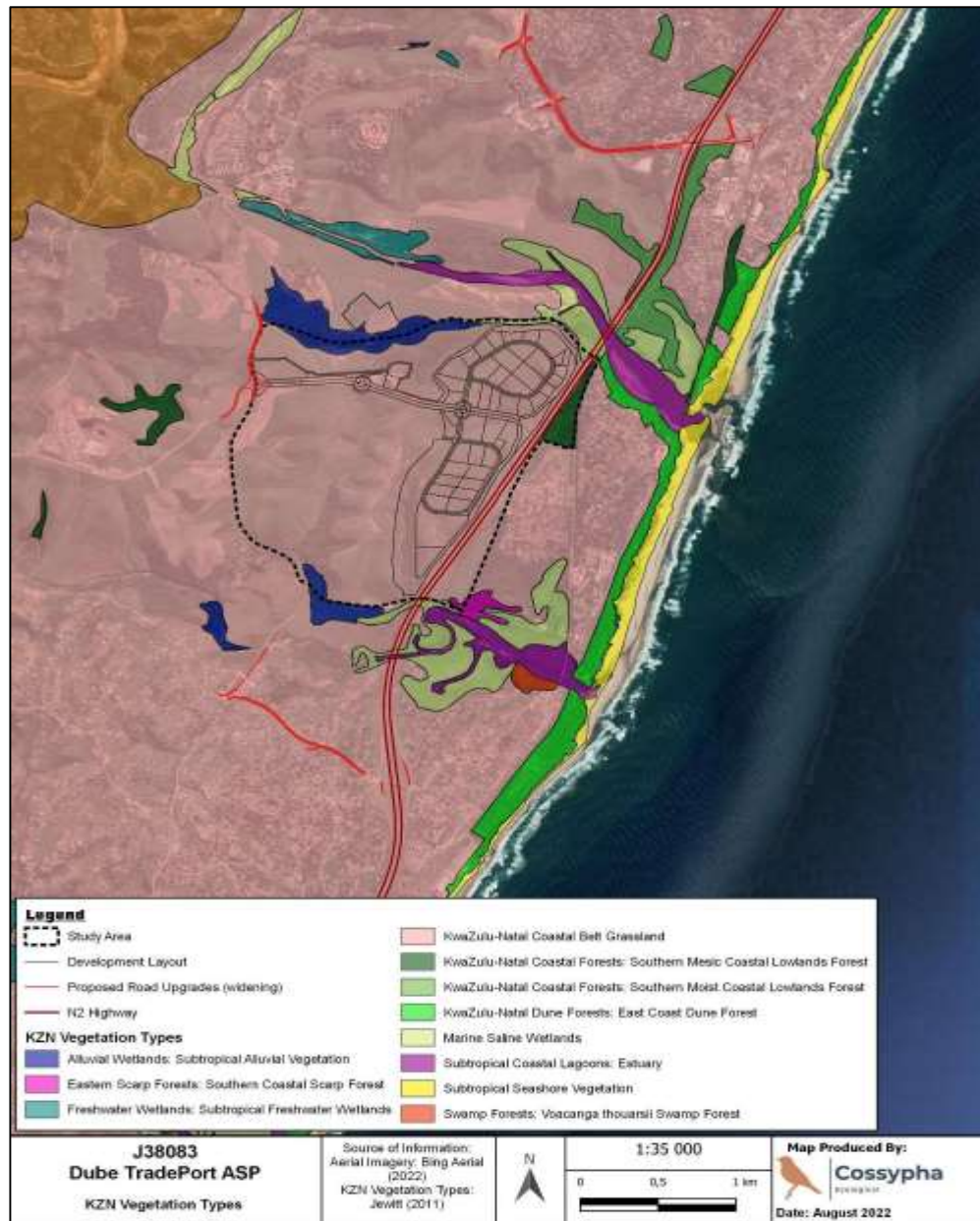


Figure 3-10: The study area in relation to national vegetation types



Figure 3-11: The study area in relation to national threatened ecosystems

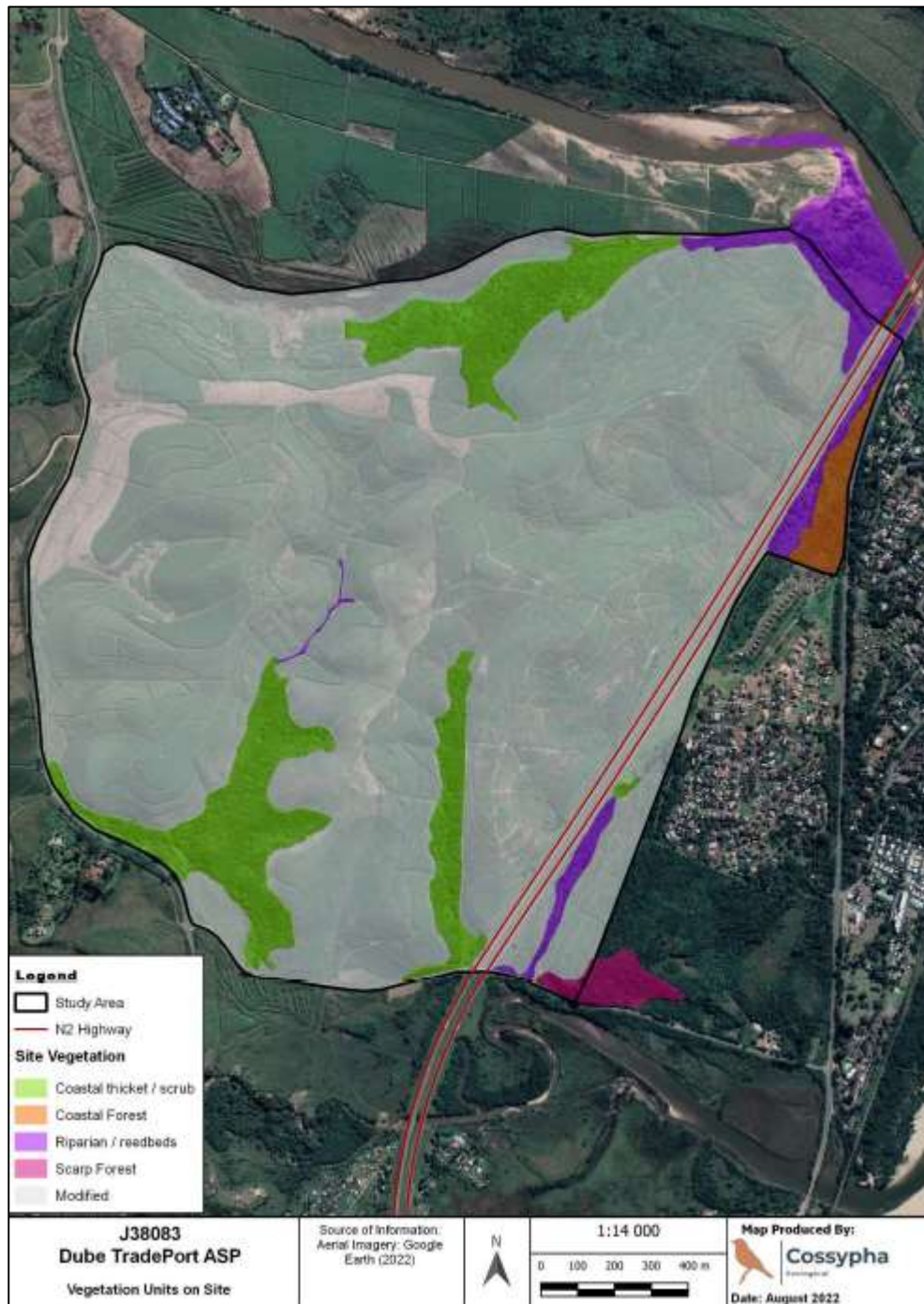


Figure 3-12: Vegetation categories described within the study area

Ecological Importance and Sensitivity

Highly sensitive vegetation and habitat within the study area included any natural vegetation associated with the iLovu and uMsimbazi Estuaries, the wetland that occurs adjacent to the N2 in the north-eastern corner of the study area, and all secondary indigenous forest occurring in the study area.

These areas all have high biodiversity value, support species of conservation concern, and provide essential ecosystem services to the landscape. All patches of coastal scrub/thicket within the study area were considered to be of medium-high ecological sensitivity. This habitat

also has high biodiversity importance and support species that are threatened or protected. These habitats are remnant natural vegetation in the study area and perform important functions such as ecological corridors and habitat filtration mechanisms upstream of the uMsimbazi and iLovu Estuaries. These habitats have a high potential for rehabilitation. Areas of medium ecological sensitivity include wetlands and drainage lines in the study area that were highly modified by agricultural activities and invasive alien plant infestations. These areas still perform important ecological functions and have high a potential for rehabilitation.

Impact Assessment

The development site layout for the ASP has undergone a detailed, iterative process, with input from the Town Planners, Engineers, and Environmental team, to avoid and minimise impact on the existing natural areas on site as far as possible, and to try and maintain a degree of landscape connectivity. The layout is designed to keep the platforms to the higher-lying, sugar cane covered crests of the hills, and avoid the deep valleys in between, which support natural vegetation, wetlands, and drainage lines.

These natural areas will be connected by the proposed installation of large box culverts under the portion of the boulevard and other roads where the valleys will join. Considering these mitigating actions, the impacts on the environment from an ecological perspective were assessed as follows:

Table 3-6: Summary of the impacts of the ASP and road upgrades

Impact	Nature of Impact	Impact Pre-Mitigation	Impact Post-mitigation
Disturbance to indigenous vegetation and faunal habitat	Direct negative	Moderate negative	Very low negative
Disturbance to or destruction to fauna or flora of conservation concern and protected plant species	Direct negative	Moderate negative	Very low negative
Disturbance to and displacement of fauna	Direct negative	Moderate negative	Low negative
Increase and spread of invasive alien plants	Indirect negative	High negative	Low negative
Erosion and siltation of drainage lines, wetlands, and downstream estuaries	Indirect negative	Very high negative	Low negative
Pollution of drainage lines, wetlands, and downstream estuaries	Indirect negative	Very high negative	Low negative
Loss of ecosystem services and ecological corridors	Indirect negative	High negative	Very low negative
Natural habitat and environmental degradation	Cumulative negative	Very high negative	Low negative
Ecosystem enhancement and decrease in alien plant infestations in the landscape	Positive	Very high negative	Moderate positive

Summary of Recommendations

To reduce negative impacts, construction activities must remain within the footprint of the currently proposed layout. The construction footprint including service roads, construction camps, stockpiles etc. must stay out of all areas containing natural vegetation and areas marked medium-high and highly sensitive. Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. A walk-through must be undertaken within the entire construction footprint, including road upgrades, prior to construction commencing. If plant and/or animal species of conservation concern are found, a rescue and relocation plan must be compiled by a suitably qualified botanist / zoologist, and the plants and/or animals relocated before construction commences. All nationally and provincially protected species will require a permit from the relevant authority for cutting, destruction, removal, or relocation.

An invasive alien plant species management and monitoring plan must be compiled and implemented for alien plant clearing and control during construction and the operational phase. A detailed, ecologically sound stormwater management plan must be compiled in consultation with the Wetland Specialist, Estuarine Ecologist, and Biodiversity Specialist, to ensure storm water is managed in a way that does not cause erosion and siltation of downstream habitats, especially the sensitive estuaries.

This should include the latest Sustainable Urban Drainage System (SUDS) technology. The stormwater reticulation design must include energy dissipaters and silt and pollution traps for water entering the natural areas. During construction, the exposed cut and fill slopes and stockpiles must be protected from erosion during rainfall events and high winds. This must be implemented strictly otherwise the impacts on the downstream habitats will be very high. Sources of potential pollution from the development must be identified and managed strictly. This must include structurally sound bulk water and sewer reticulation services with fail safe measures included in the engineering design, including an emergency/risk management plan. No effluent may be released into the natural areas. Littering and dumping must be strictly forbidden.

To help compensate for negative impacts resulting from the proposed development, ecosystem enhancement of the existing natural areas is recommended. A rehabilitation and restoration plan must be written for the natural areas that fall within the development site, and immediately adjacent. This restoration process must include the removal of all existing alien plant infestations from the wooded drainage lines, coastal thicket, and wetland areas, and include planting of appropriate indigenous species to restore the habitat to structurally intact forest and wetland. To allow movement of fauna through the landscape, the natural areas in the valleys adjacent to the platforms that form ecological corridors between the two estuaries must not be fenced. Fences must rather be erected around each platform and the boulevard. The existing P491 road on the southern border of the site, especially on the section on the eastern side of the N2, should be decommissioned and the area rehabilitated back into the estuary.

(b) Proposed sewer line

An Ecological Assessment was undertaken by GIBB (Pty) Ltd for the proposed sewer rising main for the proposed KZN ASP development (Appendix D).

The pipeline route is located within the Indian Ocean Coastal Belt biome, and falls within the KwaZulu-Natal Coastal Belt Grassland vegetation type. KwaZulu-Natal Coastal Belt Grassland is classified as Endangered at a national level and is Critically Endangered in KwaZulu-Natal.

The proposed development site is located within two ecosystems that are listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), the Interior South Coast Grasslands, and the Southern Coastal Grasslands, both listed as Critically Endangered. According to the KwaZulu-Natal Biodiversity Sector Plan, portions of the sewer line route fall in proximity to, or span areas classified as Critical Biodiversity Area: Irreplaceable. Such areas include remnants of natural bush with the study area, such as wooded drainage lines, and natural areas associated with the iLovu and Little Amanzimtoti Rivers. Such areas are also classified as part of the Durban Metropolitan Open Space System.

Most of these areas will be avoided due to position of the pipeline proposed to be routed within the road reserve along the entire route. Most of the study area and surroundings were found to be modified or highly disturbed by anthropogenic activities and consisted mostly of sugar cane fields, residential settlement, and light industrial warehouses. The entire route of the sewer pipeline is proposed to be within the road reserve of various black-top roads until it reaches the existing Kingsburgh Waste Water Treatment Works. Remaining natural vegetation in the study area was described as Coastal Thicket/Scrub and was confined to steep slopes and valleys where farming and development activities have been restricted. Other remaining natural vegetation in the study area included riparian vegetation associated with the iLovu River and Estuary, and Coastal Thicket associated with the Little Amanzimtoti also occurred in the northern end of the route. Important faunal habitat in the study area includes wooded areas provided by the coastal thicket, and the riparian and estuarine habitat associated with the iLovu River.

The riparian zone associated with the iLovu River and Estuary was classified as highly sensitive. Rivers, drainage line and wetlands usually support high biodiversity, supply important ecosystem services and tend to be corridors for movement through the landscape for flora and fauna. The patches of coastal thicket within the study area were considered to be of medium high ecological sensitivity. While these areas were confirmed to be secondary in nature, the habitat is considered important because of the diversity of vegetation and fauna it supports, including species that are threatened or protected. The removal or destruction of any threatened or protected plant species will require a permit from Ezemvelo KwaZulu-Natal Wildlife or the Department of Agriculture Forestry and Fisheries. Permits will need to be obtained for the removal or trimming of any protected trees along the route.

Fauna

The entire route of the sewer pipeline is proposed to be trenched within the road reserve of various black-top roads until it reaches the existing Kingsburgh WWTW. Besides the roads and road verges, the study area surrounding the sewer line route is largely modified by sugar cane and settlement. Important faunal habitat in the study area includes wooded areas provided by the coastal thicket, and the riparian and estuarine habitat associated with the iLovu River.

During the field surveys, high avifaunal activity was observed in and around these habitats. The wooded habitat provides high habitat heterogeneity for fauna in the study area by providing shelter, feeding, and breeding habitat for birds, mammals, amphibians, reptiles and invertebrates. Wooded habitat has a multi-layered vegetation structure dominated by evergreen or semi-deciduous trees and shrubs, with an herbaceous understorey (Lawes, 2002; Mucina and Rutherford, 2006). This complexity of strata provides multiple habitats and niches for fauna to occupy and as such, wooded areas are generally high in biodiversity.

The majority of the route occurs within areas considered to be of low ecological sensitivity. Impact on the surrounding vegetation will therefore not be severe and impacts can be mitigated. Pollution, erosion, and alien plant infestations have the potential to impose the highest negative impacts. Pollution, erosion, and invasive alien plant control will therefore be key in mitigating the impacts. Reducing these impacts will also help mitigate cumulative impacts, which have the potential to be severe due to the existing impacts in the development area.

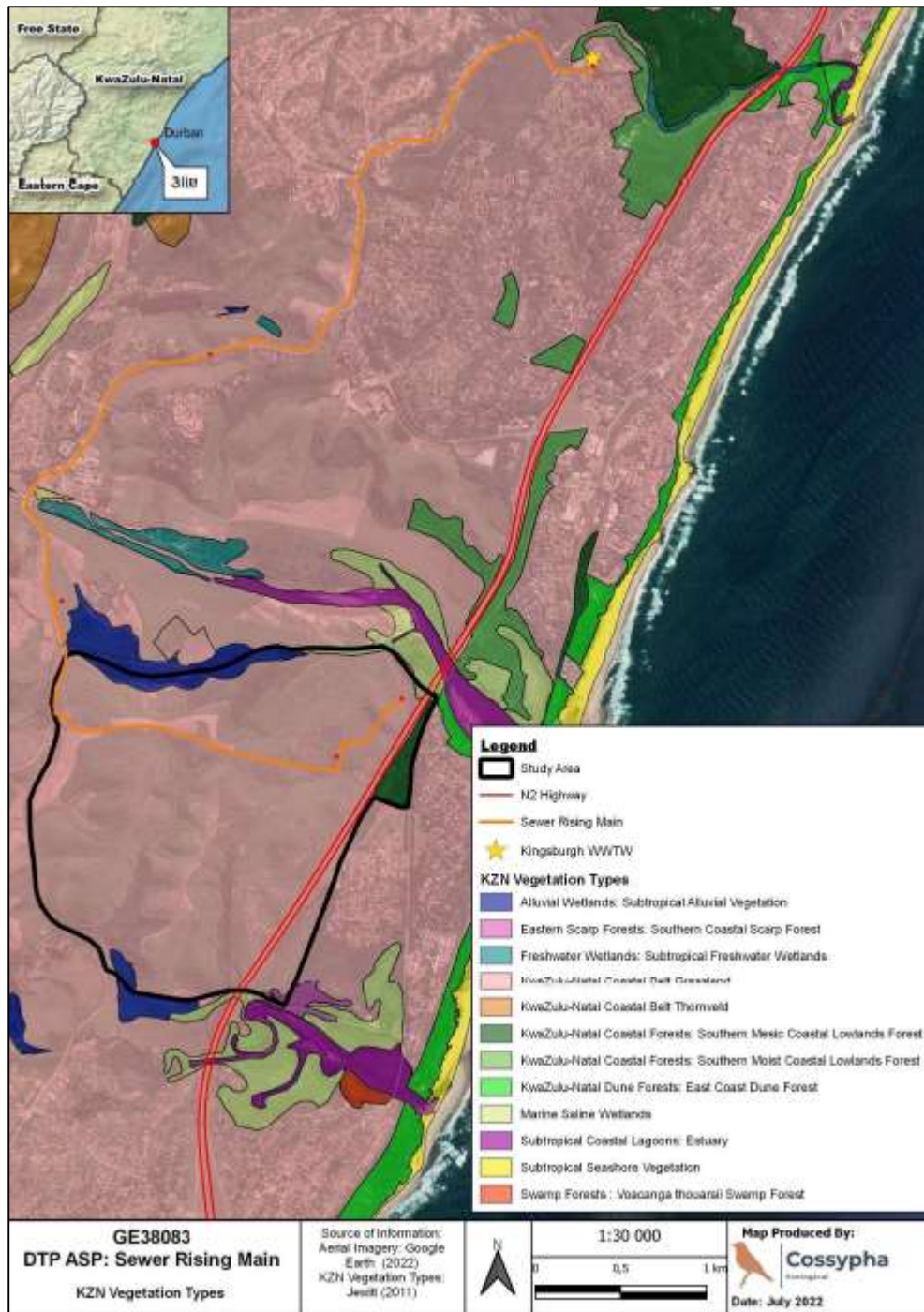


Figure 3-13: The sewerline in relation to KZN vegetation types

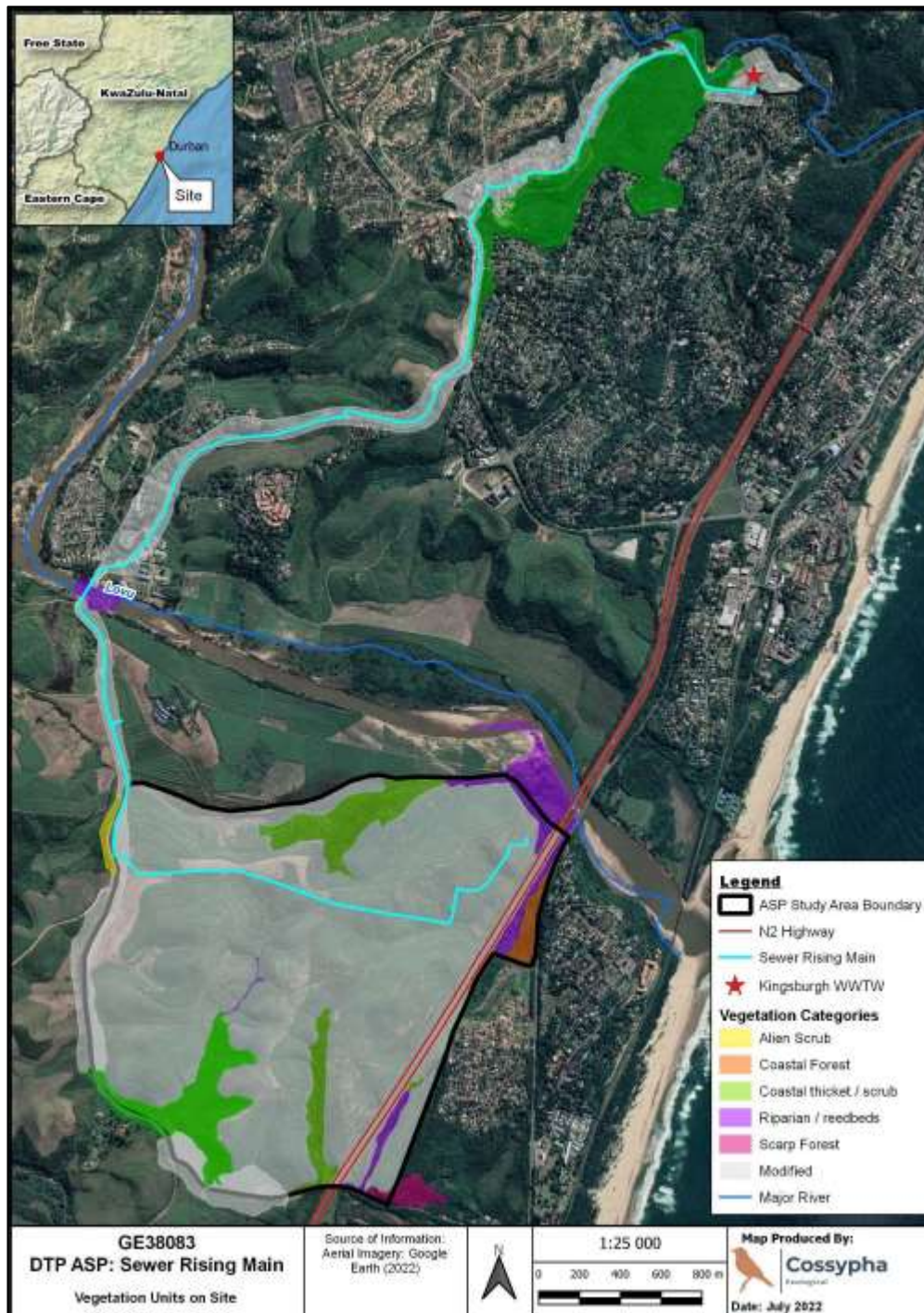


Figure 3-14: Vegetation categories described within the study area

(c) Proposed Powerline

An Ecological Assessment and Avifaunal Assessment was undertaken by GIBB (Pty) Ltd for the proposed 11kV and 132kV powerlines associated with the proposed KZN ASP development (Appendix D).

The study area is located within the Indian Ocean Coastal Belt biome and falls within the KwaZulu- Natal Coastal Belt Grassland vegetation type. KwaZulu-Natal Coastal Belt Grassland is classified as Endangered at a national level and is Critically Endangered in KwaZulu-Natal.

The proposed development site is located within two ecosystems that are listed in terms of Section 52 of NEMBA, the Interior South Coast Grasslands, and the Southern Coastal Grasslands, both listed as Critically Endangered. The proposed routes however mostly avoid areas classified as CBA: Irreplaceable according to the KZNBSP, and natural areas defined as D'MOSS. Such areas include remnants of natural bush within the study area and natural areas within the iLovu River and floodplain.

Most of the study area and surroundings were modified or highly disturbed by anthropogenic activities and consisted mostly of sugar cane fields, residential settlement and light industrial warehouses. Remaining natural vegetation in the study area is coastal thicket/scrub and is confined to steep slopes and valleys where farming and development activities have been restricted. Other remaining natural vegetation in the study area include riparian vegetation associated with the iLovu River and Estuary.

Important faunal habitat in the study area includes wooded areas provided by the coastal thicket, and the riparian and estuarine habitat associated with the iLovu River. The riparian zone associated with the iLovu River and Estuary was classified as highly sensitive, while patches of coastal thicket within the study area were considered to be of medium-high ecological sensitivity. While these areas were confirmed to be secondary in nature, the habitat is considered important because of the diversity of vegetation and fauna it supported, including species that are threatened or protected.

The majority of the powerline routes occur within areas considered to be of low ecological sensitivity and avoid sensitive areas. Impact on the surrounding vegetation will therefore not be severe and impacts can be mitigated. Most impacts begin at low to moderate negative without mitigation and drop to very low once mitigation measures have been applied. A few sections fall in proximity to, or span areas classified as high or medium-high sensitivity, which will require strict adherence to mitigation measures to ensure impacts on these areas are minimised. The most significant impact is the potential for the spread of alien invasive vegetation, which will lead to environmental degradation.

In terms of impacts on avifauna, the area of highest sensitivity in the study area is where birds will be most susceptible to collision. This includes the crossing of the iLovu River floodplain, wooded drainage lines and valleys. The impacts in this regard can be mitigated by the installation of bird flight diverters (anti-collision devices) along the entire route.

It was the opinion of the specialist that the activities may be authorised as long as mitigation are included in the EMPr and all recommendations are adhered to.

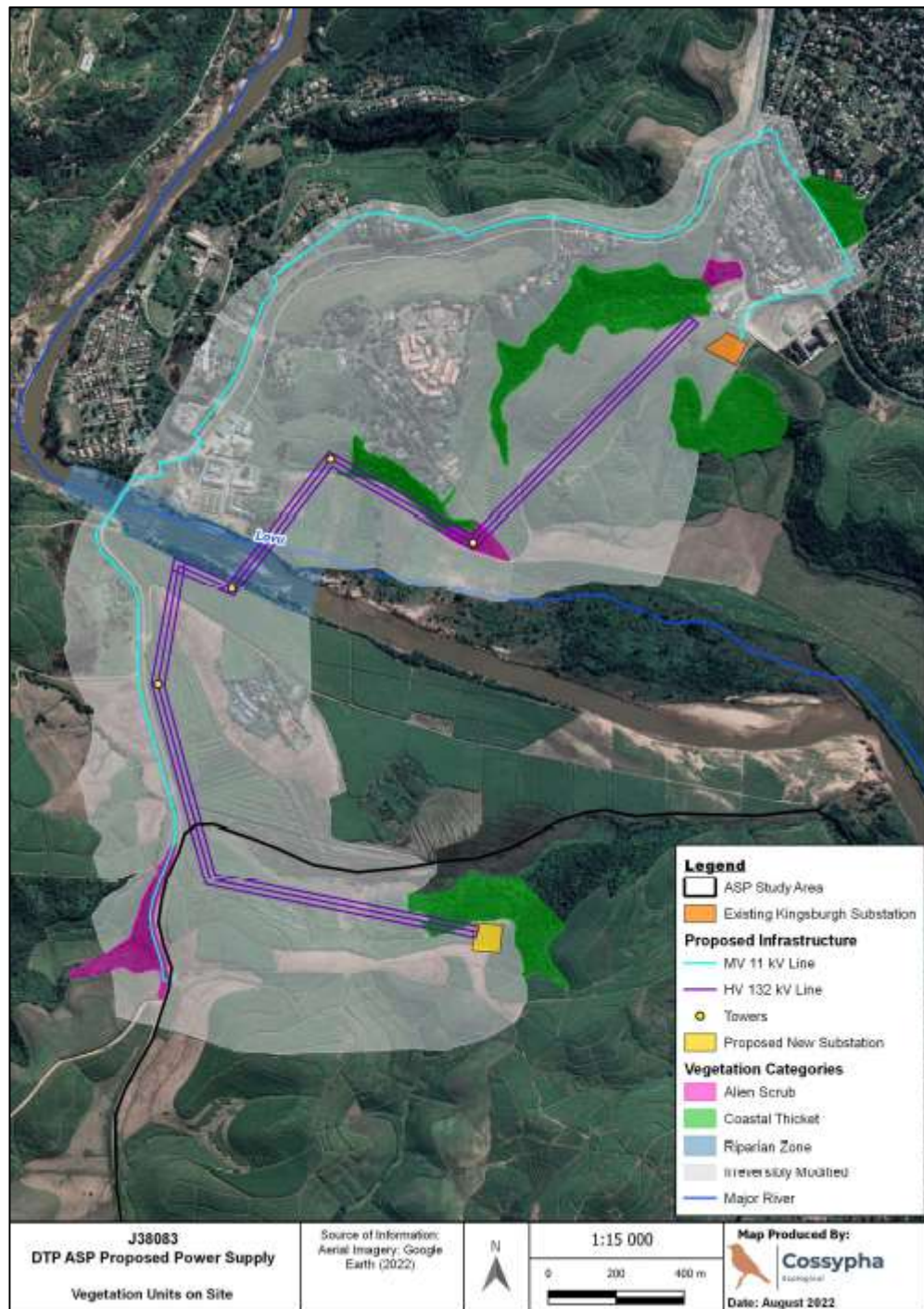


Figure 3-15: Vegetation categories described within the study area

3.2 Social Environment (Urban Econ, 2019)

A Socio-Economic Impact Assessment was undertaken by Urban-Econ for the ASP development (refer to Appendix D). The baseline data herein is taken from this study. The geographic area (referred hereafter as the Area of Influence - AOI) for which the socio-economic baseline is developed is based on the assumption that the communities immediately surrounding the study area likely to experience the greatest socio-economic impacts as a result of the construction and operation of the KZN ASP.

This area is defined in terms of the 2011 demarcations of the Municipal Demarcations board. This approach has been followed because the statistical information is available per these demarcations across two fixed time series, namely the 2001 Census and the 2011 Census. The AOI has been defined as follows in the table below.

Table 3-7: Area of Influence area

NO.	SUB-PLACE NAME	MUNICIPALITY NAME	AREA (KM ²)
1	KwaFakazi	Ugu District Municipality	3.82
2	Nkwali	Ugu District Municipality	13.04
3	Amagcino	eThekweni Municipality	0.64
4	Danganya	eThekweni Municipality	2.00
5	Ethekweni (Illovo South)	eThekweni Municipality	13.07
6	Illovo North	eThekweni Municipality	8.29
7	Kingsburgh	eThekweni Municipality	11.65
8	Umgababa South	eThekweni Municipality	6.23
9	Umnini	eThekweni Municipality	25.47
Total area			84.21

Source: (Statistics South Africa, 2012), (Urban-Econ, 2018)

3.2.1 Demographics

The demographic profile of the Area of Influence was extrapolated from Census data from two fixed time series, namely 2001 and 2011. For comparative purposes, the profile of the AOI is presented alongside the profile of KwaZulu-Natal Province and eThekweni Metropolitan Municipality.

(a) Population and Household Profile

- The AOI has an estimated population of 103 003 persons, with an average annual growth rate of 3.8% over a decade. This growth rate far exceeds the average annual growth in the population of KZN (0.7%) and eThekweni (1.1%) suggesting that it has experienced significant in-migration;
- There are currently an estimated 28 697 households in the area, with an estimated household density of 340.8 households per square kilometre (KZN = 30.2, eThekweni

= 474.5) and an average household size of 3.6 persons (KZN = 3.8, eThekweni = 3.4); and

- Over the period 2001 to 2011, the number of households and the household density experienced compound annual growth of 4.6% which far exceeds both the provincial growth rate (1.4%) and municipal growth rate (1.6%) over the same period. This is indicative of a significant influx of people and a sign of an urbanisation trend.

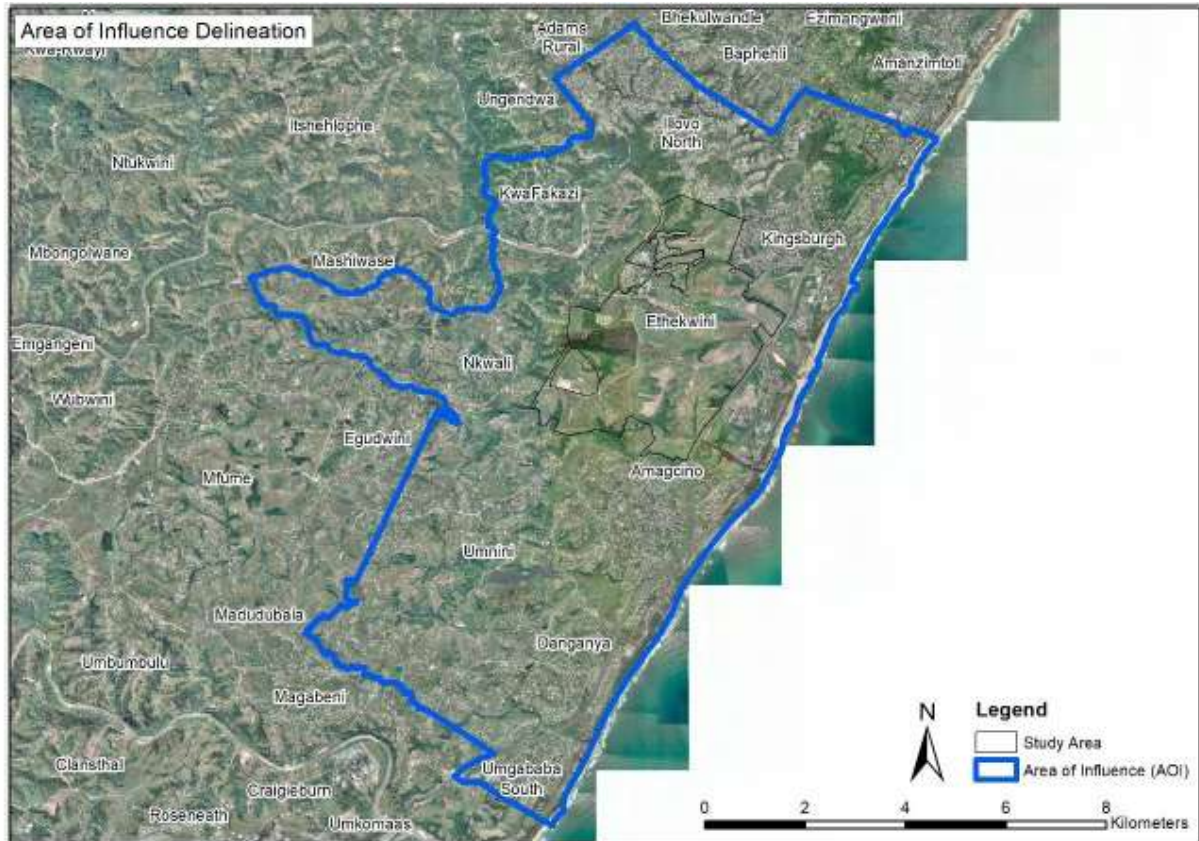


Figure 3-16: Delineation of the Area of Influence

(b) Age and Gender Profile

Extrapolating from the census 2001, 2011 and 2018 data sets with the population classified as youth (under the age of 15), as working age (16-64 years of age), and as elderly (over 65 years of age).

The trend exhibited by age profile across the different areas is broadly similar across the years. Loosely, the youth forms just about $\pm 30\%$ of the population, the working-age $\pm 65\%$ and the elderly accounting for approximately $\pm 5\%$ of the population across all three population scales.

From a gender perspective, the population in the AOI is broadly similar to the Provincial gender profile; approximately 48.3% of the population is male, with 51.7% being female. This differs slightly from the eThekweni gender profile, where the resident population is 49.4% male and 50.6% female. Refer to Figure 3-63.

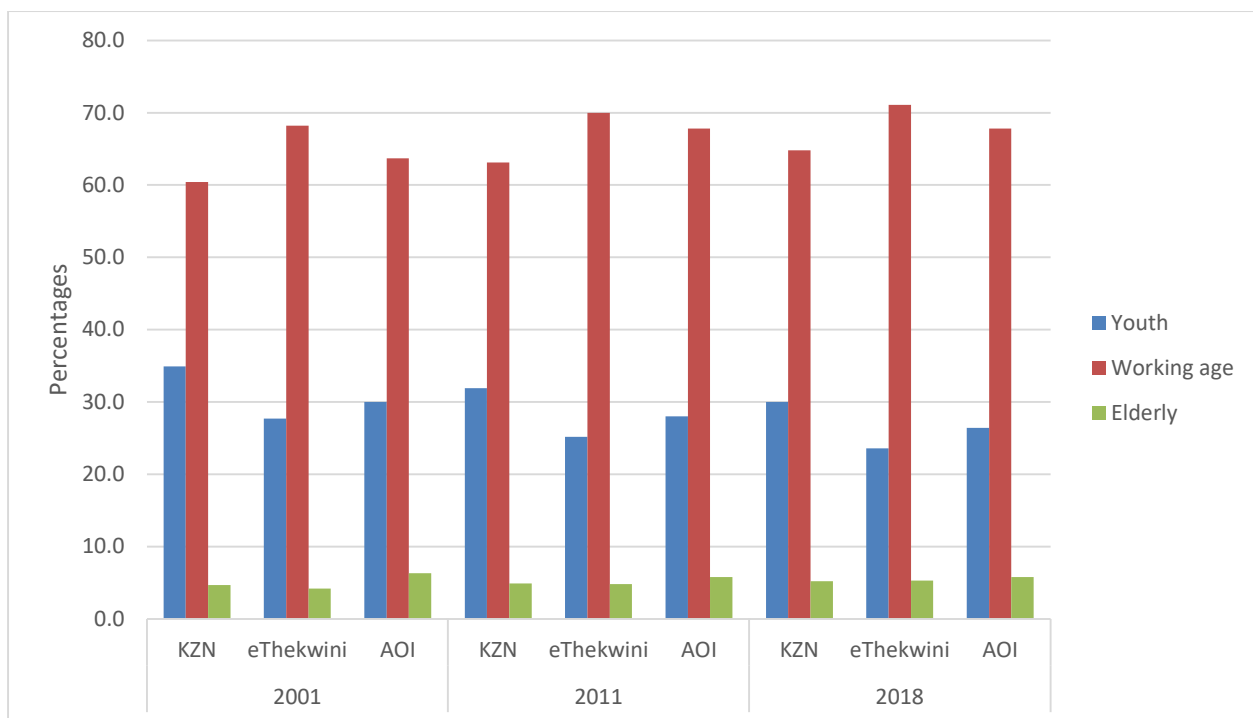


Figure 3-17: Change in age profile from 2001 to 2018

(c) Education Profile

An analysis of the educational profile of the AOI between 2001 and 2011 reveals that there has been a steady decline in the proportion of the population over 20 years of age with no formal schooling, with an average annual decline of 4.3%. Similarly, there is an associated gradual improvement in the proportion of the population that has matriculated or received a higher education qualification, with an average annual increase of 6.8% for grade 12 and 7.2% for a higher education qualification. This compares favourably with both KZN and eThekweni, with the AOI actually having a larger proportion of the population falling within the top end of the education profile than both the KZN Province and eThekweni Municipality.

3.2.2 Socio-Economic Profile

Extrapolations based on historical trends suggest that a relatively high proportion of the population in the AOI is formally employed (89.4%), with correspondingly low unemployment rate (10.6%). This is far lower than the national unemployment rate which currently sits at around 27.2% (StatSA, 2018). Similarly, the unemployment rate in AOI is also below that of KZN (33.4%) and eThekweni (27.7%). Refer to Table 3-25 for a comparison of the socio-economic profile of the AOI.

Table 3-8: Summary and comparison of the socio-economic profile of the Area of Influence (AOI), 2018

Area	KZN	eThekweni	AOI	Unit
Category				
Employment Profile	66.6%	72.3%	89.4%	Employed
	20.3%	20.9%	8.5%	Unemployed

Area	KZN	eThekwini	AOI	Unit
Category				
	13.1%	6.8%	2.1%	Discouraged work-seeker
Household Income Profile	8.2%	12.1%	6.2%	No income
	48.6%	34.0%	16.0%	Low income
	21.3%	22.9%	17.8%	Low-Middle income
	18.0%	23.8%	57.6%	Middle-High income
	3.9%	7.3%	2.3%	High income
Weighted average monthly household income	R11 286.28	R16 163.12	R23 669.35	Per month

3.2.3 Employment Profile

Employment levels are an important indicator of socio-economic wellbeing as they provide insight into the proportion of the population with access to income and the ability to provide for basic needs, such as food and shelter, among others. Refer to Table 3-26 for comparisons of the employment profile of the AOI.

Table 3-9: Employment profile, 2018

Category	KZN	eThekwini	AOI
Employed	66.6%	72.3%	89.4%
Unemployed	33.4%	27.7%	10.6%
Labour force participation rate	48.6%	57.3%	60.9%
Labour absorption rate	32.4%	41.5%	54.4%

Extrapolations based on historical trends suggest that a relatively high proportion of the population in the AOI is formally employed (89.4%), with correspondingly low unemployment rate (10.6%). This is far lower than the national unemployment rate which currently sits at around 27.2% (StatSA, 2018). Similarly, the unemployment rate in AOI is also below that of KZN (33.4%) and eThekwini (27.7%).

It must be noted that there is a likelihood that the data has been weighted by the relatively higher populations of the urban nodes of Illovo North, Kingsburgh, and Umgababa South, which provide a greater number of employment opportunities to residents.

3.2.4 Cultural and Heritage (Sativa, 2022)

(a) Proposed KZN ASP

SATIVA (Pty) Ltd have undertaken a Phase 1: Archaeological and Heritage Impact Assessment and found no significant heritage resources within the proposed development site (including the various road access options. Refer to the study in Appendix D.

Although the possibility of encountering previously unidentified burial sites is low, should such sites be exposed during subsurface construction work, they are still protected by applicable legislation and they should be protected.

(b) Proposed sewer line Route

SATIVA (Pty) Ltd undertook the Phase 1: Archaeological and Heritage Impact Assessment for the proposed construction of the sewer rising main from the KZN ASP site to the existing Kingsburgh WWTW (Appendix D). No heritage resources were identified during the site survey.

Although the area is heavily altered, the potential of encountering heritage resources hidden beneath the surface still exist. In terms of the archaeology and heritage, with respect to the proposed sewer line route, there are no obvious 'Fatal Flaws' or 'No-Go' areas. No archaeological sites were recorded along all the proposed sewer line routes. The field survey established that the affected project area is degraded by agricultural activities and associated infrastructure. Although the area is degraded, there is still a possibility of encountering archaeological remains, especially during excavation for pipeline trenches. The Chance Finds Procedure (CFP) must be implemented should heritage resources be uncovered during construction. Based on the findings of this study, the proposed sewer line route is feasible from an archaeological perspective.

(c) Proposed Powerline Routes

The literature review and field research confirmed that the project area is situated within a contemporary cultural landscape dotted with settlements with long local history. The field survey established that the affected project area is degraded by existing sugar cane production and associated infrastructure developments. Although the area is degraded, there is a possibility that the project site is part of a wider archaeological and historical site and significant cultural landscape. In terms of the archaeology and heritage, with respect to the proposed development site, there are no obvious 'Fatal Flaws' or 'No-Go' areas. No archaeological sites were recorded on the direct foot print of the powerline routes and substation site. The field survey established that the affected project area is degraded by agriculture activities and associated infrastructure. Although the area is degraded, there is still a possibility of encountering archaeological remains especially during excavation for foundations and access routes. This report concludes that the proposed development site may be approved by Amafa aKwaZulu Natali to proceed as planned subject to recommendations herein made.

3.2.5 Aesthetic Environment (SVA, 2020)

A Visual Impact Assessment was conducted by SVA International for the proposed KZN ASP site and the various access road options (Appendix D). This study was aimed at ascertaining and remarking whilst assessing the potential visual impacts associated with the proposed development on the identified site and context. Key findings from this site are described below.

(a) Proposed KZN ASP

The study area focuses on the landscape within a 2km radius of the boundary of the proposed development. This surrounding area is made up of residential, farms and undeveloped areas. The topography of the study area is predominantly soft rolling hills and coastal plains, where the height above sea level ranges between 5 – 75m above sea level. The site for the proposed development is also fairly high in relation to the ground level of the surrounding areas and movement paths.

The visual quality of the region is moderate to moderately high. The landscape is made up of large tracts of vegetation, agriculture (subsistence and commercial), housing (both high and low income) and natural rivers, wetlands and coastal regions. There is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale.

The proposed development is expected to fade from view with increasing distance from the site. Visibility will decrease exponentially with the apparent decrease in the size of the development within the receptor's Field of View (FOV) and as contextual visual information increases within the receptor's FOV. The site is expected to be the most visible to receptors viewing from locations closer to the site (within approximately 1 – 2 km). The overall visibility of the site from the surrounding is largely dependent on the presence and positions of screening elements such as vegetation and urban development.

The project area is anticipated to be most visually apparent within a 1km distance from the boundary of the proposed development site. Due to the undulating landscape topography and existing infrastructure, buildings and vegetation, the proposed project is not anticipated to be highly visible from an area greater than 2km from the project area and will be most visible from areas within 1km.

Critical viewpoints from which the site could potentially be visible were determined based on the digital viewshed analysis. Thirteen potential viewpoints have been identified. The viewshed area that has been calculated for the site indicates that it will be visible from a distance of about 2 km. Although the proposed development covers a relatively large portion of land, it is hidden by the hilly terrain. It is therefore considered to have Moderate visibility in terms of the viewshed area.

(i) Viewpoints

A photographic survey was conducted on location by taking photographs of the site for the proposed development from various significant viewpoints. Refer to Figures 3-65 to 3-77. Critical viewpoints from which the site could potentially be visible were determined based on the digital viewshed analysis. Thirteen potential viewpoints have been identified (refer to Figure 3-64). Refer to Table 3-27 for the summary of visibility of each viewpoint.

(ii) Zone of Influence

The zone of visual influence is considerably smaller due to the screening effect of mature trees and vegetation in the surrounding areas. The area is not highly visible at increasing distance from the site and is only visible within a <1km radius. The zone of visual influence indicates that the site has moderate visibility. The proposed development would therefore have a moderate viewer incidence.

As viewer perception is largely based on subjectivity, user perception would vary between various viewers. Some would have both positive and negative viewing experiences of the proposed development, depending on viewing occurrences and outlook on development in the area.

(iii) Visual Exposure

The proposed development displays the greatest degree of visual exposure from viewpoints 02, 05, 07, 08, 09, 10 and 13, which is illustrated on Figure 3-78. These viewpoints are observed at close proximity, or from surrounding high lying areas and increase the prominence of the proposed development in the observers Field of View (FOV). Existing vegetation and the nature of the topography obscure the development in the observers FOV from viewpoints 03, 04 and 06. The development is partially visible from these points. While Figure 3-57 illustrates the critical viewpoints from which the site could potentially be visible based on the digital viewshed analysis, Figure 3-78 illustrates the areas with the greatest degree of visual exposure from the viewpoints mentioned herein.

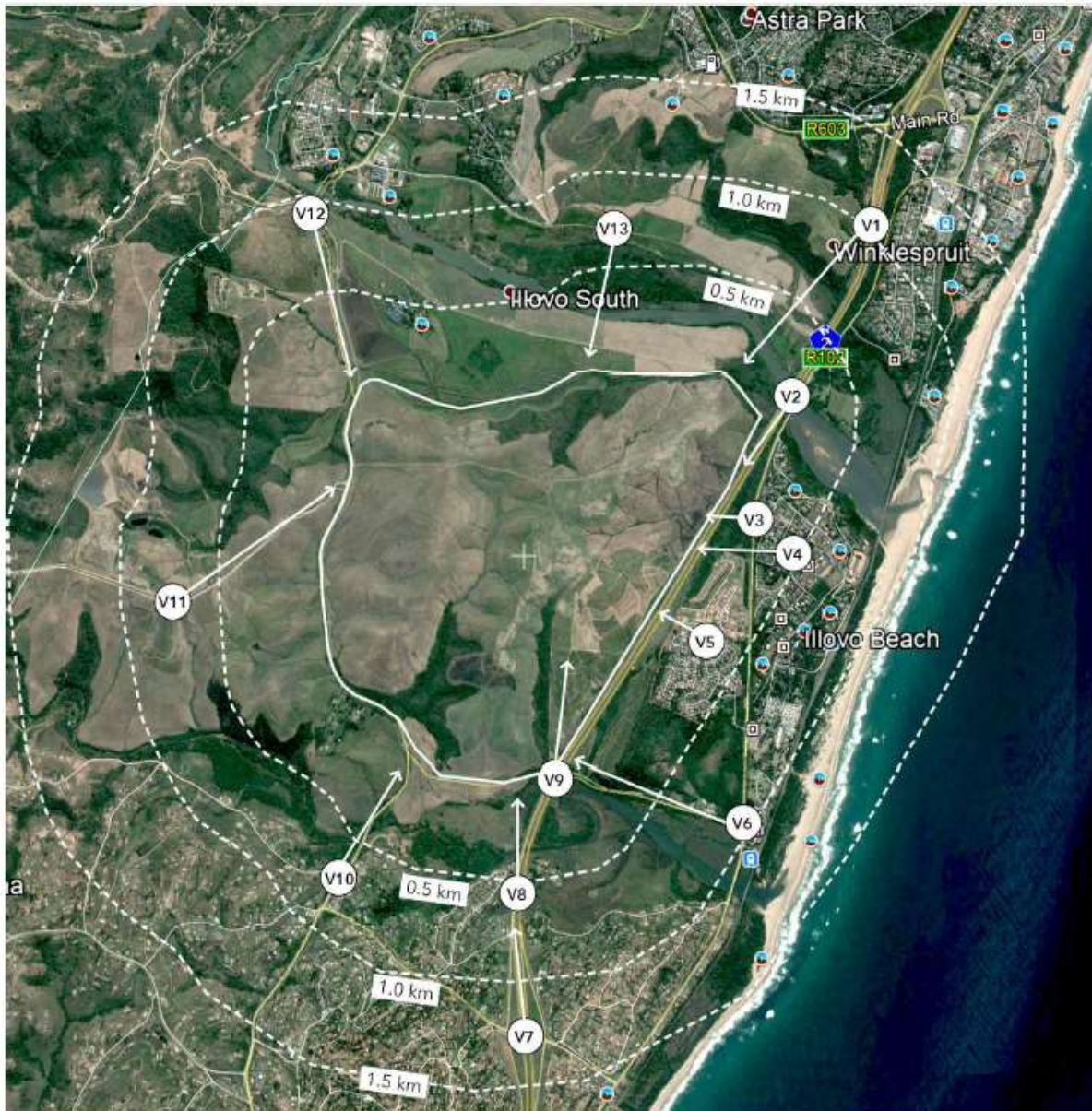


Figure 3-18: Diagram indicating potential viewpoints. (Google Earth, edited by SVA. 2019).



Figure 3-19: View Point 1 - Panoramic view from N2, near Winklespruit, looking up and down the N2. The site is hidden from view by a hill and vegetation and is not visible from this point.



Figure 3-20: View Point 2 - View from N2, on the iLovu Bridge. The view is straight down the N2 in a south-west direction, with the site visible on the right-hand side. The site is highly visible from this point.

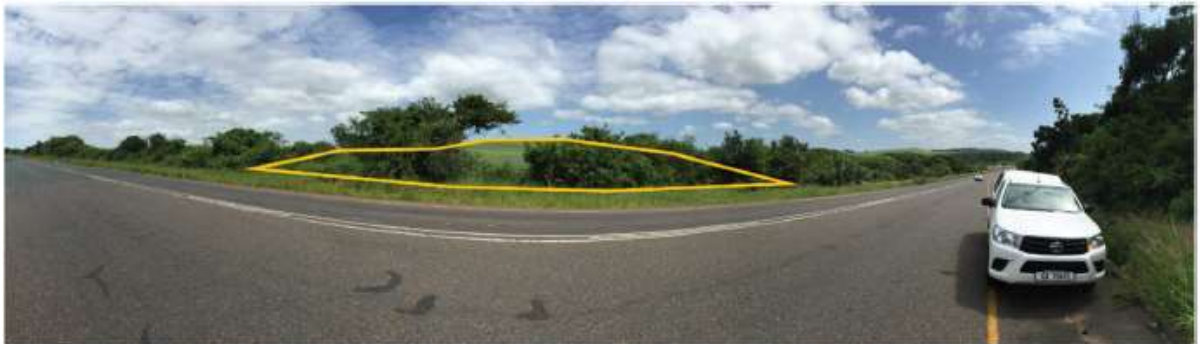


Figure 3-21: View Point 3 - Panoramic view from the N2 off-ramp for Illovo Beach, looking towards the east. The site is visible from this point.



Figure 3-22: View Point 4 - View from the Illovo Beach residential area. The site is obscured by vegetation but is still visible from this point.



Figure 3-23: View Point 5 - View from the Panorama Park residential area. The site is highly visible from this point.



Figure 3-24: View Point 6 - View from the Panorama Park residential area. The site is obscured by vegetation and the topography but is still visible from this point.

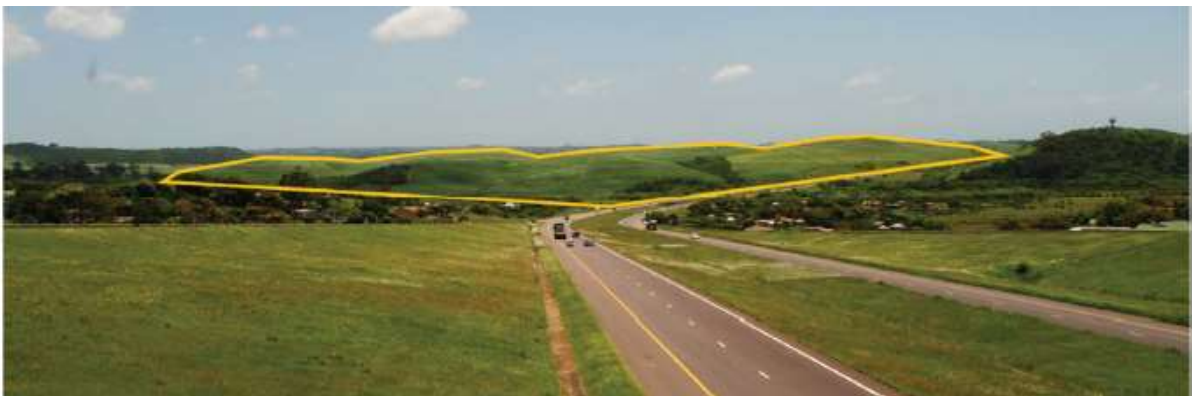


Figure 3-25: View Point 7 - View from the N2, looking north. The site is highly visible from this point.



Figure 3-26: View Point 8 - View from the N2, looking north. The site is highly visible from this point.



Figure 3-27: View Point 9 - View from the N2, above the uMsimbazi River, looking north. The site is highly visible from this point.



Figure 3-28: View Point 10 - View from the P197, looking north. The site is visible from this point.



Figure 3-29: View Point 11 - View from a high lying dirt road, looking east. The site is highly visible from this point.



Figure 3-30: View Point 12 - View from the steel bridge crossing the iLovu River. The site is not visible from this Point



Figure 3-31: View Point 13 - View from 'Old Main Road'. The site is visible from this point

Table 3-10: Summary of visibility from viewpoints

View Point (VP)	Visible
VP 1	NO
VP 2	YES
VP 3	YES
VP 4	YES
VP 5	YES
VP 6	YES
VP 7	YES
VP 8	YES
VP 9	YES
VP 10	YES
VP 11	YES
VP 12	NO
VP 13	YES

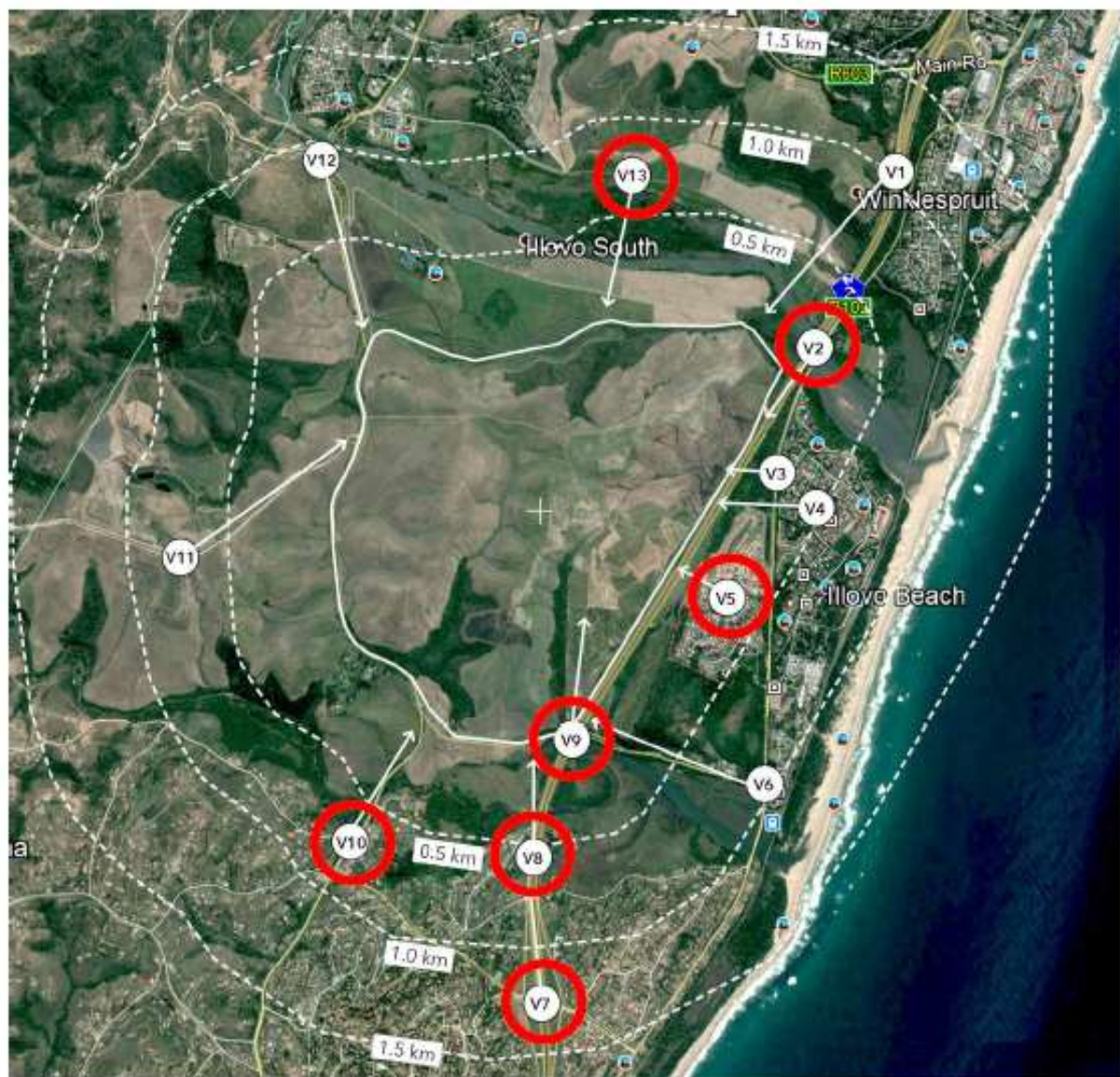


Figure 3-32: Diagram indicating potential viewpoints. (Google Earth, edited by SVA. 2019).

(iv) Visual Sensitivity

The site has medium to high visual sensitivity due to its undulating topography and large scale relative to surrounding developments. The surrounding land uses are mostly residential, which will increase the sensitivity to the proposed ASP industrial-type development

The residential areas around view point 5 and view point 13 will have the most sensitive views. At the moment these areas have a pleasant view of lush, green rolling hills. This will be replaced by large scale industrial type architecture. The duration of the viewing period would be fairly long.

These points, therefore, have high visual sensitivity. Although the site is also highly visible from viewpoints 2, 7, 8 and 9 – the duration of the viewing period is short, as the viewer is travelling along the N2 freeway and will be driving through similar kinds of developed area – around 3 minutes' travel time. These points, therefore, have low viewer sensitivity.

(v) Visual Absorption Capacity (VAC)

The site has medium visual absorption capacity due to the undulating landscape and topography and also due to the fact that many viewers would be transit travellers along the N2, with only a short time period of visual interaction with the proposed development (±3 minutes).

(vi) 'Genius Loci' (Sense of place)

This is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. In terms of the proposed development it is suggested the sense of place would be altered to a degree but that would be within acceptable parameters.

(vii) Summary

Despite its location within the surrounding landscape the proposed development is not particularly well visible within its immediate and larger context from number of viewpoints. This is primarily due to the undulating nature of existing landscape within the site and immediate surrounding which offers visual concealment from a number of sides. However, from a limited number of viewpoints the development would be highly visible.

The proposed development is therefore considered to be moderately visually intrusive and will, despite its maximum height of 15 metres, blend-in to a degree with the existing setting and context.

(b) Proposed 132kV Powerline (INR, 2020)

A Visual Impact Assessment was conducted by the Institute of Natural Resources (INR) for a 132kV electrical powerline from the existing Kingsburgh substation to the proposed substation at the ASP (Appendix D). The assessment of visibility is based on a viewshed model which is developed based on the topography and on the specifications of the development. This

identifies which areas of the region will potentially be affected visually by the proposed development. Key findings from the study are described below.

The diminishing of visual impact is compounded by the lattice makeup of the pylons which allows the background to be seen through the lattice, providing a degree of visual integration. This helps to further reduce the visual impact of a pylon. Refer to the figure below.



Figure 3-33: Comparison between the visual impact of lattice pylon at 50 m (foreground) and 2000 m (red circle)

(i) Visual Absorption Capacity

The site's visual absorption capacity is low to moderate. The expanse of sugarcane is monochromatic and fragmented but there are a few topographic features in the valley that will allow the visual impact of the development to be partially dissipated or absorbed. The landscape is dominated by sugarcane which is fragmented by nature. Powerlines would introduce additional straight, fragmenting lines which are not out of place in such a landscape, particularly when below the horizon. However, when visible above the horizon, pylons are much more intrusive and visible.

(ii) Landscape exposure/enclosure

The proposed development site is the lower iLovu River valley which is somewhat enclosed and thus relatively secluded from the surrounding valleys. The landform of the site is characterized by a river valley bottom, surrounded by ridges to the north, south and west. The site is also partially enclosed to the east, where the valley narrows as the river approaches the coast. Because of this topographic seclusion, visual impacts are largely contained within the valley. The exception to this is the Nkwali North residents as they are situated at a higher altitude and therefore overlook the valley.

Current Proposed 132kV Powerline Route (previously known as Option 1)

The broader visual impact of option 1 is relatively contained when compared with other line options. There are several local areas of concern with Line option 1. These areas of concern are predominantly residential zones, along Draeger Crescent, where the powerlines pass in close proximity and where views of the majority of the pylons exist. South Illovo residents and businesses in the area of Draeger Crescent will have views that are significantly impacted by the Powerline Option 1. Refer to the viewshed analysis in the figure below.



Figure 3-34: Viewshed analysis of Powerline

(c) Proposed Substation

The proposed substation is situated on the southern ridge of the iLovu Valley, overlooking the iLovu River. The proposed dimensions of this structure are 100 x 100 m.

(i) Viewshed for Proposed Substation

The visual impact of the substation was assessed based on the typical 132kV substation drawings and dimensions. In addition, the Kingsburgh substation has been used as an example of such a substation for visual impact assessment purposes. The proposed substation would be visible predominantly from the areas to the north, east and west of its proposed location, while areas to the south are largely shielded by the topography (Figure 3-84).



Figure 3-35: Viewshed analysis for the proposed substation

(ii) Sensitive Viewing Points

Potentially sensitive viewing points (SVPs) were identified using the viewshed analyses from the substation and each line option.

Nkwali North

Nkwali North is situated approximately 1km west of the proposed development, perched high on a ridge with easterly views across the valley (Figure 3-85). There are several free-standing houses and schools on the east-facing crest of the ridge. The sensitivity of the residents of Nkwali north is high as they are residents with affected views.

The powerlines are likely to break the skyline in certain areas but the impact of this will be diminished by the distance between the lines and the receiving environment. The visual impact of the proposed development would be further diminished as the area is already characterized by pylons and powerlines. Sand mining in the valley below has already detracted from any potentially sensitive natural views.

Astra Park

Views of the proposed development area from Astra Park (Figure 3-86) residential area are limited by the topography of the area. The most impacted residents of Astra Park will be those of the Coastline Crescent Shareblock which sits on the western extremity of Astra Park residential area. The surrounding vegetation in Coastline Crescent Shareblock will partly conceal the proposed development from view but not completely. However, the construction of pylons in the vicinity will not completely change the nature of the landscape for the receiving environment due to the presence of several existing large pylons in the area. Residents of Coastline Crescent Shareblock will be able to see at least half of the pylons in all of the powerline alternatives but residents from the rest of Astra Park will only be able to see a few pylons. Views from Astra Park are considered highly sensitive as they are residents with affected views.

Illovo South

Illovo South is a small community made up of residential areas, commercial zones and light industry (Figure 3-87). The light industry and commercial zones have a low sensitivity as they have views from urbanised areas, commercial buildings or industrial zones. However, the residents of this area have a high sensitivity. The addition of powerlines in the area would however not drastically change the character of the area as it is already relatively urbanized with a light industrial sense of place.

Nelson Close Residents and Illovo Country Estate

Nelson Close is situated west of the existing Kingsburgh substation with views across the iLovu River valley. There are several free-standing houses, a country estate and one housing complex in this area, all overlooking the valley. Current views from Nelson Close are of agricultural fields with fragmented natural vegetation. The sensitivity of the residents of Nelson Close is high as they are residents with affected views. Illovo Country Estate and Clubhouse are located on the natural ridge, overlooking the proposed development site.

Line option 1 passes within 300 m of the Nelson Close residents, likely causing slight visual impacts on the residents. The pylons and powerlines are likely to be visible above the skyline for a portion of the view from the receiving environment before dropping below the horizon. Once the pylons are below the horizon, their visual impact is significantly reduced due to the mottled and fragmented backdrop. Similarly, Line 3 a & b pass within 400 m of the Nelson Close residents, likely causing slight visual impacts on the residents.

Draeger Crescent Residents

Draeger Crescent is situated south-west of Poss Road, with approximately 10 residences that overlook the iLovu River and part of the proposed route. In addition to the residences, there is a Bed and Breakfast (Serendipity Country House) which, to a large degree, relies on the view

of the iLovu River valley and the rural sense of place for their business. The sensitivity of the residents of Draeger Crescent is high but the sensitivity of Serendipity Country House is high to exceptional as the business partly relies on the appreciation of the landscape for income.

The houses of Draeger Crescent are built on a ridge, approximately 15m-20m above the level of ground where the powerlines are proposed to be built. All proposed line options are located within 100 m of the residents of Draeger Crescent. It is likely that the residents of Draeger Crescent, including Serendipity Country House, will have their view of the iLovu River Valley broken by powerlines. The view of the valley will be broken by the powerlines and pylons which will traverse the view shown in Figure 25 of Appendix D mid-frame and in close proximity. Further away, the view of the horizon will be impacted by the proposed substation development.

The pylons of line option 1 are located at least 100 m from any of the residents on Draeger Crescent and Poss Road, reducing their visual impact slightly. However, the powerlines may still be visible across the horizon for some residents of Draeger Crescent and Poss Road. Refer to Figure 3-90 for the locality map illustrating the proximity of Draeger Crescent residential area to the proposed powerline route options.

Winkelspruit and Illovo Beach

Winkelspruit and Illovo Beach are mixed residential areas located to the east of the proposed development site. Several houses in Winkelspruit and Illovo Beach are west facing, with views over the river valley where the development is proposed to take place. Visual impacts on the receiving environment would be diminished by the distance from the proposed development. Impacts on view of the proposed development from these houses would be diminished by the distance and the sensitivity of the residents in these areas is high.

This viewpoint was selected to be representative of the views from both Illovo Beach and Winkelspruit. From Winkelspruit and Illovo Beach, the majority of the pylons in all proposed line options will be visible but the impact will not be extensive due to the distance from the proposed development. Few of the pylons would be visible above the horizon and the residents are more than a kilometre away from the pylons thereby diminishing the impact. Similarly, the proposed substation will be visible from Winkelspruit and parts of Illovo Beach but the impact will be diminished by the distance between the proposed development and the receiving environment. Refer to Figure 3-91 for the locality map illustrating the proximity of Winkelspruit and Illovo Beach to the proposed powerline route options.

Main Farm House

The main farm house is situated south-west of the existing Kingsburgh substation on a small crest. Panoramic views across the river valley can be seen from the house while the existing substation can be seen north-east of the property. Line option 1 would be visible to the north and the west of the main farm house, approximately 80 m away. Mitigation is not possible due to the close proximity of the house to line option 1. However, the main farm house faces south-east, away from line option 1, which reduces the visual impact on the main farm house.

Canoe Club and Eco Trail

The canoe club has views which are heavily exposed to all line options of the proposed development. The sensitivity of those using the canoe club for sports and recreational activities is moderate as their focus is not on the landscape but rather on the activity.

The Eco Trail starts from the canoe club and follows the iLovu River downstream. The views along the Eco Trail are focused on the landscape and will be impacted by the proposed development particularly in the portion of the Eco Trail closest to the Illovo Canoe Club (Figure 3-93). The sensitivity of those utilizing the Eco Trail is very high because their focus is on the appreciation of the landscape.



Figure 3-36: Sensitive Viewing Points that were identified, using the viewshed analyses, and then assessed during the site visit

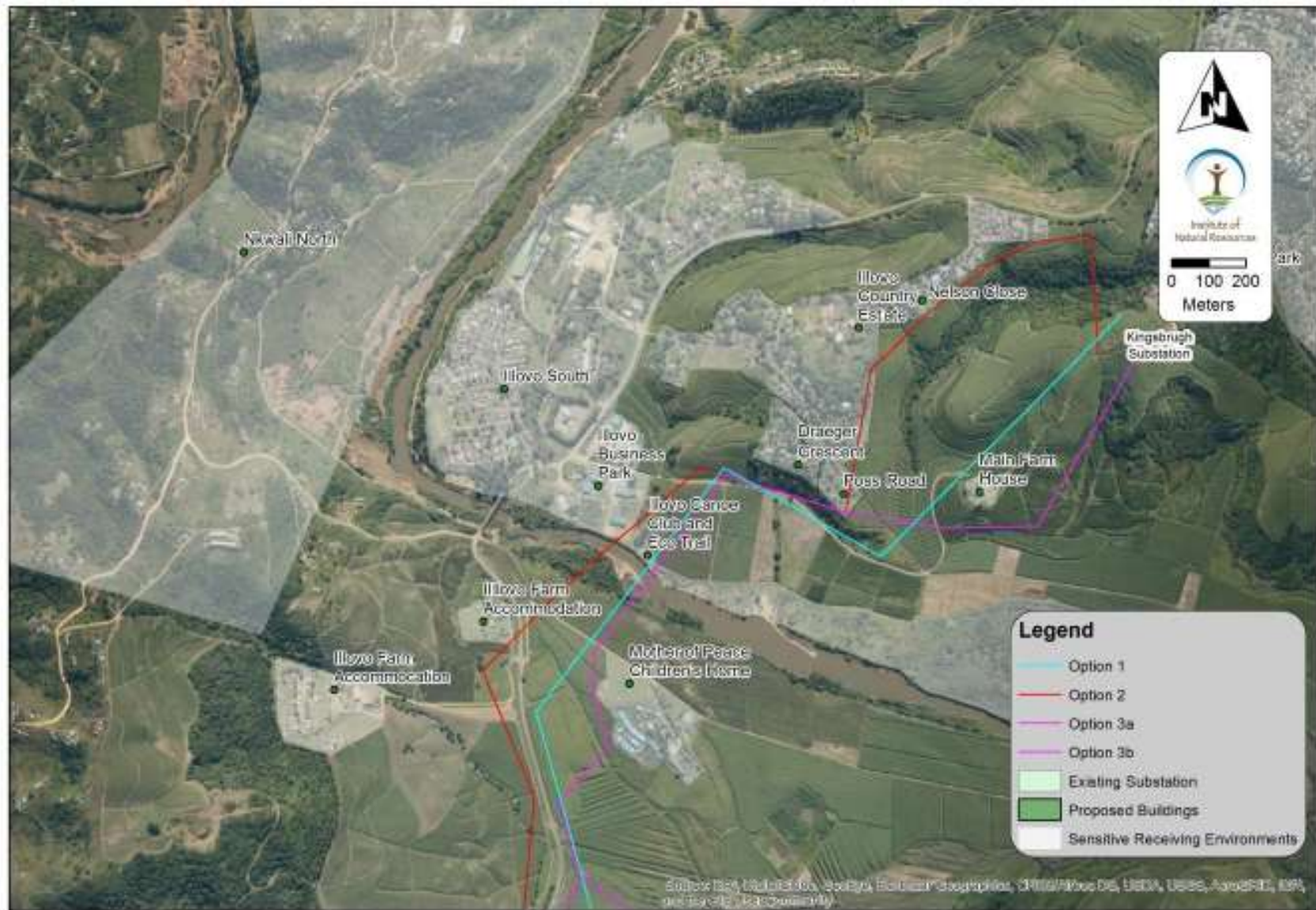


Figure 3-37: Locality map illustrating the proximity of Nkwali North residential area to the proposed powerline



Figure 3-38: Locality map illustrating the proximity of Astra Park residential area to the proposed powerline

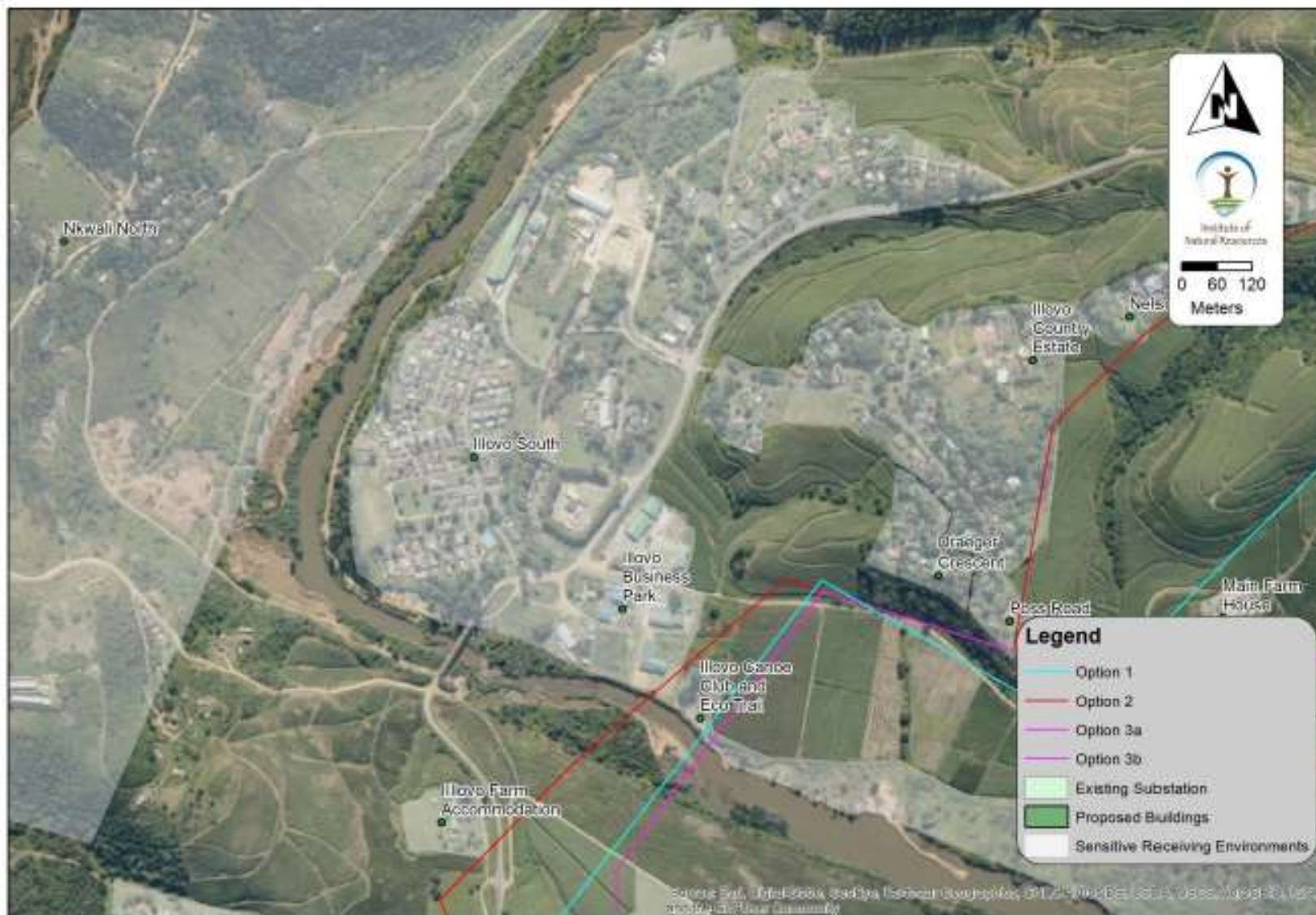


Figure 3-39: Locality map illustrating the proximity of Illovo South mixed-use area to the proposed powerline



Figure 3-40: Locality map illustrating the proximity of Nelson Close and Illovo Country Estate to the proposed powerline

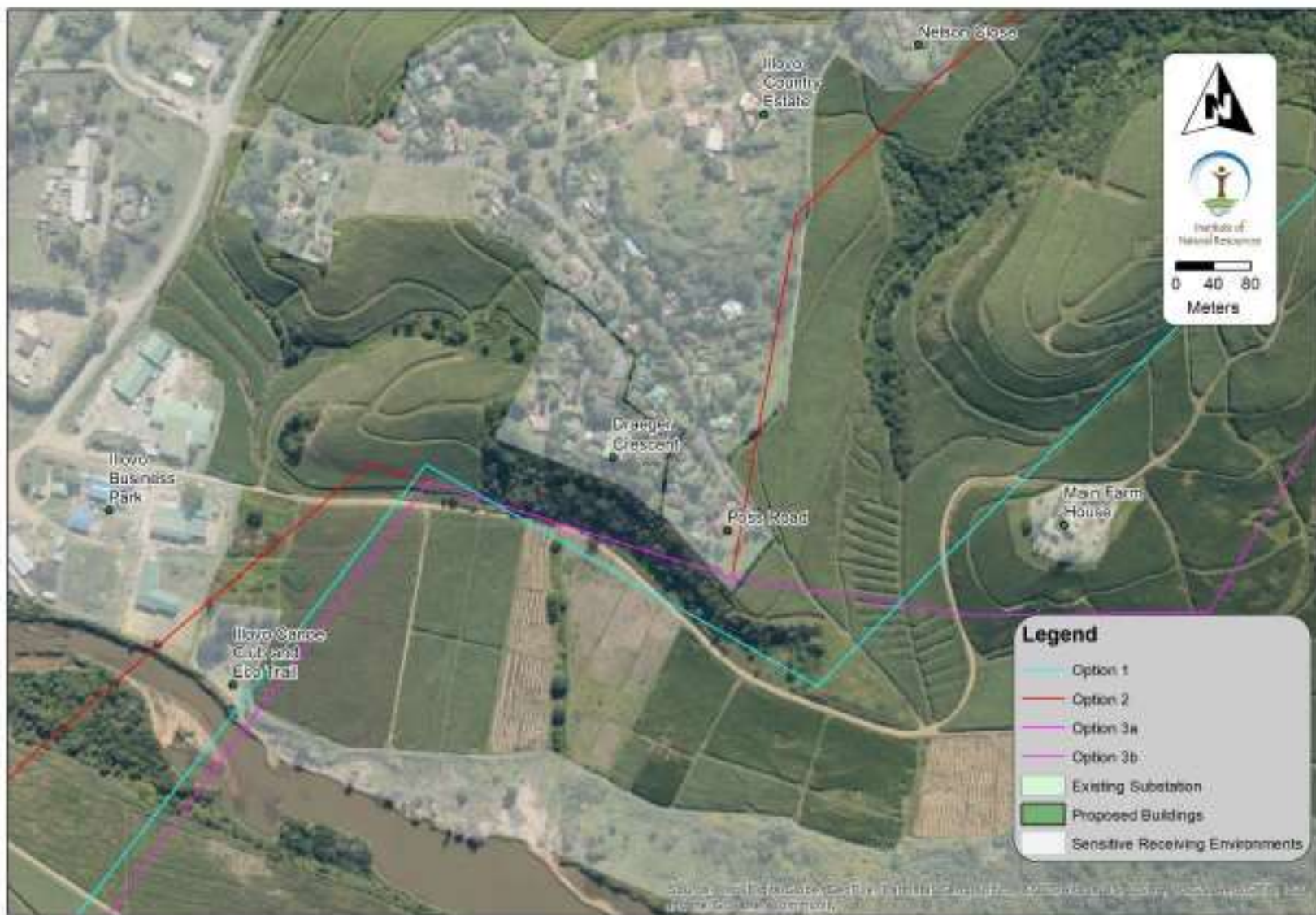


Figure 3-41: Locality map illustrating the proximity of Draeger Crescent residential area to the proposed powerline



Figure 3-42: Locality map illustrating the proximity of Winkelspruit and Illovo Beach to the proposed powerline

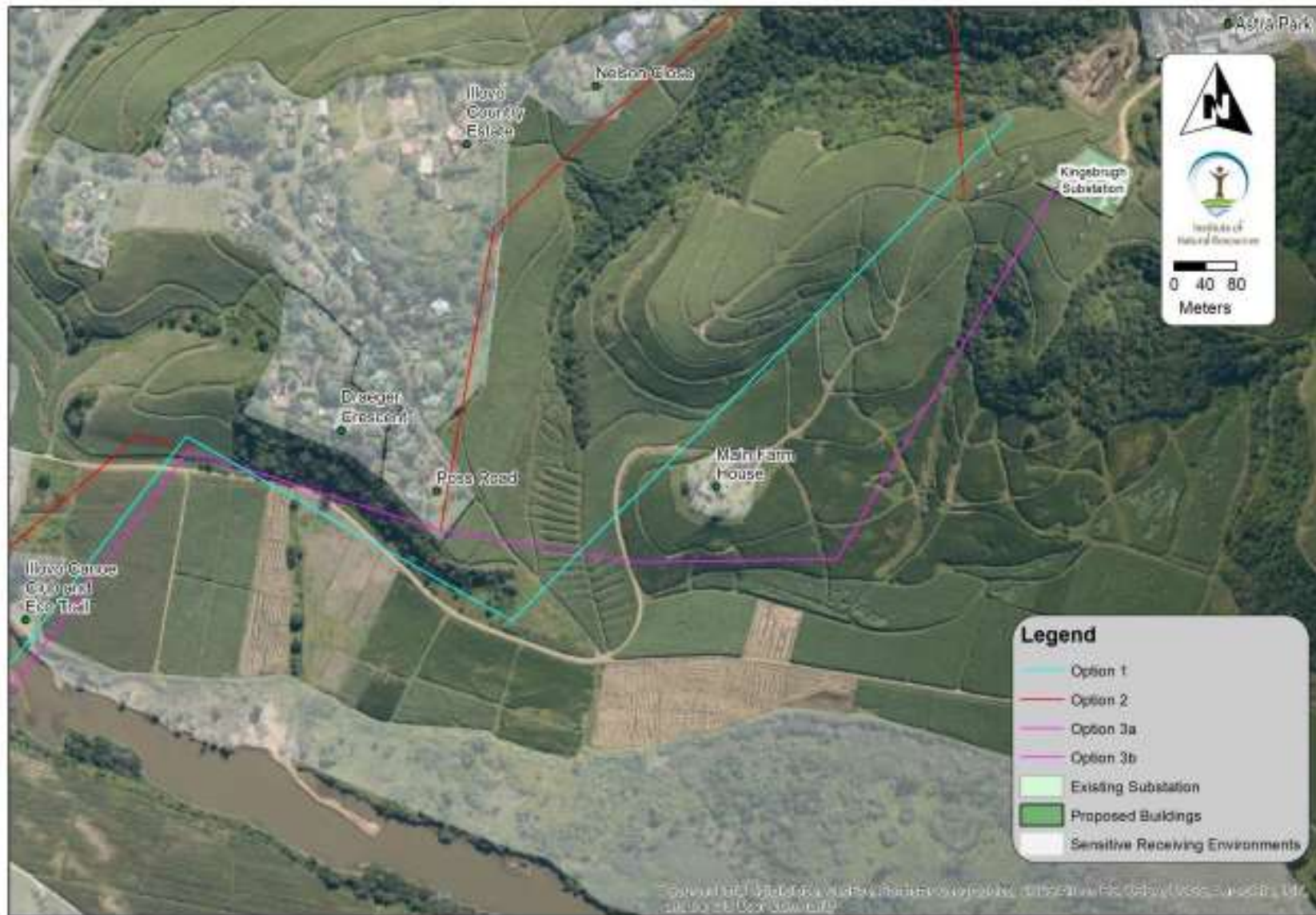


Figure 3-43: Locality map illustrating the proximity of the Main Farm House to the proposed powerline

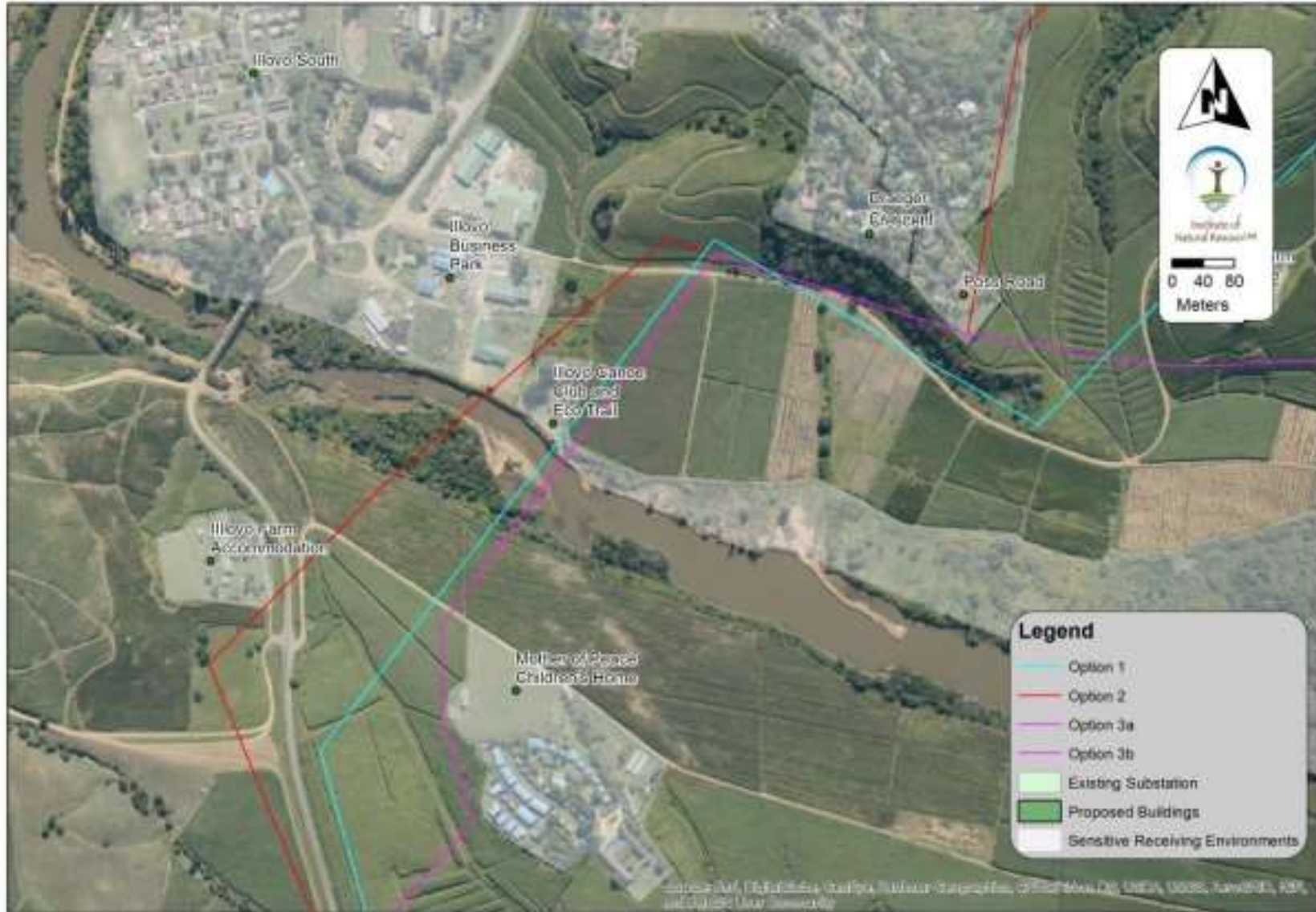


Figure 3-44: Locality map illustrating the proximity of the Illovo Canoe Club and Eco Trail to the proposed powerline

Illovo Farm Accommodation

This viewpoint was selected to be representative of the views from both Illovo Farm Accommodation properties (Figure 3-94). The Illovo Farm Accommodation is situated west of the proposed development, with panoramic views of the valley. There are several residences and offices at the site, most of which would have views impacted by the proposed development.

The farm accommodation is perched slightly above the river valley with views from the existing substation to the site of the proposed substation. Options for mitigation of any of the proposed line options are limited by the topography of the land. The sensitivity of the residents at the Illovo Farm Accommodation is high as they are residents with affected views.

Lines options 1, 2 and 3 are approximately 500-700 m away from the residences at Illovo Farm Accommodation. The pylons and powerlines are likely going to break the skyline, further increasing the visual impact. However, the existing view of the landscape from the property is broken by several pylons and powerlines. The addition of any of the proposed line options would not significantly alter the character of the landscape from the perspective of Illovo Farm Accommodation. Refer to Figure 3-94 for the locality map illustrating the proximity of Illovo Farm Accommodation to the proposed powerline route options.

Mother of Peace Children's Home

All proposed line options pass within 300 m of the Mother of Peace Children's Home. The potential for mitigation of the visual impact at this site is limited due to the close proximity of the pylons.

Line 2 passes within 200 m of the boundary of Mother of Peace, potentially causing visual impacts on the residents. This visual impact is likely to be diminished south of this viewpoint as most of the pylons would not be obvious above the horizon. In addition, they would be located alongside existing pylons meaning the nature of the landscape would therefore not be significantly altered. Lines 3 a & b pass within 20 m of the boundary of Mother of Peace, potentially causing significant visual impacts on the residents.

The sensitivity of the residents at Mother of Peace Children's Home is regarded as high as they are residents with affected views, however, this property is well vegetated and constructed with an introspective layout. The perimeter, in particular, is hedged and tall trees are present which will help mitigate the visual impact of pylons. Refer to Figure 3-95 for the locality map illustrating the proximity of the Mother of Peace Childrens Home to the proposed powerline route options.

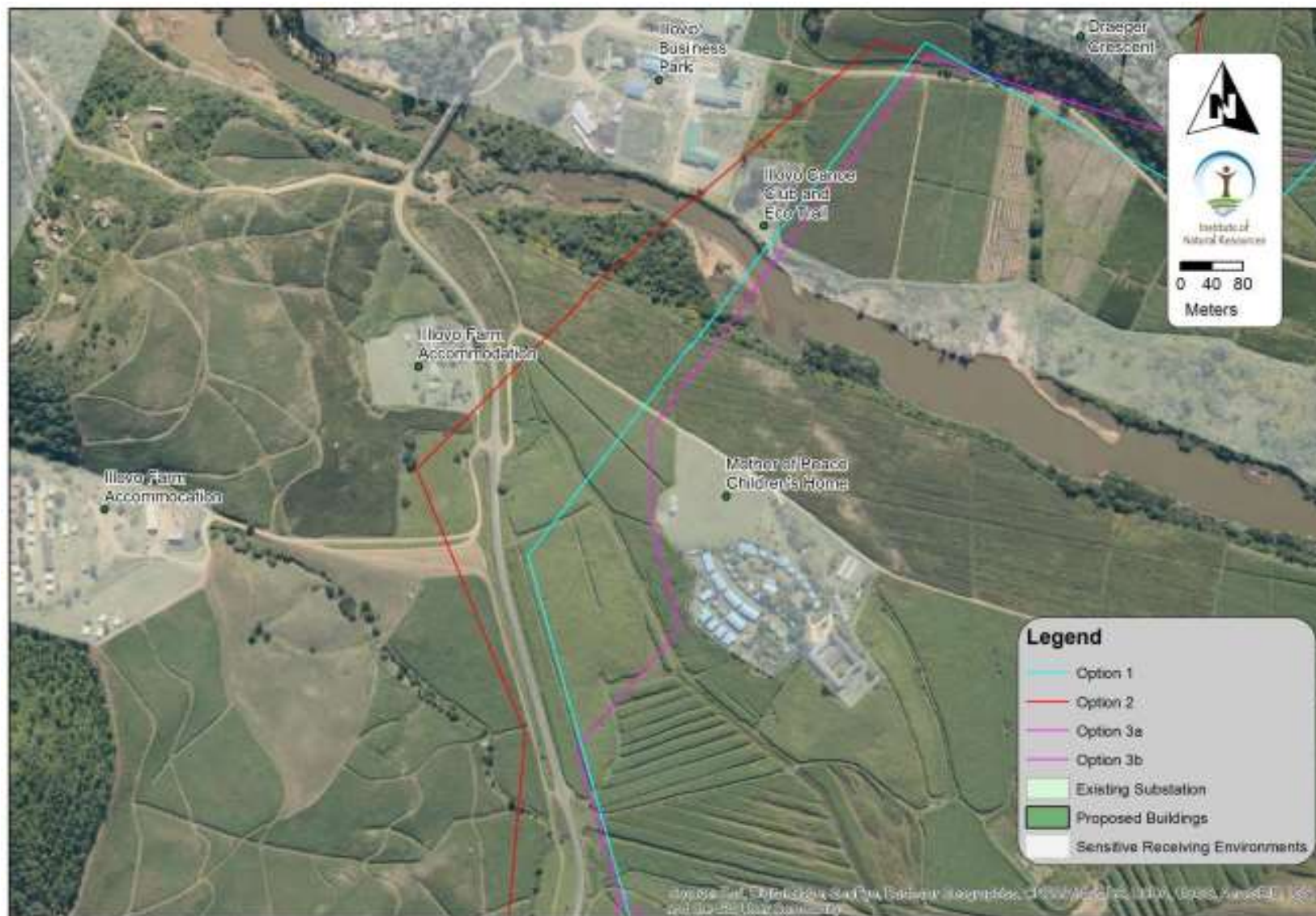


Figure 3-45: Locality map illustrating the proximity of Illovo Farm Accommodation to the proposed powerline

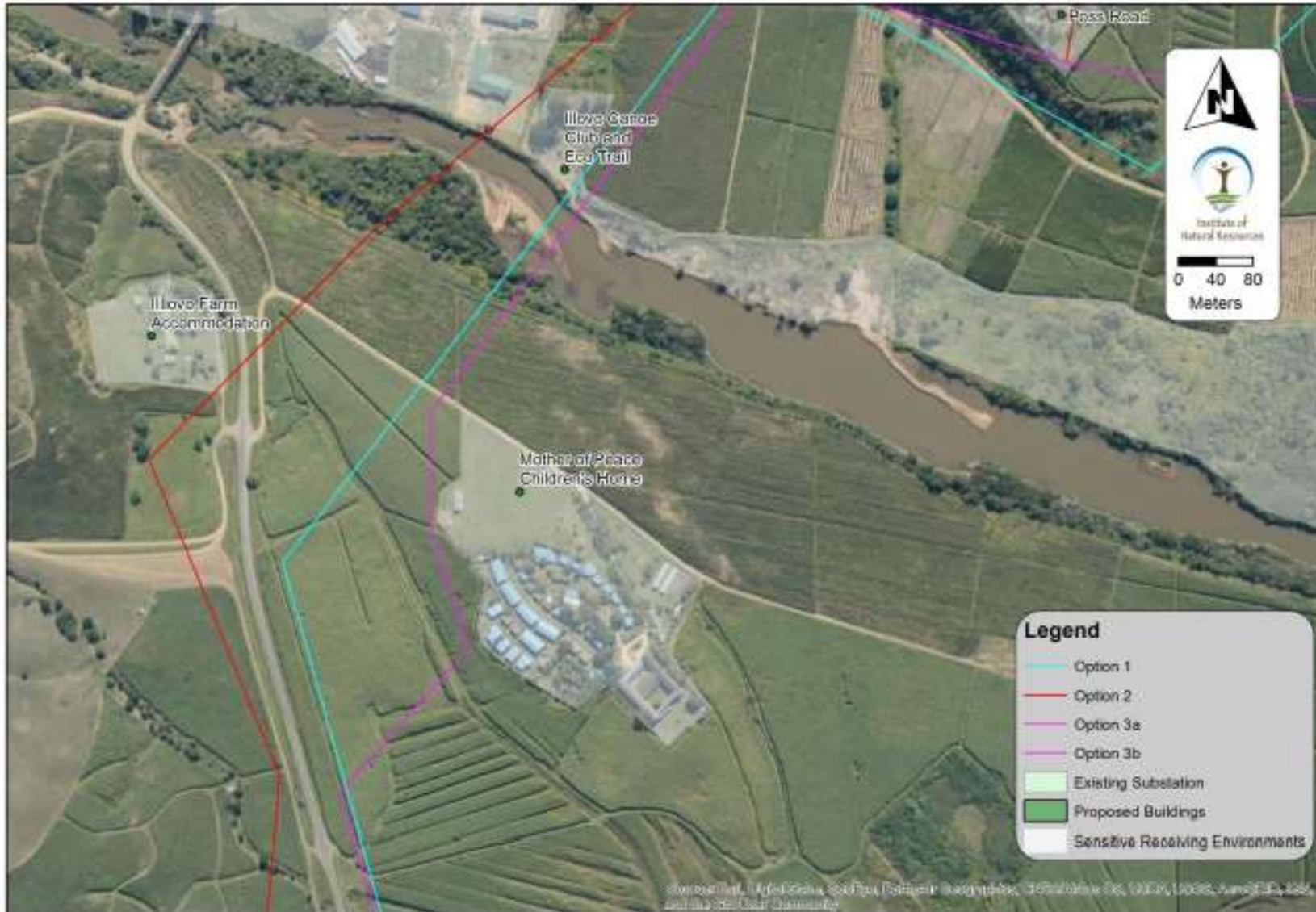


Figure 3-46: Locality map illustrating the proximity of Mother of Peace Children's Home to the proposed powerline

CHAPTER 4 CONTENTS

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4 *BASIC ASSESSMENT PROCESS*

4.1 Approach to the BA Process

A Basic Assessment (BA) process is an effective environmental planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The BA process for this project complies with the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998) [NEMA] and the NEMA EIA Regulations, 2014 (as amended). The guiding principles of a BA process are listed below.

4.2 Guiding Principles for a BA Process

The BA process must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be ongoing consultation with Interested and Affected Parties (I&APs) representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should finally be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

The eight guiding principles that govern the entire BA process are as follows:

- **Participation:** An appropriate and timely access to the process for all interested parties;
- **Transparency:** All assessment decisions and their basis should be open and accessible;
- **Certainty:** The process and timing of the assessment should be agreed in advance and followed by all participants;
- **Accountability:** The decision-makers are responsible to all parties for their action and decisions under the assessment process;
- **Credibility:** Assessment is undertaken with professionalism and objectivity;
- **Cost-effectiveness:** The assessment process and its outcomes will ensure environmental protection at the least cost to the society;
- **Flexibility:** The assessment process should be able to adapt to deal efficiently with any proposal and decision making situation; and
- **Practicality:** The information and outputs provided by the assessment process are readily usable in decision making and planning.

A BA process is further considered as a project management tool for collecting and analysing information on the environmental effects of a project. As such, it is used to ensure the following:

- Identify potential environmental impacts;
- Examine the significance of environmental implications;
- Assess whether impacts can be mitigated;
- Recommend preventive and corrective mitigating measures;
- Inform decision-makers and concerned parties about the environmental implications; and
- Advise whether development should go ahead.

The Public Participation Process forms an integral part of the Basic Assessment process and is discussed in greater detail in Section 4.4 of this BAR (below).

4.3 BA Technical Process

This section provides a summary of the technical process that has been followed to date for this BA process.

4.3.1 Application for Authorisation

The new Application for EA was submitted to the DFFE on 2 September 2022. Refer to **Appendix I** for the Application Form.

4.3.2 Information Gathering

Early in the BA process, the EAP, the proponent, key state departments and the eThekweni Municipality, Town Planners together with the Engineering Team comprising of Stormwater Engineers, Civil and Electrical Engineers, Traffic Engineers and technical specialists, identified the information that would be required for the impact assessment and the relevant data was subsequently obtained. In addition, the specialists sourced available information about the receiving environment from reliable data sources, I&APs and previously documented studies in the area.

4.3.3 Consultation with State Departments

An initial meeting was held with the following key state departments on 13 May 2019 to present the original proposed development of the KZN ASP i.e., all four (4) phases i.e., 1A, 1B, 1C and 1D. Following extensive engagement with the commenting authorities as listed below, the extent of the ASP was reduced to just two (2) phases i.e., Phase 1D/1S and 1A/1N. Phases 1A and 1D were renamed to Phases 1North and 1South for the purposes of the new application. Further engagement with the said departments were conducted in April, May and June 2022 (refer to the minutes of the meeting in Appendix A):

- eZemvelo KwaZulu-Natal Wildlife (EKZNW);
- KZN Department of Agriculture, Forestry and Fisheries (DAFF);
- KZN DoT;
- eThekweni Roads Department;
- KZN EDTEA (Coastal Management Unit); and
- eThekweni Municipality's Environmental Planning and Climate Protection Department (EPCPD).

The purpose of the authority meetings was as follows:

- To present the reduced extent/amended layout of the KZN ASP i.e. Phases 1S and 1N;
- To present the revised Traffic Management Plan;
- To present the revised wetland, estuary and SuDs reports associated with the reduced extent;
- To present the project in terms of how the mitigation hierarchy has been followed;
- To present opportunities and proposals of rehabilitation and mitigation offsets;
- To obtain comments and advice from the authorities; and
- To obtain a clear way forward and support in terms of environmental requirements for the application process.

The table below provides a summary of the engagement with the commenting authorities and the comments raised during the meetings in April and May of 2022.

Table 4-1: Summary of Engagement with Commenting Authorities (2022)

SUDs	
Comment	Response
Information on details of the Sustainable Urban Drainage System (SUDs) design e.g. discharge points in relation to wetland buffer zones	Detailed design will be carried out at Final Design stage, however the SuDs report provides information on the intent and functioning of the SuDs system.
SUDs to reduce pollutants significantly not removed entirely	Specialist agreed
SUDs handling of the water soluble hydrocarbons	Methods such as grass swales and vegetated bio-retention areas can be used to absorb nutrients and hydrocarbons

SUDs ability to handle large scale changes in the catchment	SUDs is a mitigating action that occurs high up in the catchment area at the source with immediate control in the stormwater runoff as best as possible. The 50 year pre-development peak flow will be controlled which will immediately have a positive impact on downstream watercourses in relation to flooding. In floods greater than the 1:50 year flood, any SuDs structures will be overtopped and these will be dealt with in a natural way by controlling the routes of flow so that there is no impact of the greater floods on the new development infrastructure and the downstream watercourses. SuDs will reduce and mitigate against downstream impacts.
Responsibility of SW management on site	The Applicant is responsible and this will be reflected in the information submitted in the DBAR
Separation of the Phases of the ASP	
Comment	Response
Clarity on Phases 1A and 1D and if these are viable without future development of 1B and 1C	It is viable as a standalone development
The impacts and mitigation measures associated with Phases 1B and 1C should also be considered at this stage and these cannot be ignored as further investigation could reveal that it is a fatally flawed.	At this stage, there is definite way forward. The other phases are seen as potential and dependent on availability of funds. Even at such time that funds are available, the various environmental issues will require further assessment and investigation prior to the submission of an application. Applicant aims to obtain necessary approvals for Phase 1A and 1D only. Now labelled as 1S and 1N for ease of reference to the new submission.
Looking at the Phases to determine the point at which the impacts reach a tipping point	This has since been done and addressed. The new application for only 1S and 1N is a result of the tipping point exercise. Obtain necessary approvals for 1S and 1N only.
Long term consideration of all the Phases	The other phases will be considered only at such time that the Applicant is able to secure funding. The timeline associated with this is unknown, if this will actually materialise is also unknown at this point. Applicant aims to obtain necessary approvals for Phase 1A and 1D only. The further development of the entire site will be considered at a later stage.
Estuaries and wetlands	
Comment	Response
Breaching of estuaries	The development will not cause breaching of the estuaries. The estuarine specialist explained that the comment on breaching was in relation to ensuring the continuation of natural breaching and not any form of artificial breaching

Consideration of the Estuary Management Plan (EMP) under development for the iLovu Estuary	<p>The EMP will be consulted.</p> <p>The EMP process is still underway. 26/04/2022 - JD requested a copy of the Situation Assessment Report (SAR) created as part of the EMP process. The SAR was received from EDTEA' Alfred Matsheke on 26/04/2022.</p>
Clarity on the EFZ and if this was according to the redetermined EFZ as per the NBA 2018 (10m contour and not 5m contour).	<p>The most updated EFZ was used i.e. NBA 2018 - Which for KZN estuaries incorporates a combination of the 5 & 10 m contours.</p> <p>Comment added to the assumptions and limitations section of the report (pg 40) to highlight this fact.</p>
Scoring presented is less than that presented in the NBA	<p>NBA is a desktop assessment based on available published literature, and the assessment and workshopped scores determined by the specialist NBA team. NBA assessment was in 2018. Anchor's assessment was based on two sites visits conducted in late 2021, the second of which included a complete sampling survey of the estuary and discussions with some of the Experts from the NBA team.</p> <p>Anchor stand by the updated data, lab results and the estuarine health score determined.</p>
Surprising that the estuarine assessment did not reveal any significant impacts	<p>Despite it being unusual to have not noted a significant impact on the estuaries, the size of the platforms as well as the proximity to the estuary were considered and this was used in the calculations presented. SuDs implementation was also considered. A drop in the toxic score did not result in a decrease in the overall health score for the estuary.</p>
The categories of PES reflected in the presentation are low and potential disagreement could arise with regards to biota as previous studies indicated higher PES categories.	<p>The low abundance is relative to historical studies. She added that species composition also changed significantly and species found previously were not found in more recent studies and no longer present in the assessed system. CM added that there were two different techniques used. JD responded by stating that there was an attempt to be conservative during the assessment. CM stated that it is a jump to a D category without a valid explanation as fish are the least sensitive of the biotic groups.</p> <p>Extra fish data dating back to 2007/2008 was provided by Cameron McLean. Meeting to discuss the data and the EHI score was held on 26 May 2022. Anchor stand by the updated 2021 data, lab results and the estuarine health score determined.</p>
Water quality impacts (2020)	<p>Platforms will avoid main channels. Pre and post stormwater flows to be the same so as to minimise impacts. Treated effluent will not be discharged into any watercourses.</p>

Upfront Implementation of mitigation measures (2020)	Simultaneous implementation is recommended as sediment contaminants could pose a risk at the commencement of construction
Clarity about what is being done and for what in terms of wetland and estuary mitigation and/or proposed offsets (2020)	There is now a clear separation of the wetland and estuary mitigation for Phase 1S and 1N
EIA Process	
Consideration of cumulative impacts	Will be considered during the BA Process
Avoid premature submission of the application	Comment noted

4.3.4 Site visit with State Departments – Initial Application for EA considering the full extent of the ASP

A site visit to the KZN ASP site, the wetland offset receiving areas, and the N2 interchange access options was undertaken by the Terrestrial Ecologist, Estuarine Specialist and Wetland Specialist, EKZNW, EPCPD and DAFF on 27 May 2019, i.e. subsequent to the authority meeting of 13 May 2019. Refer to the minutes of the site meeting in Appendix A.

The authorities agreed that opportunities identified within the uMsimbazi Estuary could increase the size of the offset receiving area for the uMsimbazi Catchment (including removing berms and drains and dense woody alien plants).

The general consensus among the authorities is that the approach to the uMsimbazi and iLovu wetland offset areas are acceptable. They were satisfied with the intention to include the broader floodplain of the uMsimbazi EFZ in the offset, which increases the physical extent from 5ha to approximately 20ha-25ha. This should assist with balancing losses and gains within this catchment.

The inclusion of the broader floodplain on the southern side of the iLovu River channel under sugarcane was additionally requested. General reshaping of drains and raised areas and the removal of the disused oxidation pond is the preferred approach for rehabilitation within the iLovu catchment.

The state departments were also taken to the various N2 access options 1, 1c, 1d and 3b. It was noted at the site meeting that in-principle approval of the interchange options off the N2 from SANRAL was pending. Should Option 1d be implemented, SANRAL would need to provide clearance for the R102 link road over the N2 to the proposed central boulevard. As the R102 link road would involve construction within a forest area, the access options 1c and 1d are not preferred from an ecological perspective. The main abutment next to the N2, for Option 1, 1c and 1d would also impact on a wetland. Option 3b does not impact on the forest area and is preferred from an ecological perspective and by the key state departments. The Estuarine Specialist indicated that engineering solutions to deal with stability concerns and the highly erodible sandy soils at the Option 3b site will need to be carefully considered should this option be pursued. Therefore, erosion and sedimentation risks to the downstream uMsimbazi

estuary will be important to mitigate at this site. Further recommendations regarding the access options off the N2 are provided in the terrestrial ecology report.

4.3.5 Site visit with State Departments – Revised Proposal for the KZN ASP with a reduced layout and extent i.e., Phase 1S and 1N

No site visit was conducted with the State Departments for the revised proposal, however there were several meetings held, the details of these are in Appendix A of this BAR.

4.3.6 Consultation with eThekweni Electricity - Initial Application for EA considering the full extent of the ASP

As indicated in Section 2.10.4, electricity for the proposed KZN ASP project was to be provided by eThekweni Electricity via a 132kV transmission powerline from the existing Kingsburgh substation to the proposed 132kV substation at the KZN ASP site. A meeting was held with eThekweni Electricity on 19 May 2019 to discuss the criteria to be met in selecting the most feasible powerline route alignment for the project. Refer to the minutes of the meeting in Appendix A.

Following the meeting, GIBB undertook a site visit with Mr Vasu Chetty of eThekweni Electricity on 1 August 2019 to select the most feasible route alignment. This resulted in the selection of Option 1 as the preferred route alignment, based on the following:

- There are no pylons located within the 1:100 year flood lines, the wetlands and the wetland offset receiving areas of the KZN ASP project;
- The proposed powerline will not cross existing 132kV powerlines;
- The pylons are located close to existing farm roads, thereby making it accessible for construction and maintenance;
- The properties to be traversed by the proposed powerline route belongs to DTPC;
- The proposed powerline route will have the least number of bends in comparison to Option 2, 3a and 3b powerline route alignments;
- The proposed powerline occurs 35m from the existing P197;
- The proposed powerline does not traverse fixed structures;
- It is the shortest route and therefore most cost-effective in construction of the powerline in comparison to the other route alignments;
- It is preferred from an ecological perspective as it does not traverse ecologically-sensitive vegetation, such as coastal scrub/thicket. Where the line crosses the iLovu River, collisions of birds with the powerline can be mitigated by the installation of bird flight diverters on the lines;
- The proposed powerline may be constructed based on the recommendations provided in the Geotechnical Report;

- There are low risks on the aquatic environment during both the construction and operational phases; and
- There are no heritage resources that will be impacted by construction of the proposed powerline.

4.3.7 Consultation with eThekweni Electricity - Revised Proposal for the KZN ASP with a reduced extent i.e. Phase 1S and 1N

Following the lapse of the original application for EA, eThekweni Electricity was consulted. During the consultation it was decided that the 132kV powerline would fall outside of the project timelines and to bridge the gap a new 11kV powerline is required. Therefore, the 11kV powerline was proposed to service only the Phase 1S and 1N until such time that the 132kV powerline is constructed. The eThekweni Electricity Department was responsible for the proposed route and it was sent to the consulting engineers and EAP for further investigation. The proposed route for the 11kV cable will traverse the iLovu River at the existing bridge thereafter it will follow the existing road reserve.

Similar to option 1 of the initial proposal, the 11kV is the preferred and only route alternative because:

- Length of the route is similar to Option 1 of the 132kV powerline also being applied for i.e., approximately 4.2km.
- With an exception to the first 800m of the route, and the last 300m of the route where it ties into the Kinsburgh WWTW, the route follows the existing P197 road.
- There is no sub-station associated with the 11kV proposed powerline.
- There will be no pylons located within any of the watercourses or wetlands on site.
- The route will not traverse privately owned property.

4.3.8 Initial consultation with the Department of Water and Sanitation

The following water use activities in terms of the National Water Act, 1998 (Act No. 36 of 1998) are triggered by the proposed development:

- Section 21(c) Impeding or diverting the flow of water in a watercourse); and
- Section 21(i) Altering the beds, banks and characteristics of a watercourse).

A Pre-Application Meeting was held with DWS on 11 October 2018. The purpose of the meeting was to present the background of the project, determine the water use activities and specialist studies that are required, and obtain further requirements/comments from DWS. Please refer to the minutes of the meeting in Appendix A.

At the time of the Pre-Application Meeting in October 2018, the applicant's proposal was to construct four on-site sewerage package treatment plants, one on each of the platforms proposed on site. This option was not deemed feasible due to potential impacts on the uMsimbazi Estuary. As potential tenant activities on site are unknown at this stage, it is

proposed that the sewerage generated on the site be conveyed via a sewerage pump station along the southern boundary of the site to a sewer rising main along the road reserve of the P197 and municipal roads until it reaches the existing Kingsburgh WWTW. Therefore, on-site sewerage package treatment plants do not form part of the WULA for this project. The potential tenants must, therefore, undertake Environmental Application Processes and WULAs, should they require on-site treatment of sewerage.

A WULA for the revised KZN ASP and associated sewage, road upgrades, powerline and bulk water is currently underway and will be submitted to the DWS in due course.

4.3.9 Specialist Studies

The following specialist studies have been undertaken for the initial BA process:

- Wetland Impact Assessment;
- Wetland Offset Strategy;
- On-site Wetland Rehabilitation plan;
- Terrestrial Ecological Assessment;
- Agricultural Potential Assessment;
- Phase 1 Archaeological and Heritage Impact Assessment;
- Estuarine Impact Assessment;
- Hydrological Assessment (Flood line Assessment)
- Aquatic Impact Assessment;
- Geohydrological Assessment;
- Geotechnical Assessment;
- Environmental Noise Impact Assessment;
- Socio-Economic Impact Assessment;
- Air Quality Impact Assessment;
- Visual Impact Assessment;
- Stormwater Management Plan; and
- Traffic Impact Assessment and Transport Master Plan.

During the Pre-Application meeting with the DFFE in March 2022, the Department requested that the specialist validate their studies in written communication or alternatively update the studies if required. The following specialists confirmed that the findings of the studies remain valid:

- Agricultural Potential Assessment– Letter of Validity contained in Appendix D

- Air Quality Impact Assessment - Letter of Validity contained in Appendix D
- Visual Impact Assessment - Letter of Validity contained in Appendix D
- Socio-economic Impact Assessment - Letter of Validity contained in Appendix D

The remaining studies have been updated and found in Appendix D of the DBAR.

4.4 Public Participation Process

The principles of NEMA govern many aspects of the BA process, including consultation with I&APs. These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment; and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The principal objective of public participation, in compliance with Chapter 6, Regulation 39 - 44 in GN R 326 of 7 April 2017, is thus to inform and enrich decision-making.

4.4.1 Identification of Interested and Affected Parties

I&APs representing the following sectors of society have been identified (see Appendix G for a complete preliminary I&AP distribution list):

- Provincial Authorities;
- Local Authorities;
- Ward Councillors; and
- Adjacent Landowners.

4.4.2 Public Announcement of the Project via a Background Information Document (BID)

A Background Information Document (BID) was made available to stakeholders on the preliminary I&APs database on 11 December 2018.

A BID for the revised ASP associated services and road upgrades was made available for I&APs on **20 September 2022**. Refer to the BID in Appendix G.

The purpose of this BID was to provide I&APs with background information about the proposed project. It also aimed to inform I&APs on how to further participate in the BA process. The BID invited I&APs to register their interest in the project and provide input with regards to possible biophysical or socio-economic impacts. Several comments were received from I&APs during the BID notification period. Refer to the Comments and Responses Report in Appendix G, as well as to the comments as they were received and the subsequent responses given in Appendix G.

4.4.3 Public Announcement of the Basic Assessment Report for public review and comment

The Draft Basic Assessment Report (BAR) for the initial proposal was available for public review and comment from 25 October to 25 November 2019. I&APs have been informed of the availability of the Draft BAR for public comment and have been requested to register and send their comments to GIBB in the following manner (see Appendix G for public announcement documentation):

- Publication of media advertisement in the South Coast Sun, Mercury and Isolezwe newspapers;
- On-site notices detailing the proposed development, the BA process and invitation to register and comment, were placed on and around the site; and
- Distribution of letters by email to I&APs identified in **Section 4.4.1** above.

An Application for EA and the DBAR was submitted to the DEA on 25 October 2019. The contact details of the DFFE Case Officer are indicated in **Error! Reference source not found..** In a letter dated 30 October 2019, the DFFE acknowledged receipt of the Application for EA and the Draft BAR. A reference number 14/12/16/3/3/1/2096 was issued for the Application. Refer to Appendix A9 for the DFFE acknowledgement of receipt of the application. A request for extension of submission of the Final BAR was submitted to the DFFE on 27 January 2020. On 10 February 2020, DFFE provided a letter granting extension for submission of the FBAR on 7 July 2020. However, the Application for Environmental Authorisation lapsed on 10 July 2020 (*this period co-incided with lockdown level 5 due to the COVID-19 pandemic*).

Subsequently, an enquiry email was sent to DFFE on 24 June 2020 to explain the approach to separating the Applications for Environmental Authorisations for the KZN ASP development in accordance with the proposed road access to the development in phases. Refer the email correspondence in Appendix A.

In a return email dated 30 June 2020, the case officer, Mr. Jay-Jay Mpelane at DFFE confirmed that the Applications for Environmental Authorisations be submitted as proposed by the EAP. On 9 July 2020, a request for a Pre-Application Meeting was discussed with Mr. Mpelane and he confirmed that it was not necessary and the Application should proceed based on DFFE email correspondence. Refer to email correspondence of 14 July 2020 in Appendix A.

Due to further engagement with the commenting authorities and environmental impacts that cannot be fully mitigated or offset at this stage, the proposed ASP has been reduced from four (4) phases to two (2) i.e. Phase 1S and 1N. This application and DBAR is specific to the reduced extent of the KZN ASP, the proposed 11kV powerline, the sewerline and associated pump stations and the various road upgrades for access to the ASP.

A pre-application meeting for the revised proposal was conducted with the DFFE in March 2022 and the DBAR was made available for comment on 20 September to 21 October 2022.

4.4.4 Database of Registered and Affected Parties

An I&AP database was compiled for the project and will be updated as the public participation process progresses. The IA&Ps that registered during the BID notification period were included in this database. All I&APs who register / comment during public review of the Draft BAR will be included within this database (refer to Appendix G).

4.4.5 Initial Basic Assessment Report (BAR) for Public Review

A period of 30 calendar days 25 October to 25 November 2019 was allowed to State Departments, and the general public for the review and commenting phase of the Draft BAR. The availability of the Draft BAR was announced by means of public notice (refer to Section 4.4.2 above) and personal letters to all identified stakeholders on the distribution list. Comments that were received during public review of the Draft BAR, will be captured in a Comments & Response Report and attached to the Final BAR in Appendix G.

The revised BAR was made available for comment from 20 September 2022 to 21 October 2022.

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5 *IMPACT ASSESSMENT*

The over-arching objective of the Impact Assessment component of the project is to identify, record and assess the scale of the changes that may occur within a specific receiving environment, in response to the introduction of new components or the expansion of current components within that receiving environment. In terms of Environmental Impact Assessment as provided for as an Integrated Environmental Management (IEM) tool for assessment in terms of the National Environmental Management Act and its associated Regulations, this refers to a specific site.

This approach enables the EAP to provide the team of specialist with a clearly defined Scope of Work and allows the specialist to focus and highlight pertinent changes as an independent assessor of the changes to the receiving environment¹ in the context of their field of speciality.

The approach therefore provides a framework for the assessment of the impacts that the proposed project will have on the environment, and of the impacts the environment will have on the proposed project. Based on inputs from the project team, stakeholders, I&APs and specialists, the potential environmental (biophysical, social and cultural) impacts have been identified and have accordingly been assessed and their significance summarised as an 'Environmental Impact Statement'.

All key concerns associated with the alternatives for this project, as identified during the Basic Assessment Process, have been investigated by the specialist team and categorised in terms of their biophysical and socio-economic parameters (please refer to **Appendix D of the DBAR** for their specialist reports).

5.1 Detailed Environmental Impact Assessment

All potential impacts associated with the alternatives have been categorised according to the development category, as well as the respective phases (construction, operational, decommissioning) during which they will occur. Impacts associated with each alternative has been outlined below and discussed in terms of their anticipated duration, extent, severity, probability and significance both prior and post mitigation measures being implemented.

Kindly refer to the table below for a summary of the categories of infrastructure development, and their associated alternatives, that were assessed as part of this chapter.

¹ Consideration must be given to the cumulative impact of the project within the receiving environment, but the focus is always on the changes at a specific site.

Table 5-1: Infrastructure development categories and associated alternatives

CATEGORY	ALTERNATIVES
Powerline Route	Preferred Alternative No alternative layout No alternative site
Sewerline	Preferred Alternative No alternative layout No alternative site
Access Roads Upgrades	<p>P578 Re-alignment of a gravel road adjoining the P578 to meet the required safety standards. The road is a provincial road with no reserve but a statutory width, the sidewalks proposed as part of the P578 upgrade will remain within the road reserve.</p> <p>P578/P197 intersection A round-about is proposed at the intersection with the D982. The D982 must be realigned for approximately 300m to create a four legged intersection with the P197 and the ASP Boulevard. The auxiliary lanes of the P197 will be located within the road reserve.</p> <p>P197/R603 Proposed Intersection upgrade within the reserve</p> <p>R603 Dualling of the R603 and intersection upgrades</p>
Site Layout	Preferred Alternative No alternative layout No alternative site

It is important to note that there are no site alternatives for the KZN ASP development as the land belongs to the DTPC who purchased it with the intention for development. There are also no feasible alternatives for the sewer main line development, the sewerline follows areas of existing disturbance i.e. roads, until it reaches the Kingsburgh WWTW. There were previously assessed options for a 132kV powerline, however due to the reduced extent of the ASP development site, an 11kV cable is being proposed together with the preferred option 1 from the previously assessed 132kV powerline.

5.2 Impact Assessment Methodology

GIBB, subsequent to the assessment conducted by the specialist team, have reviewed the impacts identified and assessed the inherent and residual risk posed to the receiving environment pre- and post- the application of mitigation measures. The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed development.

For each of the main project phases, the existing and potential future impacts and benefits (associated only with the proposed development) were described using the criteria listed in **Table 5-2** below. This was done in accordance with Government Notice R982, promulgated in terms of Section 24 of the NEMA and the criteria drawn from the IEM Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts, published by the DEAT (April 1998).

The assignment of ratings has been undertaken based on past experience of the EIA team, as well as through research. Subsequently, mitigation measures have been identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Table 5-2: Proposed Criteria and rating Scales which were used in the Assessment of the Potential Impacts

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the effect of the impact related to the proposed development.
	Negative	
Extent	Footprint	The impact only affects the area in which the proposed activity will occur.
	Site	The impact will affect only the development area.
	Local	The impact affects the development area and adjacent properties.
	Regional	The effect of the impact extends beyond municipal boundaries.
	National	The effect of the impact extends beyond more than 2 regional/ provincial boundaries.
	International	The effect of the impact extends beyond country borders.
Duration	Temporary	The duration of the activity associated with the impact will last 0-6 months.
	Short term	The duration of the activity associated with the impact will last 6-18 months.
	Medium term	The duration of the activity associated with the impact will last 18 months-5

Criteria	Rating Scales	Notes
		years.
	Long term	The duration of the activity associated with the impact will last more than 5 years.
Severity	High negative	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.
	Moderate negative	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected
	Low negative	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Low positive	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved
	Moderate positive	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected
	High positive	The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.

Criteria	Rating Scales	Notes
Potential for impact on irreplaceable resources	No	No irreplaceable resources will be impacted.
	Yes	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources.
	Highly detrimental	
	Moderately detrimental	
	Slightly detrimental	
	Negligible	
	Slightly beneficial	
	Moderately beneficial	
	Highly beneficial	
	Extremely beneficial	
Probability (the likelihood of the impact occurring)	Unlikely	It is highly unlikely or less than 50 % likely that an impact will occur.
	Likely	It is between 50 and 75 % certain that the impact will occur.
	Definite	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance	Very high - negative	A function of Consequence and Probability.
	High - negative	
	Moderate - negative	
	Low - negative	
	Very low	
	Low - positive	
	Moderate - positive	
	High - positive	
	Very high - positive	

Table 5-3 below provides a brief explanation of the criteria that is utilised to assess the overall impacts on the project.

Table 5-3: Explanation of Assessment Criteria

Criteria	Explanation
Nature	This is an evaluation of the type of effect the construction, operation and management of the proposed development would have on the affected environment. Will the impact change in the environment be positive, negative or neutral?
Extent or Scale	This refers to the spatial scale at which the impact will occur. Extent of the impact is described as: footprint (affecting only the footprint of the development), site (limited to the site) and regional (limited to the immediate surroundings and closest towns to the site). Extent or scale refers to the actual physical footprint of the impact, not to the spatial

Criteria	Explanation
	significance. It is acknowledged that some impacts, even though they may be of small extent, are of very high importance, e.g. impacts on species of very restricted range. In order to avoid “double counting”, specialists have been requested to indicate spatial significance under “intensity” or “impact on irreplaceable resources” but not under “extent” as well.
Duration	The lifespan of the impact is indicated as temporary, short, medium and long term.
Severity	This is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Does the activity destroy the impacted environment, alter its functioning, or render it slightly altered?
Impact on irreplaceable resources	This refers to the potential for an environmental resource to be replaced, should it be impacted. A resource could possibly be replaced by natural processes (e.g. by natural colonisation from surrounding areas), through artificial means (e.g. by reseeding disturbed areas or replanting rescued species) or by providing a substitute resource, in certain cases. In natural systems, providing substitute resources is usually not possible, but in social systems substitutes are often possible (e.g. by constructing new social facilities for those that are lost). Should it not be possible to replace a resource, the resource is essentially irreplaceable e.g. red data species that are restricted to a particular site or habitat of very limited extent.
Consequence	The consequence of the potential impacts is a summation of above criteria, namely the extent, duration, intensity and impact on irreplaceable resources.
Probability of occurrence	The probability of the impact actually occurring based on professional experience of the specialist with environments of a similar nature to the site and/or with similar projects. It is important to distinguish between probability of the impact occurring and probability that the activity causing a potential impact will occur. Probability is defined as the probability of the impact occurring, not as the probability of the activities that may result in the impact.
Significance	<p>Impact significance is defined to be a combination of the consequence (as described below) and probability of the impact occurring. The relationship between consequence and probability highlights that the risk (or impact significance) must be evaluated in terms of the seriousness (consequence) of the impact, weighted by the probability of the impact actually occurring.</p> <p>In simple terms, if the consequence and probability of an impact is high, then the impact will have a high significance. The significance defines the level to which the impact will influence the proposed development and/or environment. It determines whether mitigation measures need to be identified and implemented and whether the impact is important for decision-making.</p>

Criteria	Explanation
Degree of confidence in predictions	Specialists and the EIR team were required to provide an indication of the degree of confidence (low, medium or high) that there is in the predictions made for each impact, based on the available information and their level of knowledge and expertise. Degree of confidence is not taken into account in the determination of consequence or probability.
Mitigation measures	Mitigation measures are designed to reduce the consequence or probability of an impact, or to reduce both consequence and probability. The significance of impacts has been assessed both with mitigation and without mitigation.

Table 5-4 provides the specific categories under each impact assessment criteria and their associated rating scales.

Table 5-4: Impact Assessment Criteria and Rating Scales

Duration		Extent		Irreplaceable Resources		Severity		Consequence = (Duration+Extent+Irr) x Severity		Likelihood		Significance (consequence x Likelihood)		Confidence
1	Temporary	1	Footprint	1	Yes	-3	High - negative	-25 to -33	Extremely detrimental	1	Unlikely	-73 to -99	Very high - negative	Low
2	Short term	2	Site	0	No	-2	Moderate - negative	-19 to -24	Highly detrimental	2	Likely	-55 to -72	High - negative	Medium
3	Medium term	3	Local			-1	Low -negative	-13 to -18	Moderately detrimental	3	Definite	-37 to -54	Moderate - negative	High
4	Long term	4	Regional					-7 to -12	Slightly detrimental			-19 to -36	Low - negative	
		5	National			1	Low -positive	0 to -6	Negligible			0 to -18	Very low - negative	
		6	International			2	Moderate - positive							
						3	High - positive	0 to 6	Negligible			0 to 18	Very Low - positive	
								7 to 12	Slightly beneficial			19 to 36	Low - positive	
								13 to 18	Moderately beneficial			37 to 54	Moderate - positive	
								19 to 24	Highly beneficial			55 to 72	High - positive	
								25 to 33	Extremely beneficial			73 to 99	Very high - positive	

5.2.1 Ascribing Significance for Decision-Making

The best way of expressing the environmental costs/impacts and the inherent benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)² of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, is potentially death but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

5.2.2 Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked and likelihood to be defined of that consequence. In **Table 5-5** below a scoring system for consequence ranking is shown. Two important features should be noted in the table, namely that the scoring doubles as the risk increases and that there is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

² Because 'probability' has a specific mathematical/empirical connotation the term 'likelihood' is preferred in a qualitative application and is accordingly the term used in this document.

Table 5-5: Ranking of Consequence

Environmental Cost	Inherent risk
Human health – morbidity / mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – high
Material reductions in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – low
Negative change – with no other consequences	Low
Environmental Benefits	Inherent benefit
Net improvement in human welfare	Moderate – high
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic Development	Moderate – Low
Positive change – with no other consequences	Low

5.2.3 Likelihood

Although the principle is one of probability, the term ‘likelihood’ is used to give expression to a qualitative rather than quantitative assessment, because the term ‘probability’ tends to denote a mathematical/empirical expression. A set of likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring, is presented in **Table 5-6**.

Table 5-6: Likelihood categories and definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical ‘average’ of the causes but rather a qualitative estimate in its own right.

5.2.4 Residual Risk

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in **Table 5-7** where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in **Table 5-8**.

Table 5-7: Residual risk categories

		Residual risk				
Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 5-8: Implications for decision-making of the different residual risk categories

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

5.3 Impacts associated with the sewer pipeline and layout of the development

It is important to note that there are no alternatives for the proposed ASP layout, as alternatives were investigated in the initial application stage (for all four phases) and reduced to just Phase 1N and 1S in this BA Process. In addition to this, there are no feasible alternatives for the sewer main line development.

Due to the fact that there are certain impacts that are only experienced as a result of the development layout and sewer pipeline, they have been extracted and included in this section up front of the impact assessment chapter.

(a) Construction Phase

(i) *Impacts of disturbance by higher levels of noise and light on the iLovu and uMsimbazi Estuary during the construction phase of the ASP*

During construction operations, noise may have an impact on terrestrial species that visit or utilise the estuarine functional zone e.g. birds. Noise may be generated by construction activities (e.g. vehicles, generators, digging, drilling, grinding etc.). Although, marine and estuarine invertebrates have been shown to be relatively insensitive to low frequency sound, and fish appear to be able to tolerate moderate sound levels (Keevin & Hempen 2012), the construction and operational phases of the ASP will all be land based with little sound penetrating the water column. Similarly, the predominant land use of the proposed development site is currently a single species crop (sugarcane) which will have low species diversity in terms of small mammals. Therefore, the effects of noise pollution will mainly be on bird species.

Construction activities for Phase 1-South and 1-North are expected to last two and three years, respectively. However, urbanization and industrialization also generate noise pollution (Deconto *et al.* 2021) which will occur throughout the operational phase, but to a lesser degree. Additionally, in South African it is now common for companies to utilise petrol/diesel operated, emergency generators for power generation during intermittent load shedding. Although some species of birds have been shown to stay in place during human induced noise resulting in reductions in their overall health, most species move away to evade man-made noise and some species have even adapted to compensate for anthropogenic noise (Ortega 2012, Halfwerk *et al.* 2018). Therefore, bird species are expected to be able to avoid the sound source should it reach levels sufficient to cause discomfort. In addition, due to the existence of similar habitats along the length of the estuary, it is not expected that avifauna will be excluded from utilising a particular habitat type as a roosting site except for short periods of time.

Table 5-9: Impacts of disturbance by higher levels of noise and light on the iLovu and uMsimbazi Estuary during the construction phase of the ASP

Impact Table:				
PROJECT PHASE	Construction and Operational Phase			
DIRECT IMPACT	Disturbance by increased noise and lights to the ecological corridors and the iLovu and uMsimbazi Estuaries (this is an impact influencing predominantly) the water bird component of estuaries			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-20	3
EXTENT	2	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Highly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-60	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
During construction operations, noise may have an impact terrestrial species that visit or utilise the estuarine functional zone e.g. birds. Noise may be generated by construction activities (e.g. vehicles, generators, digging, drilling, grinding etc.). Although, marine and estuarine invertebrates have been shown to be relatively insensitive to low frequency sound, and fish appear to be able to tolerate moderate sound levels (Keevin & Hempen 2012), the construction and operational phases of the ASP will all be land based with little sound penetrating the water column. Similarly, the predominant land use of the proposed development site is currently a single species crop (sugarcane) which will have low species diversity in terms of small mammals. Therefore, the effects of noise pollution will mainly be on bird species.				
The construction footprint must be demarcated and construction crew must be made aware at induction that construction activities are not o extend beyond this boundary.				
As far as possible, construction activities must not take place at night. However, in instances where construction at night is required, the use of extensive artificial lighting during the night during construction must be avoided.				
Upward lighting should be avoided to minimise light pollution. Light can be restricted to select areas by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light.				

<i>The construction of the development must be phased where one platform is completed before earth works of another begins.</i>				
<i>Mobile equipment, vehicles and power generation equipment should be subject to noise tests which are measured against manufacturer specifications to confirm compliance before deployment on site.</i>				
<i>Noise emissions from mobile and fixed equipment should be subject to periodic checks as part of regular maintenance programmes to allow for detection of any unacceptable increases in noise.</i>				
<i>Additionally, businesses and industries that are expected to generate high levels of noise and/or utilise emergency power supplies throughout the operational phase should operate these within sound dampening infrastructure.</i>				
POST-MITIGATION				
DURATION	3	<i>The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term</i>	-10	3
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-30	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(ii) Permanent loss of wetland habitat, as a result of construction of the platforms

During the construction phase in which the platforms will be constructed, earthworks will take place. As a result, portions of wetland habitat will be destroyed.

Phases 1-North and 1-South of the development are located along the eastern study site boundary, along the western boundary of the N2 highway and fall within the iLovu and the uMsimbazi catchments. The most recent development layout indicates that this phase of the development will largely incorporate general industrial land uses, with smaller areas prioritised for business and light industry. Open areas have been assigned to the remaining natural areas buffering the development footprint, which is anticipated to be utilised for recreational purposes. Considering only the Phase 1-South development, it is anticipated that 7.4ha and 2.5ha of wetland habitat will be lost within the iLovu and uMsimbazi catchments, respectively. The wetlands within the iLovu catchment are considered to be equivalent to 2.2hectare of functional wetland habitat, whilst the wetlands within the uMsimbazi catchment are

considered to be equivalent to 1.2ha of functional habitat. Based on the reasonable attainable rehabilitated state approach (i.e. opportunity lost) – as advocated by the relevant authorities, the functional hectare equivalents for the iLovu system would be 5.1hectare equivalents, whilst for the uMsimbazi system it would be equivalent to 2.2 hectares. Based on Eco-Pulse's (2019) assessments, the functional and habitat hectare equivalent targets were calculated for the two catchments. For the iLovu catchment, the functional hectare equivalent target is 6.4, whilst the habitat hectare equivalent target is 3.8. For the uMsimbazi catchment, the functional hectare equivalent target is 2.2, whilst the habitat hectare equivalent target is 1.2.

For the Phase 1-North development, the impacts are located within the iLovu catchment and the 2.2 hectares of wetland that will be lost as a result of the development is equivalent to 1.0 hectares of functional wetland habitat. Based on the reasonable attainable rehabilitated state approach, the functional hectare equivalents for the systems would be 1.4 hectares, i.e. opportunity lost. Both the functional and habitat hectare equivalent targets are 1.8 and 1.2 hectares, respectively.

Table 5-10: Impact ratings for the permanent loss of wetland habitat, as a result of construction of platforms

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Permanent loss of wetland habitat as a result of construction of platforms</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-24	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Highly detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-72	HIGH NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>An independent Environmental Control Officer (ECO) must be appointed to oversee construction and the monitoring of wetland rehabilitation interventions (Table 8-1 of the Wetland Report, GroundTruth,2022)</i>				
<i>The losses within the iLovu catchment must be mitigated through the rehabilitation of Site A, as identified by Eco-Pulse (2019), and nett-gain is achieved within the landscape.</i>				
<i>Impacts within the uMsimbazi catchment must be mitigated through the rehabilitation of the valley-bottom wetlands within the greater study site.</i>				
<i>The reduced spatial extent of the KZN ASP serves as a mitigation measure associated with the impacts on wetlands. Reducing the extent of the ASP to Phase 1S and 1N only results in the overall significance of this impact being reduced to low.</i>				
<i>The incorporation of the SUDS within the development layout would further assist in addressing the slight functional target deficit, as it is anticipated that the run-off entering the systems from the development site would be cleaner. Furthermore, the rehabilitation of the valley-bottom wetlands within the greater study site will also assist in buffering the impacts associated with the ongoing agricultural activities on the uMsimbazi estuary.</i>				
<i>With a large portion of the study site being dominated by AIPs within the wetlands and their catchments, controlling the re-emergence of these unfavourable plant species is key to securing the vegetation integrity of the rehabilitated systems over time. As such, in addition to the initial clearing of the identified alien invasive plant species within the area to be rehabilitated, follow-up activities are required to eradicate emerging seedlings or coppicing stumps. The implementation of follow-up operations is essential in order to reach maintenance levels in terms of controlling alien invasive plants within the systems. It is recommended that the follow-up alien plant clearing activities adopt the following approach:</i>				
<ul style="list-style-type: none"> • Manual activities, including hand-pulling of seedlings, to reduce the risk of the translocation of herbicide; • Frequent follow-up operations, with at least two operations being undertaken per year, and • Where necessary foliar application of herbicide to emerging coppice. 				
<i>Due to the rapid re-growth of species, at least four follow-up operations should be planned for during the first two years after the initial clearing. These will mainly be during the spring and summer months.</i>				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-12	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or	Moderately Detrimental	Definite

		<i>communities are negatively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
CONFIDENCE LEVEL				
High				

(iii) *Impacts to ecological linkages/corridors between the iLovu and uMsimbazi Estuaries and adjacent or nearby ESAs*

The iLovu and uMsimbazi estuaries are connected to other ecological support areas and these are essential to support the processes and flow of fauna and flora between wetlands, streams and the estuary as well as the links between estuaries.

Table 5-11: Loss of Ecological Support habitats of the iLovu Estuary

Impact Table:				
PROJECT PHASE	Construction and Operational Phase			
DIRECT IMPACT	<p><i>Ecological support habitats are defined as areas that generate or deliver ecosystem services for other ecosystem types and must be maintained in at least a semi natural/moderately modified ecological state in order to support the ecological functioning of Critical Biodiversity Areas (CBA) (SANBI 2016). Wetland habitats act as ecological support areas for estuaries providing vital water quality maintenance services, acting as sources of water and nutrients and as buffers, which reduce the severity of droughts and floods by regulating water flow rates (Wondie 2018).</i></p> <p><i>The development of the ASP platforms using the cut and fill method (tops of hills cut off and material used to fill valleys to level out the platform area) will result in the loss of wetland area. According to the wetland specialist report (GroundTruth 2022) the Phase 1-South development, will result in the loss of 7.4 ha and 2.5 ha of wetland habitat within the iLovu and uMsimbazi catchments, respectively. Impacts of the Phase 1-North development are predominantly located within the iLovu catchment, with 2.2 ha of wetland lost as a result of the development (GroundTruth 2022).</i></p>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-21	3
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		

SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Highly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-63	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Limit the movement of construction vehicles to within the development footprint.</i>				
<i>Constrain spatial and temporal extent of impacts to the minimum required.</i>				
<i>Areas cleared during construction should be revegetated with local indigenous plants species.</i>				
<i>Implement the offset area rehabilitation plan for the iLovu catchment proposed by Eco-Pulse (2019b).</i>				
<i>Undertaken IAP clearing within the EFZ</i>				
<i>Ensure wetland offset occurs prior to the initiation of development activities.</i>				
<i>Improvement in the estuary habitats adjacent to the EFZ by rehabilitation of the wetlands identified in the Eco-Pulse Wetland Offset Report.</i>				
<i>Implementation of an effective water quality management programme including monitoring of water quality within the stormwater infrastructure.</i>				
<i>Appropriate environmentally sensitive management rules regarding lights and noise (as per the specialist reports) on the site need to be integrated into the environmental management plan.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long-term Term</i>	14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	2	<i>The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected</i>	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	54	MODERATE - POSITIVE		
CONFIDENCE LEVEL				
High				

Table 5-12: Loss of Ecological Support habitats of the uMsimbazi Estuary

Impact Table:				
PROJECT PHASE	Construction and Operational Phase			
DIRECT IMPACT	<p>Ecological support habitats are defined as areas that generate or deliver ecosystem services for other ecosystem types and must be maintained in at least a semi natural/moderately modified ecological state in order to support the ecological functioning of Critical Biodiversity Areas (CBA) (SANBI 2016). Wetland habitats act as ecological support areas for estuaries providing vital water quality maintenance services, acting as sources of water and nutrients and as buffers, which reduce the severity of droughts and floods by regulating water flow rates (Wondie 2018).</p> <p>The development of the ASP platforms using the cut and fill method (tops of hills cut off and material used to fill valleys to level out the platform area) will result in the loss of wetland area. According to the wetland specialist report (GroundTruth 2022) the Phase 1-South development, will result in the loss of 7.4 ha and 2.5 ha of wetland habitat within the iLovu and uMsimbazi catchments, respectively. Impacts of the Phase 1-North development are predominantly located within the iLovu catchment, with 2.2 ha of wetland lost as a result of the development (GroundTruth 2022).</p>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term	-24	3
EXTENT	3	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-3	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Highly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-72	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Limit the movement of construction vehicles to within the development footprint.				
Constrain spatial and temporal extent of impacts to the minimum required.				
Areas cleared during construction should be revegetated with local indigenous plants species.				
Implement the offset area rehabilitation plan for the iLovu catchment proposed by Eco-Pulse (2019b).				
Undertaken IAP clearing within the EFZ				

<i>Ensure wetland offset occurs prior to the initiation of development activities.</i>				
<i>Improvement in the estuary habitats adjacent to the EFZ by rehabilitation of the wetlands identified in the Eco-Pulse Wetland Offset Report.</i>				
<i>Implementation of an effective water quality management programme including monitoring of water quality within the stormwater infrastructure.</i>				
<i>Appropriate environmentally sensitive management rules regarding lights and noise (as per the specialist reports) on the site need to be integrated into the environmental management plan.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-24	LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(iv) Destruction of plant species of conservation concern and protected plant species as a result of construction of platforms, roads and infrastructure

Certain areas within the greater study area support populations of plant and animal species of conservation concern as well as provincially protected plant and animal species. Areas include the coastal thicket in the drainage lines and on steep slopes, edges between the sugar cane and the wooded drainage lines. Clearing of vegetation for the construction of the platforms will require the destruction of these species and/or habitat for these species.

Table 5-13: Impact ratings for destruction of plant species of conservation concern and protected plant species as a result of the construction of platforms, roads and infrastructure

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Destruction of plant species of conservation concern and protected plant species</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				

DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-63	HIGH NEGATIVE		
PROPOSED MITIGATION MEASURES				
As plant species of conservation concern, such as Hypoxis hemerocallidea were recorded in the grassy areas between the costal thicket and sugar cane, a botanical walk through must be undertaken in the construction footprint prior to construction commencing. If such plants are found, a rescue and relocation plan must be compiled by a suitably qualified botanist, and the plants relocated before construction commences				
A number of provincially and nationally protected plant species were recorded in the costal thicket in the study area. The reduced extent of the ASP will result in no impact to the coast thicket on the larger study area.				
Removal or trimming of individuals of species of conservation concern will require a permit that should be accompanied by a rehabilitation plan specifying either re-establishment or rescue and relocation to a suitable site				
A permit from eZemvelo KZN Wildlife (EKZNW) will be required to destroy or relocate any species of conservation concern or provincially protected plant species. A permit from the national authority (DAFF) will be required to remove, cut or destroy a nationally protected species				
As the proposed platforms will be constructed in close proximity to the edges of the coastal thicket habitat on the site, it is recommended that a walk-through of the habitat edges to search for Bradypodion melanocephalum (KwaZulu Dwarf Chameleon) be undertaken by a suitably qualified ecologist or herpetologist prior to construction. If the species is detected, a site specific Species Management Plan including Search and Rescue Plan must be written by a suitably qualified herpetologist and implemented prior to construction.				
The Critically Endangered and Protected Hyperolius pickersgilli (Pickersgill's Reed Frog) was given a medium likelihood of occurring in the study area. While this rare and localised species was not detected during the field surveys, it does not rule out the possibility of it occurring in the study area. It is therefore recommended that a follow-up survey be conducted by a suitably qualified herpetologist following good spring rains, prior to construction commencing, to confirm the absence/presence of the species.				

<i>The construction footprint must be kept to a minimum and must not encroach onto the surrounding coastal thicket and other natural areas.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-12	3
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-24	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(v) *Increased informal dwellers as a result of construction activities at the site for development*

It is anticipated that there will be an influx of job seekers into the area during construction. Considering the size of the proposed development and the long period over which the proposed development will take place, it is likely that a large percentage of job seekers will migrate not only from the surrounding rural areas, which are characterised by high levels of poverty, but from throughout KwaZulu-Natal.

Table 5-14: Impact of increased informal dwellers as a result of construction activities

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Increased informal dwellers as a result of construction activities at the site for development</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD

PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-16	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-32	LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Prior to construction, the municipality should be informed of the possibility of an increase in informal dwellers and/or destitute people so that the necessary planning can be undertaken.</i>				
<i>In collaboration with the municipality, DTPC should undertake monitoring of the number of informal dwellers and/or destitute people living within the AOI.</i>				
<i>There should be sustained stakeholder engagement sessions with the surrounding communities, tribal authorities, councillors and any other relevant stakeholders to make clear the availability of employment opportunities that may or may not arise as a result of the development of the KZN ASP so as to ensure there are no unrealistic expectations regarding employment opportunities.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-8	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	<i>Slightly detrimental</i>	<i>Likely</i>
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-16	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vi) Increased criminal activity, as a result of construction activities at the site for development

An increase in criminal activity is often associated with large developments and/or projects where there is likely to be an in-migration of construction workers, job seekers and criminal opportunists.

In the case of the proposed KZN ASP, the possibility of an increase in crime, potentially over an extended period, should not be under-estimated. It is anticipated that there will be a significant movement of people into the area, some of whom are likely to be criminal opportunists as well as job seekers who, through not being able to find work, support themselves and their dependents via criminal activities. While the Kingsburgh and iLovu North areas may be affected by crime it is believed that existing security measures and the police presence in these areas should be in a position to manage the situation. It is more likely that the most significantly affected areas will be more rural settlements, in particular, the settlements to the west of the study area. It is likely that job seekers and criminal opportunists moving into the area will settle in these rural areas, with criminal opportunists taking advantage of potential 'soft' targets'.

Table 5-15: Impact of increased criminal activity as a result of construction activities

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Increased criminal activity as a result of construction activity</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years</i>	-14	2

		<i>and as such is rated as Long Term</i>		
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-28	LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Construction staff should be clearly identified by wearing uniforms and/or wearing identification cards that should be exhibited in a visible place on their body.</i>				
<i>Disciplinary steps or dismissal of any staff caught in criminal activities.</i>				
<i>Inform local law enforcement agencies of the possibilities of increased criminal activity in the area.</i>				
<i>Inform local Nin-Governmental Organisations (NGOs), and private security companies of the potential for increases in crime especially in the more vulnerable rural areas.</i>				
<i>Monitor crime statistics so as to determine if criminal activity is increasing. In the event that criminal activity is increasing, DTPC should establish, manage and, if necessary, fund a community policing forum in the affected areas. In addition there will be the strengthening and maintenance of relations with the local authorities</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	<i>Slightly detrimental</i>	<i>Likely</i>
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-14	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				

(vii) Foreign direct investment as a result of the proposed KZN ASP development

The nature and scale of the proposed KZN ASP is likely to attract international investors to invest into the local economy, because the automotive industry is SA's leading manufacturing sector and the largest attractor of direct foreign investment in manufacturing.

Table 5-16: Impact ratings for foreign direct investment as a result of the proposed KZN ASP development

PROJECT PHASE	<i>Construction and Operational Phase</i>			
DIRECT IMPACT	<i>Impact of foreign direct investment as a result of the KZN ASP development</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	2	<i>The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive</i>	<i>Moderately beneficial</i>	<i>Definite</i>

		<i>or vulnerable systems or communities are positively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	42	MODERATE POSITIVE		
PROPOSED MITIGATION MEASURES				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	42	MODERATE - POSITIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(viii) Impact of urban renewal

The proposed site is currently largely being used for sugarcane farming. The proposed development is likely to bring in renewed investment into the area and is likely to improve the urban environment within which it will be located.

Table 5-17: Impact ratings for foreign direct investment as a result of the proposed KZN ASP development

PROJECT PHASE	Construction and Operational Phase			
DIRECT IMPACT	Impact of Urban renewal			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	42	MODERATE POSITIVE		
PROPOSED MITIGATION MEASURES				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		

SEVERITY	2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	42	MODERATE - POSITIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(b) **Operational Phase**

(i) *Impacts on aquatic taxa sensitive to changes in water quality, due to accidental spillage of sewerage*

During the operational phase, there is a risk of accidental leakage or breakage of the sewer pipeline, and the resultant release of sewage into the freshwater environment. This impact may potentially affect not only the development but also adjacent properties, and larger downstream river and estuarine systems that are of greater ecological and biodiversity significance. However, with regular inspections and a scheduled maintenance plan, detections of leakages can be done early and be can be repaired.

Table 5-18: Impact ratings for impacts on aquatic taxa sensitive to changes in water quality

PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Impacts on aquatic taxa sensitive to changes in water quality, due to accidental spillage of sewage			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-24	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-72	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Alignment of the sewerline with existing areas of development i.e. existing roads in the area.				
No sewer manholes must be constructed within the floodline of major rivers or the delineated watercourses (wetlands and riparian zones of rivers).				

<i>All sewer manholes must be sealed to guarantee that surcharge events do not occur if there is a blockage.</i>				
<i>Construction of new sewer pipelines, manholes and pump stations must be constructed outside of the 1:100 year floodline of perennial rivers wherever practically possible. This does not include upgrades to existing infrastructure already located within the 1: 100yr floodline.</i>				
<i>Pump stations must be fenced off to prevent unauthorized access by humans/wildlife which could cause damage to infrastructure and cause accidental malfunction and/or spillage of untreated wastewater.</i>				
<i>The pump station must be placed within a lined, impermeable concrete bunded area with the capacity to hold untreated wastewater in an emergency and provide for sufficient time for maintenance staff to address any faults/problems. This is to limit the risk of untreated wastewater overflowing in the event of any leakage or accidental spillage at the pump station.</i>				
<i>Fail safe measures and early warning systems for pipe failure that would cause leakage must be put in place.</i>				
<i>There must be water quality monitoring of the downstream surface water resources.</i>				
<i>Visual soil assessments must be undertaken for signs of contamination along the sewer pipeline route.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	1
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-14	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(ii) Impacts of sewerage spills or contamination on the iLovu and uMsimbazi Estuaries

Contamination of both estuaries from breakages, overflows and power outages from the proposed sewer rising main, within and adjacent to the iLovu EFZ poses the risk of organic pollution entering the estuary. This organic pollution can drive changes in water quality, lowering dissolved oxygen and increasing nutrient enrichment. This can serve to alter estuarine food webs and result in the loss of species and with high levels of contamination repeated fish kills often occur.

Table 5-19: Impact of sewerage spills or contamination on the iLovu estuary during the operational phase of the ASP

Impact Table:				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Impacts of sewerage spills or contamination on the iLovu and uMsimbazi Estuaries			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-24	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-72	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
A comprehensive infrastructure maintenance plan with emergency protocols to deal with sewage spills has to be developed with an estuary scientist. Response time needs to be extremely short if contamination to the estuary is to be avoided.				
Routine inspection along the sewer line should be conducted in order to visually check for possible leakages (and scheduled maintenance plan must be in place).				
Surface water quality monitoring be implemented to monitor the impact of the development on the receiving environment.				
Construct suitable on-site balancing/emergency storage to store effluent in case of a spill to prevent estuary contamination.				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last 6-18 months- and as such is rated as short term	-14	1
EXTENT	2	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		

SEVERITY	-2	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Moderately Detrimental	unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-14	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(iii) Reduced water quality of wetlands, as a result of sewerage spills

The water quality of surrounding wetlands may be significantly impacted if there is a leak in the sewer pipeline, thereby causing extensive contamination of watercourses downstream.

Table 5-20: Impact ratings for reduced water quality of wetlands and watercourses as a result of sewerage spills

PROJECT PHASE	<i>Construction Phase and Operational</i>			
DIRECT IMPACT	<i>Reduced water quality of wetlands as a result of sewerage spills</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-21	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Highly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-72	HIGH - NEGATIVE		

PROPOSED MITIGATION MEASURES
<p><i>Appropriate infrastructure must be designed to reduce risk of leaks, proper maintenance schedules and operational management plans and protocols for pump stations, including contingency measures in the event of mechanical breakdown, spillage, etc.</i></p>
<p><i>Sewer pump stations and pipelines will need to be created with durability in mind and to involve minimal maintenance in order to ensure ideal functioning of such systems. Maintenance of pipelines and pump stations must be carried out as sensitively as possible to avoid negative impacts to the environment during access and repairs. Blockages and manhole overflows must be fixed immediately. Any vegetation clearing and re-excavation of watercourses required to maintain/repair sections of pipeline must adhere to the construction phase impact mitigation measures provided. Ensure that an incident response and contingency plan is prepared to deal with any potential unforeseen impacts that could arise at the pump station during operation.</i></p>
<p><i>These may include:</i></p> <ul style="list-style-type: none"> • <i>Failure of sewer pipeline design/poor construction;</i> • <i>Failure of materials leading to rupture of the sewer pipe and leakage;</i> • <i>Exposure of sewer pipelines and damage through erosion;</i> • <i>Unintentional damage by machinery operating near pipelines; and</i> • <i>The pump station also has the potential to malfunction, overflow or leak raw sewerage into the environment due to electrical failure, poor maintenance, environmental damage (e.g. storms) or systems operating above capacity.</i>
<p><i>Pump stations must be fenced off to prevent unauthorized access by humans/wildlife which could cause damage to infrastructure and cause accidental malfunction and/or spillage of untreated wastewater.</i></p>
<p><i>Reasonable measures must be taken to provide back-up for mechanical, electrical, operational or process failure and malfunction at pump stations. At a minimum there should be an alarm system to warn of an electrical failure and sufficient standby equipment to provide for reasonable assurance that the pump station can be functional within 24 hours.</i></p>
<p><i>No sewer manholes must be constructed within the flood line of major rivers or the delineated watercourses (wetlands and riparian zones of rivers).</i></p>
<p><i>Construction of new sewer pipelines, manholes and pump stations must be constructed outside of the 1:100 year flood line of perennial rivers wherever practically possible. This does not include upgrades to existing infrastructure already located within the 1: 100yr flood line.</i></p>
<p><i>All sewer manholes must be sealed to guarantee that surcharge events do not occur if there is a blockage</i></p>
<p><i>The pump station must be placed within a lined, impermeable concrete bunded area with the capacity to hold untreated wastewater in an emergency and provide for sufficient time for maintenance staff to address any faults/problems. This is to limit the risk of untreated wastewater overflowing in the event of any leakage or accidental spillage at the pump station.</i></p>
<p><i>Signage should be provided at a visible location at pump stations to inform local residents in the area of the purpose of the pump station. Emergency telephone contact details should also be provided on the signs so that pump station failure, leakage or electrical power outages affecting the system can be easily reported to the Local Municipality.</i></p>
<p><i>A monitoring and maintenance programme should be prepared for the various pump stations to ensure the on-going performance of infrastructure and prevention of foreseeable faults/problems that could result in leakage/failure.</i></p> <p><i>Pump station monitoring to include:</i></p> <ul style="list-style-type: none"> • <i>Assessing motor/gearbox problems – replace gearbox oil;</i> • <i>Checking for wear and tear;</i> • <i>Checking electrical components are working correctly (e.g. electrical board in good operating condition);</i>

<ul style="list-style-type: none"> Looking for any surcharging (blockages); Checking that access to the facility is controlled (no gaps in fencing, etc.); and Checking that any emergency alarms are in working-order. 				
Water quality monitoring and visual assessment must be undertaken regularly.				
Routine inspections of all sewer related infrastructure (hydraulic monitoring) must be undertaken.				
Piezometric seepage boreholes must be installed if pollution is evident.				
A temporary cut off trench must be installed to contain poor quality runoff.				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	1
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-16	VERY LOW-NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(iv) **Pollution of vadose zone and regional water table / groundwater aquifer due to broken sewer lines**

Pollution of the vadose and regional water table/ groundwater aquifer may result as a result poor quality seepage from cracks or broken sewer lines and sewage pump station areas which could percolate to the shallow aquifer.

Table 5-21: Impact ratings for pollution of the vadose and regional water table / groundwater aquifer due to broken sewer lines

PROJECT PHASE	Operational Phase
DIRECT IMPACT	Pollution of the vadose zone and regional water table / groundwater aquifer, as a result of broken sewer lines
INDIRECT IMPACT	--

CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-48	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Undertake visual soil assessment for signs of contamination along the installed sewer line and pump stations.				
Undertake routine sewer hydraulic flow testing.				
Water Quality Monitoring as per the Geohydrological Assessment for the Sewer and Powerline				
Sewerline to be designed according to recommended standards				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-6	2
EXTENT	1	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted		
SIGNIFICANCE	-6	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(v) *Impacts of water quantity changes on the iLovu and uMsimbazi Estuary during the operational phase of the ASP*

The transformed surface of the KZN ASP site that was previously sugar cane would have as little as ten percent of the area of a watershed covered in roads, parking lots, rooftops, and other impervious surfaces. This could lead to the rivers and streams within those watersheds becoming degraded. Streams in watersheds with more than ten percent hard surfaces become physically unstable, causing erosion and sedimentation (Booth, 1991; Booth and Reinelt, 1993). In addition, natural habitats such as pools, woody debris, and the wetted perimeter of the streambed decline (Booth and Reinelt, 1993; Shaver et al., 1995). Overall, habitat quality falls below the level necessary to sustain a broad diversity of aquatic life.

The additional volume created by stormwater, from a development of this size, would increase inflows into the estuary and affect the water balance and the mouth functioning.

Table 5-22: Impacts of water quantity changes on the iLovu and uMsimbazi estuaries during the operation of the ASP

Impact Table: Operation of the ASP				
PROJECT PHASE	<i>Operational phase</i>			
DIRECT IMPACT	<i>Water quantity changes as a result of modification of the local catchment with extensive areas of hardened and impervious surfaces.</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-27	3
EXTENT	4	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Extremely Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		

SIGNIFICANCE	-81	VERY HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Retention dams and other stormwater infrastructure as per the assessed stormwater management plan should be put in place to avoid major changes to runoff volume and velocity into the long term.</i>				
<i>Monitoring and maintenance of these retention facilities needs to be part of a routine environmental management plan.</i>				
<i>Wetland rehabilitation, restoration and management should be carried out as soon as possible during or immediately following construction. This will serve to protect streams and aquatic habitats which feed into or are within the EFZ.</i>				
<i>Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. A site specific rehabilitation plan must be compiled by a suitably qualified ecologist and implemented by a suitably qualified rehabilitation specialist</i>				
<i>No material from the cut and fill operation should be dumped or stored in the wetland/stream or estuary areas.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-12	2
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-24	LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vi) Impacts of water quality changes of the iLovu Estuary during the operational phase of the ASP

Several studies have shown that urban stormwater runoff correlated well with deterioration of the water quality in estuaries. Urbanisation leads to increased stormwater volumes running off paved areas. Consequently, runoff that would previously have percolated through the soil discharges directly into aquatic ecosystems, with the high potential of deteriorating water quality and ecosystem health status more rapidly than diffuse sources. The large area of hardened surfaces combined with a development that will comprise a multi-use industrial park make the possibility of contamination to the feeder streams and wetlands that feed freshwater

to the downstream estuaries extremely high. There is a potential for contamination of the iLovu Estuary.

Table 5-23: Impacts of water quality changes on the iLovu estuary during the operational phase of the ASP

Impact Table: Operation of the ASP				
PROJECT PHASE	Operational phase			
DIRECT IMPACT	Water quality changes as a result of pollutants being carried by runoff to the iLovu estuary with highly polluted urban stormwater flushing across hardened surfaces.			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-27	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Extremely Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-81	VERY HIGH NEGATIVE		
PROPOSED MITIGATION MEASURES				
Retention dams and other stormwater infrastructure as per the assessed stormwater management plan should be put in place to avoid major changes to runoff volume and velocity into the long term. Monitoring of water quality within the stormwater network will need to be incorporated into the management plan to ensure that polluted stormwater is prevented from entering the EFZ.				
Wetland rehabilitation, restoration and management should be carried out as soon as possible during or immediately following construction. This will serve to protect streams and aquatic habitats which feed into or are within the EFZ.				
Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. A site specific rehabilitation plan must be compiled by a suitably qualified ecologist and implemented by a suitably qualified rehabilitation specialist				
No material or waste water should be discharged, dumped or stored from individual sites into the wetland/stream or estuary areas.				

<i>Wetland rehabilitation, restoration and management should be carried out as soon as possible during or immediately following construction. This will serve to protect streams and aquatic habitats which feed into or are within the EFZ in the long term</i>				
<i>Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. A site specific rehabilitation plan must be compiled by a suitably qualified ecologist and implemented by a suitably qualified rehabilitation specialist</i>				
<i>Monitoring and maintenance of these retention facilities needs to be part of a routine environmental management plan.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-28	LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vii) Impacts of water quality changes of the uMsimbazi Estuary during the operational phase of the ASP

The potential for contamination of the uMsimbazi Estuary is higher than the iLovu Estuary. This is due to its smaller catchment size, and the larger proportion of the ASP development which sits in its catchment. The uMsimbazi Estuary has the potential for flushing and is also much less than that of the iLovu Estuary.

Table 5-24: Impacts of water quality changes on the uMsimbazi Estuary during the operational phase of the ASP

Impact Table: Operation of the ASP	
PROJECT PHASE	<i>Operational phase</i>
DIRECT IMPACT	<i>Water quality changes as a result of pollutants being carried by runoff to the uMsimbazi estuary with highly polluted urban stormwater flushing across hardened surfaces.</i>
INDIRECT IMPACT	--

CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-27	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Extremely Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-81	VERY HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Retention dams and other stormwater infrastructure as per the assessed stormwater management plan as should be put in place to avoid major changes to runoff volume and velocity into the long term. Monitoring of water quality within the stormwater network will need to be incorporated into the management plan to ensure that polluted stormwater is prevented from entering the EFZ.				
Wetland rehabilitation, restoration and management should be carried out as soon as possible during or immediately following construction. This will serve to protect streams and aquatic habitats which feed into or are within the EFZ.				
Implementation of the SuDs.				
Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. A site specific rehabilitation plan must be compiled by a suitably qualified ecologist and implemented by a suitably qualified rehabilitation specialist				
No material or waste water should be discharged, dumped or stored from individual sites into the wetland/stream or estuary areas.				
Wetland rehabilitation, restoration and management should be carried out as soon as possible during or immediately following construction. This will serve to protect streams and aquatic habitats which feed into or are within the EFZ in the long term				
Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. A site specific rehabilitation plan must be compiled by a suitably qualified ecologist and implemented by a suitably qualified rehabilitation specialist				
Monitoring and maintenance of these retention facilities needs to be part of a routine environmental management plan.				

<i>Implementation of the SuDS system. SuDS are designed to minimize, attenuate, and mitigate the impacts of stormwater runoff from the industrial platforms at the source, prior to it reaching the natural environment i.e., neighbouring wetlands, estuaries, and ultimately the sea.</i>				
<i>Monitoring of water quality within the estuaries during and post-development to ensure the efficacy of the SuDS structures.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-28	LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(viii) Impacts of disturbance by higher levels of noise and light on the iLovu and uMsimbazi Estuaries during the operational phase of the ASP

Widespread lighting associated with operational activities can influence the behaviour of animals and may affect estuarine ecosystems. The most significant aspect of this disturbance for this project is the disturbance of the water birds that would use the estuary and ESAs for feeding, breeding and roosting. Birds are a highly visible and frequently diverse component of the fauna of estuaries. Many species form large and dense foraging aggregations and thus have the potential to play key roles in estuarine ecosystem dynamics.

It is established that human disturbance can prevent water birds from gaining access to food supplies, roosting areas and breeding sites and in this respect this can be seen as a net habitat loss to this component of the estuarine community. The use of estuaries by not only resident birds but migratory waders makes it important to take into account the loss of areas for these birds.

However, the estuarine specialist has stated that the construction and operational phases of the ASP will all be land based with little sound penetrating the water column. Similarly, the predominant land use of the proposed development site is currently a single species crop

(sugarcane) which will have low species diversity in terms of small mammals. Therefore, the effects of noise pollution will mainly be on bird species. After mitigation, the impact of noise and vibration on the estuarine environment is likely to be 'low' (Anchor Environmental, 2022).

Table 5-25: Impacts of disturbance by higher levels of noise and light on the iLovu estuary during the operational phases of the ASP

Impact Table:				
PROJECT PHASE	<i>Operational</i>			
DIRECT IMPACT	<i>Disturbance by increased noise and lights to the ecological corridors and the iLovu estuary (this is an impact influencing predominantly the water bird component of estuaries)</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-18	3
EXTENT	4	<i>The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Further investigation into the waders, waterfowl and other water birds is required. Particularly the cryptic species given the recent sighting of a Corncrake and African finfoot within the EFZ. This would allow further refinement of measures to mitigate disturbance impacts to the bird fauna.</i>				
<i>In order to fight noise pollution, landowners or businesses with activities generating high level noises should be assessed and required to install absorptive sound barriers. These barriers swallow sound, reducing impact on surrounding areas.</i>				
<i>To reduce light pollution, the main landowner can install lower-wattage bulbs, avoid the use of a glaring neon signs in favour of more subtle choices. Turn off unnecessary lighting during non-operational hours. Environmentally friendly downward cast lighting should be used wherever possible for roads, paths etc.</i>				
POST-MITIGATION				

DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	LOW-NEGATIVE		
CONFIDENCE LEVEL				
High				

(ix) Potential for the decline in the aesthetic value of the iLovu and uMsimbazi Estuaries

The magnitude of an aesthetic impact and whether it can be considered negative or not will depend to some degree of the urbanisation of the area in which the proposed development is situated. The viewsheds on both of these picturesque and highly rated (aesthetically) will be significantly altered. This is evident from the Visual Assessment Report (SVA 2019) which indicates that the view south of the iLovu will be radically altered by the change from agricultural activities to industrial land uses. This is echoed looking north from the uMsimbazi Estuary, where the soft rolling hills backdrop will be significantly changed. This estuary together with the uMgababa is one of our more scenic estuaries within the eThekweni Municipality. This impact is considered negative with very little mitigation possible.

Table 5-26: Impacts to aesthetic value of the iLovu and uMsimbazi Estuaries during the operational phase of the ASP

Impact Table:				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Aesthetic impacts on the iLovu and uMsimbazi Estuaries			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				

DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long-term Term</i>	-16	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-48	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Make use of natural, contextually appropriate materials wherever possible.</i>				
<i>As far as possible, use low level, unobtrusive and contextually appropriate signage is used.</i>				
<i>Ensure that fencing is visually permeable, contextually appropriate and softened with planting to provide visual screening. Use appropriate colours such as dark grey, charcoal and black that are visually recessive.</i>				
<i>Design streetscape elements (e.g. paving, street furniture, lighting etc.) in a manner that responds to the local context.</i>				
<i>Place services underground, where possible.</i>				
<i>Colours of all structures should be muted to blend as much as possible.</i>				
<i>Softening with perimeter planting should be an intensive undertaking for the broader site boundary as well as individually for the development of each site.</i>				
<i>Use exterior colours that have low reflectivity value and blend with the surroundings and the contextual character of the surrounding environment.</i>				
<i>Use a combination of natural and neutral colours as far as possible.</i>				
<i>Avoid usage of a single colour on large surfaces. Such surfaces can be visually broken down using different paint colours.</i>				
<i>Darker colours tend to recede from view, while lighter colours are much more visually noticeable.</i>				

Keep reflective surfaces to a minimum or ensure that these areas are shaded by roof overhangs, where possible.

Ensure that non-reflective paving surfaces are used as far as possible.

Allow for the existing features of the site such as mature vegetation and screening elements to be retained, where possible.

Use vegetation to visually 'screen' built structures wherever possible.

Use vegetation and landscaping to soften the hard surfaces on the site.

Make allowance for on-going landscape maintenance to allow site vegetation to mature sufficiently to allow the environment to achieve maximum VAC.

POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(x) *Altered hydrology, erosion and / sediment regime of wetlands, as a result of hardened surfaces*

The site will be fully platformed and consist primarily of hardened surfaces. The excess or improper management of stormwater may cause higher flows and velocities within watercourses causing erosion and sedimentation. As these proposed developments are largely intended for use of heavy earth moving machinery/vehicles, such as dumper trucks, there will be movement and disturbance within the site.

Table 5-27: Impact ratings for altered hydrology, erosion and / sediment regime of wetlands

PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Altered hydrology, erosion and / sediment regime of wetlands			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-48	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Erosion</i> <i>Minimise high velocities by constructing wide channels, high roughness coefficient and semi-permeable where practically possible. Outlets to be designed to dissipate the high flow velocities to minimise the erosion potential.</i> <i>Minimise the number of cumulative discharge points from the proposed development and rather design more but smaller outlet points.</i> <i>Erosion protection in the form of Reno mattress, Gabion baskets, stone pitching or rip-rap to be constructed at all storm water discharge points, including downstream and upstream of crossings and attenuation facilities including spillway. The Resident Engineer on site to confirm locality, extent and type of the erosion protection required.</i> <i>Include stormwater detention facilities within the network, where practically possible.</i> <i>Post-development peak flows to be attenuated back to Pre-development peak flows where practically possible.</i> <i>No development should take place below road level upstream of road crossings (including a 0,5m free board).</i>				

All proposed development to take place outside of the 1:50 year flood lines and the 1:100 year to be delineated on drawings.

In order to reduce the post-development flows back to pre-development flows, mitigation measures are required within the proposed development. Mitigation measures include for a combination of attenuation facilities and recommended SuDS methods on each proposed ERF, and in common areas within the development where MAJOR retention facilities have been proposed.

Mitigation measures on each ERF include SuDS methods. One of the most effective SuDS methods is the use of attenuation facilities. On each site we have termed these attenuation facilities as MINOR attenuation.

All potential "dirty" water areas are to be covered and bunded to prevent this water from contaminating the clean water from each developed site.

The "dirty" water collected would need to be treated and disposed of to a system separate to the clean stormwater system.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	LOW - NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(xi) **Impact of permanent change of visual character on the nearby visual receptors**

Despite its location within the surrounding landscape the proposed development is not particularly well visible within its immediate and larger context from number of viewpoints. This is primarily due to the undulating nature of existing landscape within the site and immediate surrounding which offers visual concealment from number of sides. However, from a limited number of viewpoints the development would be highly visible i.e.

The proposed development is therefore considered to be moderately visually intrusive and will, despite its maximum height of 15 metres, blend-in to a degree with the existing setting and context.

The site has a medium visual absorption capacity located in a rural context of natural landscape feature such as hills and existing well-established vegetation. The visual absorption capacity is lowest from the south west of the site. There are multiple viewing opportunities of the site from the surrounding areas. There will be medium change of site character and immediate context character due to the proposed scale of the development to its immediate context.

The site and immediate context sense of place will change although this is suggested to be within acceptable parameters. Visual impacts on the surrounding context are assessed as medium considering the site location within the context identified from natural to urban. Light pollution at night would be medium due to its close proximity to Illovo Beach.

Table 5-28: Impact of permanent change of visual character on the nearby receptors

PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Permanent change of visual character on the nearby receptors</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>An architectural guidelines document must be compiled during the detailed design stage to give a detailed description of the proposed architectural character.</i>				
<p><i>Examples of mitigation measures to be included in the architectural guideline document:</i></p> <p><i>Massing and Scale</i></p> <ul style="list-style-type: none"> • <i>Break up the structures on site to avoid large single-mass objects, as far as possible.</i> • <i>Avoid large, flat elevations as far as possible.</i> • <i>Make use of natural, contextually appropriate materials wherever possible.</i> • <i>As far as possible, use low level, unobtrusive and contextually appropriate signage is used.</i> • <i>Ensure that fencing is visually permeable, contextually appropriate and softened with planting to provide visual screening. Use appropriate colours such as dark grey, charcoal and black that are visually recessive.</i> • <i>Design streetscape elements (e.g. paving, street furniture, lighting etc.) in a manner that responds to the local context.</i> <p><i>Colour</i></p> <ul style="list-style-type: none"> • <i>Use exterior colours that have low reflectivity value and blend with the surroundings and the contextual character of the surrounding environment.</i> • <i>Use a combination of natural and neutral colours as far as possible.</i> • <i>Avoid usage of a single colour on large surfaces. Such surfaces can be visually broken down using different paint colours.</i> • <i>Darker colours tend to recede from view, while lighter colours are much more visually noticeable.</i> • <i>Keep reflective surfaces to a minimum or ensure that these areas are shaded by roof overhangs, where possible.</i> • <i>Ensure that non-reflective paving surfaces are used as far as possible.</i> <p><i>Vegetation</i></p> <ul style="list-style-type: none"> • <i>Allow for the existing features of the site such as mature vegetation and screening elements to be to be retained, where possible.</i> • <i>Use vegetation to visually 'screen' built structures wherever possible.</i> • <i>Use vegetation and landscaping to soften the hard surfaces on the site.</i> • <i>Make allowance for on-going landscape maintenance to allow site vegetation to mature sufficiently to allow the environment to achieve maximum VAC.</i> <p><i>Lighting</i></p> <ul style="list-style-type: none"> • <i>Low-lumen lighting should be considered and floodlights should be angled towards the ground where possible.</i> • <i>Avoid neon, spot or up-lighting.</i> • <i>Screen and filter lights sources as far as possible.</i> • <i>Shield external lights on buildings to cast light only upon the area required to be illuminated.</i> • <i>Ensure that naked light sources are not visible from beyond the site.</i> • <i>Ensure that no light is emitted into the sky.</i> 				
POST-MITIGATION				

DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	LOW NEGATIVE		
CONFIDENCE LEVEL				

(xii) Impact of loss of agricultural land as a result of the proposed development

The site is currently used for commercial sugar cane farming, and as a result of the clearance of the site for the proposed development, the land use will change to industrial development. Due to difficult terrain and shallow soils, this farm would be marginal if it were commercially owned.

As there are no high yield potential arable soils at the site, and since sugarcane is an industrial crop with a poor level of employment per hectare, there is no apparent reason why favourable consideration should not be given to alternate land use activities. The proposed KZN ASP will generate, amongst other benefits, a higher employment rate per hectare of land. Permanent employment is the most widespread provider of food security.

Table 5-29: Impact ratings for loss of agricultural land as a result of the proposed development

PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Loss of agricultural land as a result of the proposed development</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				

DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	21	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	3	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.</i>	Highly beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	63	HIGH - POSITIVE		
PROPOSED MITIGATION MEASURES				
<i>In the areas where sugarcane can be safely removed and replaced with industrial or commercial development it is strongly recommended that, prior to the commencement of the development, a suitably qualified landscape gardening practice be engaged to ensure that in public open spaces within the development there is the creation of professionally planned and executed new micro-ecosystems.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	21	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	3	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Highly beneficial	Definite

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	63	HIGH-POSITIVE		
CONFIDENCE LEVEL				
High				

(xiii) *Increased pressure on municipal services and existing community facilities*

The proposed development is likely to result in economic impacts, including increased investment and business activity in the area. This increase in business and industry, if not planned, is likely to place increased pressure on existing services such as water and electricity social services, health care services, schools, etc., all resulting from an increase in the number of businesses operating in the area.

Table 5-30: Impact ratings for increased pressure on municipal services and existing community facilities

PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Increased pressure on municipal services and existing community facilities			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Highly Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-63	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>The relevant municipal service authorities have been consulted regarding future service requirements and provision has been made for the proposed KZN ASP Development.</i>				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-14	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-28	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(xiv) Impact of expanded manufacturing base

The proposed KZN ASP is aimed at leveraging the comparative advantage in the area in terms of vehicle manufacturing, by expanding the manufacturing base within the region. The manufacturing sector is considered to be a key sector for delivering the economic growth required to tackle the triple challenge of poverty, inequality and unemployment, with the automotive industry viewed as having a significant role to play, both as employer and stimulator of economic development. eThekweni South enjoys a comparative advantage over eThekweni Municipality in manufacturing, with a relatively dominant advantage in the transport equipment sub-sector. Toyota SA Motors' presence in the eThekweni South region is

likely to be the key driver of the comparative advantage, with many of its supply chain role-players also located in this region to take advantage of this.

Table 5-31: Impact ratings for expanded manufacturing base

PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Expanded manufacturing base			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	48	MODERATE POSITIVE		
PROPOSED MITIGATION MEASURES				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	16	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		

SEVERITY	2	<i>The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected</i>	Moderately Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	48	MODERATE POSITIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(xv) Increased contribution to municipal rates as a result of the change of land use activities on the site

The site for the proposed development is currently used for agricultural purposes. During the operational phase, the rates contribution to eThekweni Municipality will increase significantly, as the majority of land will be zoned for Industrial and related land uses. Therefore, the municipal rates that the eThekweni Municipality will be able to collect from the proposed land uses within the development will be considerably more than the municipal rates collected from agricultural land.

Table 5-32: Impact ratings for increased contribution to municipal rates as a result of change of land use activities on the site

PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Increased contribution to municipal rates as a result of change of land use activities</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	21	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	3	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.</i>	Highly beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	63	HIGH - POSITIVE		
PROPOSED MITIGATION MEASURES				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	21	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	3	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.</i>	Highly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	63	HIGH - POSITIVE		
CONFIDENCE LEVEL				
High				

5.4 11Kv and 132kV Powerlines – Impact Assessment

The Applicant, the DTPC, will be responsible for the construction of the proposed powerline (in accordance with eThekweni Electricity (EE) specifications) after which it will be handed over to the Municipality for operation and maintenance.

Table 5-33: Impact ratings for erosion potential and siltation of downstream watercourses due to construction and associated infrastructure developments

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Increased erosion potential and siltation of downstream watercourses due to construction and associated infrastructure developments (e.g. pipeline, site layout)			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE -NEGATIVE		
PROPOSED MITIGATION MEASURES				
The 11kV powerline is underground and will follow the route of the proposed sewerline for majority of the route i.e. the existing P197 road until it reaches the ASP site. This is associated with areas of existing disturbance.				
Construction must be timed for the winter, low flow periods to prevent unnecessary diversion of water flow.				
All development footprint areas must remain as small as possible.				
No vehicles must be allowed to indiscriminately drive through the riparian areas or within the active stream channels. Designated access roads must be determined prior to the commencement of construction and clearly demarcated. Ad hoc access roads must not be permitted.				
During construction all building materials must be kept out of the riparian areas as well as the active stream channels. Building materials, including soil and spoil stock piles, must not be stored within 30m of a drainage line/ stream.				
All waste and remaining building materials must be removed from site on completion of the project, and disposed of at a registered landfill facility.				
The bed profile must be re-instated in such a way as to prevent incision and erosion in all areas that may be disturbed.				

<i>Where needed, construct any necessary erosion protection mechanisms where the pipeline intersects the macro-channel banks of rivers /streams allowing for prevention of scouring or outer-bank erosion. Protection mechanisms to be considered may include gabions, reno-mattresses or other stabilising structures to armour them. It is important to take into consideration that the outside bends of channels are particularly vulnerable to erosion/ bank collapse and should preferably be avoided when detailed crossing positions are fixed.</i>				
<i>Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.</i>				
<i>Install protective works (e.g. gabions, reno-mattresses) to stabilise and protect unstable banks immediately upstream and downstream of the crossing prior to commencing construction. The 11kV cable will cross the Lovu River at the existing Lovu River Bridge.</i>				
<i>Unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes.</i>				
<i>Topsoil and vegetation from areas to be excavated should be stripped and stored at the designated soil stockpile area outside of the wetland/aquatic zone for use later in rehabilitation. Topsoil and subsoil to be stored separately.</i>				
<i>In cases where natural vegetation will be cleared as a result of the movement of people or stockpiling of building materials, re-vegetation should take place. Preceding re-vegetation efforts occurring in cleared and degraded wetlands, it is essential that all solid wastes are removed from individual HGM units as well as their immediate surroundings.</i>				
<i>No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e. for firewood or medicinal use). No persons may remove, damage, deface, paint or disturb of any flora (plants) outside of the demarcated construction areas, unless specifically authorised by the ECO in consultation with the resident engineer.</i>				
<i>Indigenous wetland vegetation removed from the road/pipeline crossing footprint and suitable for rehabilitation activities must be carefully removed and stored in an appropriate facility for rehabilitation purposes.</i>				
<i>Sediment traps can be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.</i>				
<i>Stockpiles must be established on flat ground at least 20m away from delineated watercourses.</i>				
<i>Erosion/sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment runoff from stockpiles. Subsoil and topsoil is to be stockpiled separately.</i>				
<i>The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor shall, where possible, avoid stockpiling materials in vegetated areas that will not be cleared.</i>				
<i>Stockpiles shall be located outside of freshwater habitat (including riparian zones). Stockpiled soils are to be kept free of weeds and are not to be compacted</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2

EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	<i>Slightly Detrimental</i>	<i>Likely</i>
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

- (i) *Changes to stream characteristics as a result of excavation activities and compaction of soil due to construction vehicles movements and associated infrastructure developments (e.g. pipeline, site layout)*

It is foreseen that the proposed construction of the electrical powerline will have an impact on the stream habitat during the construction phase, where excavation activities will take place near watercourses. Changes in water flow characteristics will also occur when there is compaction of soil, caused by construction vehicles and potential discharge of silt laden water used during construction. The incorrect rehabilitation and reshaping of the stream bed and banks will alter run off patterns and ultimately stream flow.

Table 5-34: Impact ratings for changes to stream characteristics as a result of excavation activities and compaction of soils due to construction vehicle movements

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Changes to stream flow characteristics as a result of excavation activities and compaction of soil due to construction vehicle movements and associated infrastructure developments (e.g. pipeline, site layout)</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-18	3

EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Slightly detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-54	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Construction must be timed for the winter, low flow periods to prevent unnecessary diversion of water flow.</i>				
<i>Streams may not be diverted.</i>				
<i>Development activities may not extend beyond the study area boundary.</i>				
<i>No vehicles must be allowed to indiscriminately drive through the riparian areas or within the active stream channels. Designated access roads must be determined prior to the commencement of construction and clearly demarcated. Ad hoc access roads must not be permitted.</i>				
<i>During construction all building materials must be kept out of the riparian areas as well as the active stream channels. Building materials, including soil and spoil stock piles, must not be stored within 30m of a drainage line/ stream.</i>				
<i>All waste and remaining building materials must be removed from site on completion of the project, and disposed of at a registered landfill facility..</i>				
<i>The bed profile must be re-instated in such a way as to prevent incision and erosion in all areas that may be disturbed.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or</i>	Slightly Detrimental	Likely

		<i>vulnerable systems or communities are negatively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(ii) *Increase in sedimentation and turbidity due to the clearing of vegetation in the vicinity of watercourses*

This impact will only have a temporarily effect on the watercourses even though it is highly probable.

Table 5-35: Impact ratings for increase in sedimentation and turbidity

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Increase in sedimentation and turbidity due to the clearing of vegetation through or in the vicinity of watercourses and associated infrastructure developments (e.g. pipeline, site layout)</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-18	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Moderately detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Adequate storm water management must be implemented on site to prevent erosion and the associated sedimentation of the riparian and instream areas.				
Construction must be timed for the winter, low flow periods to prevent unnecessary diversion of water flow.				
As far as possible no activities, with special mention of access roads, must occur within the riparian zones of stream channels as well as the stream channels themselves.				
The construction crews must be educated in the importance of natural resources and must not litter or pollute areas of bush, wetlands and rivers.				
Adequate disposal and toilet facilities must be provided on site in all areas during construction.				
The duration in which soils are exposed during construction activities must remain as short as possible.				
Concurrent rehabilitation is to take place as far as possible and footprint areas must be minimised as far as possible.				
All areas affected by construction must be rehabilitated upon completion of the construction phase of the development.				
River banks must be appropriately re-profiled and re-vegetated with indigenous grasses and trees with the guidance of a vegetation specialist. Steep banks should be stabilised with hessian sheets.				
During the construction and operational phases of the proposed development, erosion berms must be installed to prevent gully formation and siltation of the riparian resources.				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	2	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur		
SEVERITY	-2	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	likely
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(iii) *Degradation of water quality of non-perennial and perennial river systems situated downstream of the site as a result of excavation activities and accidental spillage of hydrocarbons*

During the construction phase of the 11kV powerline, water quality may be impacted through the input of sediment and silt to the surrounding stream due to excavation activities, as well as runoff from materials stockpiled in close vicinity of the riverine areas. Furthermore, the accidental leakage of oil, grease and fuel from construction machinery could lead to hydrocarbon contamination of these sensitive areas. However, this impact will be of temporary nature and the macro-invertebrates communities will be able to recover.

Degradation of water quality of non-perennial and perennial river systems situated downstream of the site is likely to occur if equipment and vehicles are washed in the water bodies, and material stockpiles are placed on the banks of the river and streams which occur in the project area. Erosion of stockpiles may occur during wet seasons, leading to siltation of the water bodies (overland runoff).

Table 5-36: Impact ratings for degradation of water quality on non-perennial and perennial river systems

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Degradation of water quality of non-perennial and perennial river systems situated downstream of the site as a result of excavation activities and accidental spillage of hydrocarbons.</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-18	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Moderately Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>The time in which soils are exposed during construction activities must remain as short as possible.</i>				
<i>Workable areas must be demarcated and kept to the immediate vicinity of the construction site. It must not extend into surrounding natural areas.</i>				
<i>During construction, all construction materials must be kept out of the riparian or wetland zones.</i>				
<i>All waste and remaining building materials must be removed from site periodically during construction and on completion of the project.</i>				
<i>No dumping must take place in or near the construction site.</i>				
<i>All spills must be immediately cleaned up and treated in accordance with the spill contingency plan.</i>				
<i>During construction, regular checks of the riparian, wetland and coastal thicket areas must be undertaken. A clean-up operation must be implemented immediately if litter and pollution are found to be present</i>				
<i>All construction vehicles must be checked daily for damage and/or leaks. Repairs must be affected immediately.</i>				
<i>Vehicles used during the construction phase must be parked in a designated area and containers should be used to prevent any oil leaks.</i>				
<i>Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility.</i>				
<i>There must be water quality monitoring of the downstream surface water and visual assessments.</i>				
<i>Material stockpiles must be covered with a temporary liner to prevent contamination.</i>				
<i>Adequate disposal and toilet facilities must be provided on site in all areas during construction. All waste and remaining building materials must be removed from site periodically during construction and on completion of the project.</i>				
<i>No material or waste water from the construction operations should be discharged, dumped or stored in the wetland/estuary areas.</i>				
<i>All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.</i>				
<i>All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces.</i>				
<i>Materials not to be stockpiled within the buffer area; all materials should strictly be kept 30m away from the watercourses on site.</i>				
<i>An appropriate Contingency-Spill Response Plan is to be compiled and stored on site.</i>				
<i>No equipment laydown or storage areas must be located within 20m of any watercourse and/or within the 1:100 year floodline of the Lovu and Msimbazi Rivers.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		

SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	<i>Slightly detrimental</i>	<i>likely</i>
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(iv) Pollution of vadose zone and regional water table / groundwater aquifer during soil excavations / construction activities

Pollution of the vadose and regional water table/ groundwater aquifer may result as a result of soil excavations/ construction activities. The accidental spillage of hydrocarbons from machinery used to excavate soils and other accidental spillages of oil, grease and fuel leaks could lead to contamination of the vadose zone which could percolate to the shallow aquifer.

Table 5-37: Impact ratings for pollution of the vadose and regional water table / groundwater aquifer during soil excavations / construction activities and associated infrastructure developments (e.g. pipeline, site layout)

PROJECT PHASE				
<i>Construction Phase</i>				
DIRECT IMPACT	<i>Pollution of the vadose zone and regional water table / groundwater aquifer, as a result of excavation activities and accidental spillage of hydrocarbons and associated infrastructure developments (e.g. pipeline, site layout)</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-12	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but</i>	Slightly Detrimental	Likely

		<i>natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-24	LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Only excavate areas applicable to the project area.</i>				
<i>All waste generated during construction on site (i.e. building rubble, used oil and paint containers etc.) must be stored in designated areas which are isolated from surface drains. Waste storage facilities should be covered to prevent dust and litter from leaving the containment area, and to prevent rainwater ingress.</i>				
<i>Minimise the amount of exposed ground and stockpiles of building material (i.e. sand, cement, wood, metal, paint, solvents etc.) to prevent suspended solid transport loads and leaching of rocks/materials. Stockpiles can be covered, and sediment fences constructed from a suitable geotextile.</i>				
<i>Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils.</i>				
<i>Cover excavated soils with a temporary liner to prevent contamination.</i>				
<i>Keep the site clean of all general and domestic wastes.</i>				
<i>Undertake water quality monitoring of the downstream surface water.</i>				
<i>Park heavy machineries in lined areas and place drip trays under vehicles at the site.</i>				
<i>Visual soil assessments for signs of contamination.</i>				
<i>During the construction phase, water and soil monitoring focus on active excavation and equipment / heavy machinery parking or housing areas. Regular visual inspections of these areas need to be undertaken. Moreover, placement and monitoring of drip trays underneath parked construction vehicles will help to determine which vehicles need to be repaired/taken off-site to prevent contamination while in service.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-6	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		

SIGNIFICANCE	-12	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(v) *Degradation of water quality of non-perennial and perennial river systems situated downstream of the site*

Degradation of water quality of non-perennial and perennial river systems situated downstream of the site is likely to occur if equipment and vehicles are washed in the water bodies, and if material stockpiles are placed on the banks of the river and streams which occur in the project area. Erosion of stockpiles may occur during wet seasons, leading to siltation of the water bodies (overland runoff).

Table 5-38: Impact ratings for degradation of non-perennial and perennial river systems situated downstream of the site

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Degradation of water quality of non-perennial and perennial river systems situated downstream of the site, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Undertake water quality monitoring and visual assessments.				
Install a temporary cut off trench to contain poor quality runoff.				

<i>Cover material stockpiles with a temporary liner to prevent contamination of downstream water resources.</i>				
<i>During the construction phase, all measures should be taken in order to prevent contamination of wetland areas by vehicles utilised. If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.</i>				
<i>All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. Additionally, materials not to be stockpiled within the buffer area; all materials should strictly be kept 30 m away from the watercourses on site. Furthermore, during the operational phase, when maintaining and utilising the road, mitigation measures must be developed and implemented to inhibit further degradation of these wetland systems. In the event of an unexpected damage occurring this should be reported to the relevant authority immediately.</i>				
<i>An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to hand large spill events (e.g. SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation. Individual operational sites/companies will need to compile their own contingency/spill plans.</i>				
<i>No vehicles must be allowed to indiscriminately drive through the riparian areas or within the active stream channels. Designated access roads must be determined prior to the commencement of construction and clearly demarcated. Ad hoc access roads must not be permitted.</i>				
<i>During construction all building materials must be kept out of the riparian areas as well as the active stream channels. Building materials, including soil and spoil stock piles, must not be stored within 30m of a drainage line/ stream</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>No irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(vi) *Increased potential for soil erosion caused by vegetation clearance and increased surface water runoff*

The movement of construction vehicles and machinery may cause soil compaction. During storm events, less rainfall will infiltrate into the soil and the construction site will generate

increased surface runoff thereby increasing the erosive potential of the soil. During the construction phase, the digging of trenches for the proposed pylons may result in the destabilisation of the natural soils and removal of vegetation cover in the study site. This may make soils prone to erosion.

Table 5-39: Impact ratings for increased potential for soil erosion caused by vegetation clearance and increased surface water runoff

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Increased potential for soil erosion, caused by removal of vegetation during construction and associated infrastructure developments (e.g. pipeline, site layout)			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-14	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
The construction of the proposed infrastructure should ensure that the footprint is minimised to reduce damage to soils and vegetation which could affect drainage patterns on site and lead to increased erosion.				
No construction can be undertaken until a Water Use License is granted by the Department of Water and Sanitation (DWS), for construction within 500m of a watercourse.				
During construction, excavated material should be stockpiled in a manner that prevents runoff into open trenches. Care should be taken to limit any construction footprint, to reduce soil compaction and to avoid concentrating runoff in a manner that might cause soil erosion.				

<i>The construction of the proposed infrastructure should ensure that the construction footprint is kept as small as possible to reduce destabilisation of soils and effects on natural drainage patterns that could lead to increased risks of soil erosion.</i>				
<i>One defined access route for construction vehicles is normally recommended, to prevent multiple wheels-track and ruts that could concentrate runoff</i>				
<i>All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.</i>				
<i>Site management plans should also include measures to rehabilitate soils and vegetation after the construction of the proposed infrastructure.</i>				
<i>Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place.</i>				
<i>The footprint of access routes for construction vehicles should be kept minimal as far as possible to reduce the degree of soil compaction.</i>				
<i>Existing road stormwater drains should be protected and maintained as far as possible during the construction phase of the project.</i>				
<i>Erosion protection measures should be implemented to reduce flow velocities at outlet points.</i>				
<i>Runoff water should be spread over vegetated surfaces to promote stormwater infiltration.</i>				
<i>The construction camp and footprint of the pylons should be rehabilitated to ensure the slopes and vegetation cover resembles the pre-development state. This will ensure that the area has naturalised runoff patterns.</i>				
<i>The impact may be reduced if construction takes place in the winter months or outside of the rainy season.</i>				
<i>Trench sides should be sloped or shored to prevent potential collapse during rain events.</i>				
<i>Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.</i>				
<i>Install protective works (e.g. gabions, reno-mattresses) to stabilise and protect unstable banks immediately upstream and downstream of the development area prior to commencing construction.</i>				
<i>Unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes.</i>				
<i>Prior to the stripping, infilling, excavation and re-shaping of any wetland/aquatic habitat within the development footprint/corridor, a search and rescue of indigenous vegetation must be undertaken prior to habitat destruction for use in rehabilitation. Arrangements must be made to store and/or relocate the relevant species into suitable onsite or offsite habitats or in a temporary nursery/storage area. This process should be led by the appointed ECO.</i>				
<i>Sedimentation and erosion control measures must be implemented to prevent slope destabilisation and increased sediment loads entering freshwater systems. Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps can be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources</i>				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last	-10	2

		6-18 months and as such is rated as Short term	Slightly Detrimental	Likely
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEABLE RESOURCES	1	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(vii) *Reduced water quality of wetlands and watercourses, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)*

Construction vehicles will be present on site, giving rise to the possibility of fuel/ chemical spills which could impact on the water quality of the downstream wetlands and watercourses.

Table 5-40: Impact ratings for reduced water quality of wetlands and watercourses, as a result of construction activities and associated infrastructure developments (e.g. 11kV powerline route, site layout)

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Reduced water quality of wetlands and watercourses, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3

EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
During periods of construction, there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the drainage line (Kotze et al., 2008). Demarcation of no-go areas during construction is critical. The edges of the construction zone within the vicinity of the delineated wetlands and riparian habitats must be clearly demarcated by a surveyor and defined using highly visible material (e.g. danger tape) before construction commencing. Acceptable rubbish bins and waste disposal facilities on-site and at the campsite should be provided in order to prevent any littering and pollution. Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or wild animals from accessing the contents.				
During the construction phase all measures should be taken in order to prevent contamination of wetland areas by vehicles utilised. If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platform location in order to avoid such contamination in the watercourses.				
All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to hand large spill events (e.g. SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation. Individual operational sites/companies will need to compile their own contingency/spill plans.				
No equipment laydown or storage areas must be located within 20m of any watercourse and/or within the 1:100 year flood line of the iLovu River.				
As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the drainage line (Kotze et al., 2008). The edges of the construction zone within the vicinity of the delineated wetlands and riparian habitats must be clearly demarcated by a surveyor and defined using highly visible material (e.g. danger tape) before construction commencing. Acceptable rubbish bins and waste disposal facilities on-site and at the campsite should be provided in order to prevent any littering and pollution. Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or wild animals from accessing the contents.				
An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable				

company to hand large spill events (e.g. SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation. Individual operational sites/companies will need to compile their own contingency/spill plans.

As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the drainage line (Kotze et al., 2008). The edges of the construction zone within the vicinity of the delineated wetlands and riparian habitats must be clearly demarcated by a surveyor and defined using highly visible material (e.g. danger tape) before construction commencing. Acceptable rubbish bins and waste disposal facilities on-site and at the campsite should be provided in order to prevent any littering and pollution. Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or wild animals from accessing the contents.

POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	<i>Slightly Detrimental</i>	<i>Likely</i>
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>No irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(viii) Altered ecological processes and biodiversity of wetland habitat as a result of increased spread of invasive alien plants

Ecosystem services provided by the assessed wetlands are largely of low importance due to the degree of degradation and loss of wetland functioning as a consequence of wetland transformation by agriculture. The most prominent ecosystem services provided by wetlands assessed along the powerline route included the provision of cultivated foods as most of these wetlands were utilised for sugarcane cultivation. The activity of constructing and installing the powerlines poses and overall low risk to the receiving environment as small portions of vegetation will be removed.

Table 5-41: Impact ratings for altered ecological processes and biodiversity of wetland habitat as a result of increased spread of invasive alien plants and associated infrastructure developments (e.g. pipeline, site layout)

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Altered ecological processes and biodiversity of wetland habitat as a result of increased spread of invasive alien plant activities and associated infrastructure developments (e.g. pipeline, site layout)			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Minimal activity is to take place within wetland and 20m buffers apart from possible alien plant control to take place in wetlands and buffer zones.				
Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.				
No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e. for firewood or medicinal use). No persons may remove, damage, deface, paint or disturb of any flora (plants) outside of the demarcated construction areas, unless specifically authorised by the ECO in consultation with the resident engineer. Any indigenous vegetation suitable for rehabilitation should be stored appropriately for later use. Indigenous wetland vegetation removed from the road/pipeline crossing footprint and suitable for rehabilitation activities must be carefully removed and stored in an appropriate facility for rehabilitation purposes.				
Implement effective rehabilitation to reverse construction related impacts.				
Following the completion of construction, a mixture of indigenous species should be introduced. The re-establishment of vegetation will enhance these systems' capability to maintain biodiversity.				
When re-vegetation activities are taking place, the following should be adhered to: <ul style="list-style-type: none">In areas where sugarcane cultivation is to be continued, sugarcane must be planted immediately following reshaping of the wetland surface.In areas where sugarcane cultivation is to be discontinued temporarily or permanently, a mixture of rapid-colonising grasses (such as Cynodon dactylon or Stenotaphrum secundatum) must be planted immediately				

<i>following reshaping of the wetland surface to bind the soils and prevent erosion. Hydroseeding or broad casting of seed by hand is recommended.</i>				
<ul style="list-style-type: none"><i>The target groundcover of re-vegetated areas shall be no less than 80% of specified vegetation and there must be no bare patches of more than 500 x 500 mm in maximum dimension.</i><i>No exotic/alien plants are to be used in hydroseeding (e.g. Kikuyu grass, Pennisetum clandestinum, is not recommended).</i><i>The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed. For slopes >15°: 25-50 kg/ha, slopes <15°: 15-25 kg/ha.</i><i>Also, recommend that indigenous wetland species (sedges, bulrushes and reeds) are to be rescued prior to construction and stockpiled and then used in revegetation, supplemented by seeding of disturbed areas.</i>				
<i>Install protective works (e.g. gabions, reno-mattresses) to stabilise and protect unstable banks immediately upstream and downstream of the pipeline crossing prior to commencing construction.</i>				
<i>No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e. for firewood or medicinal use). No persons may remove, damage, deface, paint or disturb of any flora (plants) outside of the demarcated construction areas, unless specifically authorised by the ECO in consultation with the resident engineer. Any indigenous vegetation suitable for rehabilitation should be stored appropriately for later use. Indigenous wetland vegetation removed from the road/pipeline crossing footprint and suitable for rehabilitation activities must be carefully removed and stored in an appropriate facility for rehabilitation purposes.</i>				
<i>Prior to the stripping, infilling, excavation and re-shaping of any wetland/aquatic habitat within the development footprint/corridor, a search and rescue of indigenous vegetation must be undertaken prior to habitat destruction for use in rehabilitation. Arrangements must be made to store and/or relocate the relevant species into suitable onsite or offsite habitats or in a temporary nursery/storage area. This process should be led by the appointed ECO.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(ix) *Impact on heritage and cultural resources as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)*

The Heritage Impact Assessment revealed that the receiving environment for the proposed powerline development has low to medium potential to yield previously unidentified archaeological sites during subsurface excavations and construction work associated with the proposed development.

The proposed 11kV powerline route runs in the vicinity of historical buildings and a steel bridge which are currently being renovated. The study confirmed that none of these historical structures and buildings will be affected by the proposed powerline route. The proposed route runs in the vicinity of a previously recorded cemetery. The proposed route will not affect the cemetery in any way.

Table 5-42: Impact ratings for Impact on heritage and archaeological resources

PROJECT PHASE				
<i>Construction Phase</i>				
DIRECT IMPACT	<i>Impact on heritage and archaeological resources as a result of construction activities</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	1
EXTENT	1	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-10	VERY LOW NEGATIVE		

PROPOSED MITIGATION MEASURES				
<i>The powerline route follows closely to the proposed sewerline route i.e. alongside existing roads in the study area.</i>				
<i>The chance finds process must be implemented when necessary especially when archaeological materials and burials are encountered during subsurface construction activities.</i>				
<i>If archaeological materials are uncovered, work should cease immediately and the Amafa aKwaZulu Natali be notified and activity should not resume until appropriate management provisions are in place.</i>				
<i>If during the construction or operations phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefacts of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</i>				
<i>The site manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing Amafa aKwaZulu Natali</i>				
<i>If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and Amafa aKwaZulu Natali are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency rescue permit may be issued by Amafa aKwaZulu Natali for an archaeologist to exhume the remains.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary</i>	-4	1
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-1	<i>Negligible</i>	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-4	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(x) Increase in ambient noise levels on surrounding land owners

Noise may result from the movement of vehicles, trucks and other associated machinery used during the construction phase. However, the noise associated with construction activities will be of short term nature, localised and will only last during the construction phase of the project.

Table 5-43: Impact ratings for nuisance noise on the surrounding community as a result of increased noise generation due to construction activities and the movement of construction vehicles

IMPACT OF NOISE ON SURROUNDING COMMUNITIES				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Increased noise generation due to construction activities and the movement of construction vehicles and associated infrastructure developments (e.g. pipeline, site layout)			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-20	LOW NEGATIVE		
PROPOSED MITIGATION MEASURES				
Where reasonable and feasible, the proponent must apply best practice noise mitigation measures including: <ul style="list-style-type: none">Orienting equipment away from noise sensitive receptors				
As far as reasonably practicable, sources of significant noise should be enclosed. The extent to which this can be done depends on the nature of the machines to be enclosed and their ventilations requirements.				
Minimise reversing of equipment to prevent nuisance caused by reversing alarms.				
Driver practices when approaching and leaving the site should minimise noise emissions created through activities such as unnecessary acceleration and breaking squeal, especially on the access road to the construction site.				
Site inductions should cover the importance of noise control and available noise reduction measures.				
Contractors should be required to use equipment that is in good working order and that meets current best practice noise emission levels. This should be achieved by making it a component of contractual agreements with the construction contracts.				
The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only.				

<i>The on-site construction supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the Owner shall be established prior to construction commencement that will allow for resolution of noise problems that cannot be immediately solved by the site supervisor.</i>				
<i>Stockpile areas will be decided and approved by the Project Manager and appointed ECO before construction commences on site.</i>				
<i>Construction vehicles, plant and machinery maintained and fitted with silencers.</i>				
<i>Regular maintenance on vehicle and equipment to be done.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-8	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-16	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(xi) *Increase in ambient dust levels and air emissions, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)*

The sensitive receptors adjacent to the construction areas (such as Illovo Industrial area, residents of Astra Park, Nelson Close and Poss Road) where trenching and installation of the proposed powerline will occur, may be impacted by dust entrainment caused by excavations of trenches and construction activities. The ambient air quality may be deteriorated by exhaust fumes generated by the increased vehicular movement.

Table 5-44: Impact ratings for increase in ambient dust levels and air emissions, due to construction activities

INCREASE IN AMBIENT DUST LEVELS AND AIR EMISSIONS	
PROJECT PHASE	<i>Construction Phase</i>
DIRECT IMPACT	<i>Increase in ambient dust levels and air emissions, due to construction activities and associated infrastructure developments (e.g. pipeline, site layout)</i>
INDIRECT IMPACT	--

CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-20	LOW NEGATIVE		
PROPOSED MITIGATION MEASURES				
A comments and complaints register, accessible to members of public, should be implemented and maintained. Such a register would provide a formal framework within which to record any comments and complaints received, as well as to identify and action appropriate mitigation and/or remediation measures. The register should also include a means of recording and communicating the close-out of issues.				
The need for dust containment should be assessed on a daily basis to avoid unnecessary wastage of non-potable water used in dust suppression. Site runoff of water or mud should be avoided.				
Bonfires and burning of waste materials must be prohibited.				
Cover should ideally be removed in small areas during work and not all at once.				
Stockpile surface areas to be minimised to reduce area of surfaces exposed to wind pick-up.				
Where appropriate, windbreak netting/screening can be positioned around material stockpiles, as well as exposed excavation and material handling operations, to provide a physical barrier between the works and the surroundings. Where practicable, stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of prevailing wind directions and seasonal variations in the prevailing wind.				
During dry or windy weather, material stockpiles and exposed surfaces could be dampened down using a water spray to minimise the potential for wind pick-up. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Where it is not possible to re-vegetate or cover with topsoil, the use of hessian, mulches or tackifiers (soil binding agents) should be considered.				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-4	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		

SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-4	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(xii) Increased traffic congestion on surrounding road network, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)

Due to construction activities for excavation of trenches and the powerline installation, the traffic patterns of the affected roads (R102, N2, P197, P578 and R603) and surrounding roads network may be affected, with increased traffic congestion.

Table 5-45: Impact ratings for traffic congestion on the surrounding road network

IMPACT OF TRAFFIC ON SURROUNDING ROAD NETWORK				
PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Increased traffic caused by construction of the proposed powerline the movement of construction vehicles and associated infrastructure developments (e.g. pipeline, site layout)</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties.</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-30	LOW NEGATIVE		
PROPOSED MITIGATION MEASURES				
Avoid movement of construction vehicles and machinery on main access roads during peak times (7:00 – 9:00) & (16:00 – 18:00).				
If the above is unavoidable – implement traffic control measures such as points men at the intersections.				
Timing of any large-scale vehicle movements to avoid peak hours on the local road network would also be beneficial.				
A Traffic Management Plan must be compiled by a Traffic Engineer for approval by eThekweni Transport Authority (eTA) prior to construction.				
Flagsmen must be on duty to direct traffic flow during congestion and warn motorists of the approaching construction zones.				
For powerline construction, access to the residential properties needs to be maintained at all times.				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties.		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-10	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(xiii) Skills transfer and capacitating of local communities during construction

The construction phase will require skilled and unskilled labour. The project will however be used from the start to train people and transfer skills as far as possible. The tender specifications for any construction work on the project will include a compulsory utilisation of a certain percentage of local labour and the compulsory training of local labour.

Other employment opportunities for the duration of the construction period of the specific element of the project will include:

- Erection of shade cloth at the construction sites;
- Excavation of trenches;

- Flags men duties for traffic control; and
- Fencing of construction sites.

Due to the high percentage of unemployment in the area, sufficient unskilled labour is available for the project, as the potential labour force resides in close proximity of the development site.

Table 5-46: Impact ratings for Skills transfer to local employees and capacitating of local communities during construction

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Skills transfer and capacitating of local communities during construction			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	14	VERY LOW POSITIVE		
PROPOSED MITIGATION MEASURES				
In liaison with the eThekweni Municipality’s Extended Public Works Programme, recruit local residents to supply unskilled labour during the construction phase;				
Stakeholders (Appointed Contractor and the Municipality) should be mutually accountable for increased opportunities regarding skills and competency development (general education and technical training);				
Training should be concentrated on skills that can be readily transferred to other employment opportunities;				
Ensure that the employment and training of Historically Disadvantaged Individuals (HDI’s) from the local communities and women are implemented.				
POST-MITIGATION				

DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	15	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	3	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.</i>	Moderately Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	45	MODERATELY POSITIVE		
CONFIDENCE LEVEL				
<i>Low</i>				

(xiv) Disturbance to or destruction of indigenous vegetation including protected species

Digging of trenches to bury the 11kV powerline will require the clearance of indigenous vegetation in certain areas. This may include the destruction of removal of species of conservation concern

and/or protected species. The vegetation that will be impacted on includes coastal thicket and indigenous trees in the road reserve.

Table 5-47: Impact ratings for disturbance/destruction of indigenous vegetation including protested species

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Disturbance / destruction of indigenous vegetation including protected species</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-16	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-48	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>An independent Environmental Control Officer (ECO) must be appointed to oversee construction activities</i>				
<i>Clearance of indigenous woody vegetation, especially in coastal bush must be avoided where possible. The removal of any indigenous vegetation must be limited as much as possible.</i>				
<i>The removal or destruction of any threatened or protected plant species will require a permit from EKZNW or DAFF. Before vegetation clearance begins a suitably qualified botanist must undertake a walk-through of the route during the growing season to account for any such species that may have established</i> <i>Construction crew camps must not be located adjacent to any natural areas, drainage lines or wetlands.</i>				
<i>Fire on site must be prohibited.</i>				
<i>The use of construction vehicles and earth-moving equipment in steep areas must be avoided as far as possible.</i>				
<i>Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous grass species found in the area.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-7	3
EXTENT	2	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.</i>	Slightly Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-21	LOW NEGATIVE		
CONFIDENCE LEVEL				
Low				

(b) **Operational Phase**

(i) *Increased potential for electrocution of birds as a result of the presence of powerlines*

Electrocutions of birds may happen in two ways: (1) phase-to-phase electrocution by bridging the air gap between two live conductors, and (2) phase-to-earth electrocution by contact between a live conductor and earth device (pylon or pole), especially when the feathers are wet (Bevanger, 1998). A number of factors determine the likelihood of electrocutions including landscape features such as vegetation and topography, weather conditions, size of the bird, behaviour of the bird, and structure and dimensions of the pylon (Smallie *et al.*, 2009). Most bird electrocutions occur on lower voltage electricity pylons, where the gaps between conductors are small, and which are attractive perching and nesting alternatives to trees in otherwise open, flat areas. More electrocutions occur in rainy and/or misty weather conditions. Bird species that are prone to electrocution are larger perching species such as birds of prey (including vultures, medium and large bodied raptors, and smaller raptors such as falcon), storks and herons.

Table 5-48: Impact ratings for increased potential for electrocution of birds as a result of the presence of the powerlines

PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Increased potential for electrocution of birds, as a result of the presence of powerlines			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		

SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected</i>	Moderately Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>To avoid electrocution by large species, the vertical phase-earth clearance should be greater than 1.8m</i> <i>All jumpers at transformers, T-offs and strain structures must be insulated.</i>				
<i>Only pole structures that are approved as bird friendly by Eskom’s Proactive Bird Mortality Mitigation Strategy should be used (Annexure C).</i>				
<i>Anti-perching devices must be used at the sub-station and on pylons to deter birds from perching and nesting</i> <i>During operation, the sub-station must be monitored for electrocution occurrences and should this pose a problem then site-specific mitigation must be applied in consultation with the Endangered Wildlife Trust (EWT) /Eskom Partnership.</i>				
<i>This is only applicable to the 132kV powerline as the 11kV powerline is a buried cable</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary</i>	-7	2
EXTENT	2	<i>The extent of the impact is rated as footprint as it only affects the area where the proposed development will occur</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-14	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(ii) *Increased potential for collision of birds, as a result of the presence of powerlines*

Table 5-49: Impact ratings for increased potential for collision by birds, as a result of the presence of the powerlines

PROJECT PHASE		Operational Phase		
DIRECT IMPACT		Increased potential for electrocution of birds, as a result of the presence of powerlines		
INDIRECT IMPACT		--		
CUMULATIVE IMPACT		--		
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-21	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Highly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-63	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Lines must be routed alongside existing roads and tracks as far as possible.				
The use of anti-collision devices and flight diverters plays an integral role in mitigating the impacts of powerlines on avifauna. It has been found that the majority of collisions happen with the thinner earth wires as they are less visible than the conductors. Lines traversing open areas and sensitive habitats such as the iLovu River floodplain must be marked with anti-collision devices. Due to the fact that the proposed route does not follow any existing powerline servitudes and will pose as a new route in the landscape, it is recommended that the entire route be fitted with flight diverters. Bird flight diverters on the earth wires must be installed as per specifications devised by the EWT / Eskom Partnership (see Annexures A and B)				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last	-3	1

		<i>more than 5 years and as such is rated as Long Term</i>		
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-18	VERY LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(iii) *Altered hydrological processes, erosion and/or sediment regime of the nearby wetlands, as a result of maintenance activities*

The operational phase of the proposed powerline is assumed to pose a low risk to the remaining wetlands due to occasional maintenance required powerline once installed. The development of new roads to access the maintenance areas may lead to undue erosion and sedimentation, thereby altering the hydrological processes and sediment regime of the nearby wetlands.

Table 5-50: Impact ratings for altered hydrological processes, erosion and/sediment regime as a result of maintenance activities

PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Altered hydrological processes, erosion and/sediment regime of the nearby wetlands, as a result of maintenance activities</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	1	<i>The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary</i>	-6	3
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		

SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-18	VERY LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Soil rehabilitation should be conducted after the placement of the sewer line and power pylons to ensure that soils recover to a condition that is close to their natural state.</i>				
<i>Maintenance of pylons must be carried out as sensitively as possible to avoid negative impacts to the environment during access and repairs. Maintenance tracks and routes need to be formalised to avoid wetlands. No new access roads should be created, only existing roads should be utilised for maintenance purposes.</i>				
POST-MITIGATION				
DURATION	1	<i>The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary</i>	-3	1
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-6	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(iv) Altered ecological processes and biodiversity, as a result spread of alien invasive plant species

Following the completion of construction, there may be increased spread of alien invasive plant species within the wetland habitats, should there be improper solid waste removal and lack of rehabilitation of the construction site. Movement of people and vehicles during

maintenance activities may impact negatively on the wetlands, if equipment and vehicles carrying dirt/soil containing alien invasive plant seeds make their way on site.

Infestation by alien and invasive species will lead to degradation of the surrounding natural areas and will increase the potential of spread into the greater landscape due to propagules being released into downstream watercourses by stormwater.

Table 5-51: Impact ratings for altered ecological processes and biodiversity, as a result of alien invasive plant species

PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Altered ecological processes and biodiversity as a result of spread of alien invasive plant species			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-16	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-48	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
All vehicles and equipment, as well as maintenance material must be free of plant material before coming on site. Equipment and vehicles must be thoroughly cleaned prior to access to the construction site, especially close to the natural drainage lines and the iLovu River.				
The careful control of the dispersion of alien invasive vegetation within a wetland is imperative due to their degradation causing properties. The key to controlling the dispersion of alien vegetation is through early detection and removal. The removal and management of alien vegetation is essential in maintaining the ecological integrity of a wetland as well as its ability to maintain biodiversity (Richardson et al., 2007). An alien Plant Control Plan should				

be compiled and implemented. This includes details of removal as well as monitoring to ensure the alien plants are kept in control throughout the life of the activity.

IAP (Invasive Alien Plant) and weed control must take place within remaining wetland habitats and 20m buffer areas on site post onsite rehabilitation in accordance with an IAP control and management programme aligned with the NEM:BA Invasive Species regulations. Initial control and follow-up maintenance to take place. Integrated control (combination of mechanical and chemical control) to be implemented, with specific controls to be tailored to the species of IAPs to be managed (e.g. Chromolaena odorata, Lantana camara, Psidium guajava, Melia azedarach, Tecoma stans). Herbicide use to be controlled and herbicides or pesticides use to be restricted within delineated wetlands/riparian areas unless herbicides are non-toxic to watercourses and authorised for use in wetlands/rivers.

No further disturbances should be experienced by the wetland systems on site. Access should be restricted into wetland areas. Furthermore, during the operational phase, when maintaining and utilising existing roads, mitigation measures must be developed and implemented to inhibit further degradation of these wetland systems. In the event of an unexpected damage occurring this should be reported to the relevant authority immediately.

During the operational phase, the site must be searched for alien vegetation on a regular basis and all alien seedlings and saplings removed as they become evident. This must include the immediate surroundings where natural vegetation prevails.

POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-7	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-14	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(c) **Decommissioning Phase**

The proposed 11kV and 132kV transmission powerlines will not be decommissioned in the future, as it will be permanent electrical infrastructure that will be owned and maintained by the eThekweni Municipality. It is also not envisaged that the sewer pipeline will be decommissioned.

5.5 Access Roads Upgrades – Impact Assessment

5.5.1 Access Roads Upgrades

(a) Construction Phase

- (i) *Increased traffic congestion on the surrounding road network as a result of road upgrades within the study area to support the ASP Development*

Construction activities often have negative impacts on the communities surrounding the construction site and motorists. Impacts such as delays and congested traffic conditions caused by the additional traffic volume of construction vehicles and closure of lanes, increased safety hazards and economic losses may be experienced by the community. This impact will be of a short duration during the construction phase.

Table 5-52: Impact ratings for increased traffic congestion on the surrounding road network as a result of the proposed road upgrades

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Increased traffic congestion as a result of road upgrades in the vicinity of the ASP</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-30	LOW - NEGATIVE		

PROPOSED MITIGATION MEASURES				
<p><i>A Traffic Management Plan must be developed for implementation during the construction phase.</i></p> <p><i>Direct traffic flows during congestion and warn motorists of the upcoming construction zone by means of proper road signage.</i></p> <p><i>Inform neighbouring residential areas and businesses beforehand if excessively high noise generating activities are to be undertaken.</i></p> <p><i>Avoid construction before sunrise and after sunset. In the event of this not being possible, the information should be provided in the local media to ensure that people are aware that construction will be taking place at night. Improve the efficiency of construction operations by minimizing unexpected delays in the movement of materials and equipment to and from the construction site.</i></p> <p><i>Try to complete the construction process within the stipulated period. To avoid further inconvenience to the community affected.</i></p> <p><i>Flagsmen must be on duty to direct traffic flow during congestion and warn motorists of the approaching construction zones.</i></p>				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-15	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(ii) *Nuisance and inconvenience to the local community as a result of road upgrade activities during construction*

Inconvenience is one of the negative impacts that could be experienced by the community during construction. Nuisance impacts on the local community such as increased noise and dust pollution as a result of construction vehicles and the use of heavy equipment may occur. Safety hazards and occasional ground vibrations may also cause damage to nearby structures. This makes it imperative that these impacts are reduced to minimize the impact on the community.

Table 5-53: Impact ratings for nuisance and inconvenience to the local community as a result of road upgrade activities

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Inconvenience and nuisance to the local community, as a result of road upgrades			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-20	LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				

A traffic management plan has been developed and will be implemented during the construction phase of the project.

Noise suppression techniques will be used as far as practically possible.

Dust suppression will be implemented at the construction site.

Routes to divert the traffic will be according to the Traffic Management Plan as it proposes the most practical options for traffic to be diverted if required.

Construction hours will be limited to between sunrise and sunset where practically possible and there will be early notification to affected parties if there is likely to be significant disruptions in any given area.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-5	2
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Negligible	Likely
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-10	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
Medium				

(iii) Employment opportunities as a result of construction of the road access

Developments of the KZN ASP road upgrades are likely to positively impact the socio-economic environment through the creation of employment opportunities. It should be noted that these opportunities will be created only for the duration of construction (which could span 6 to 18 months) and, therefore, should be considered temporary in nature. Also, it should be noted that the geographic spread of these employment opportunities will be a function of the location of the companies appointed as service providers to undertake the required construction work. While a project of this nature is anticipated to create employment opportunities in the local area (AOI) and surrounding communities, the supply chains of the service providers will determine the localisation of these opportunities.

Table 5-54: Impact ratings for employment opportunities as a result of road upgrades

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Employment opportunities as a result of the road upgrades			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	12	3
EXTENT	4	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries		
SEVERITY	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected	Slightly Beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	36	LOW - POSITIVE		
PROPOSED MITIGATION MEASURES				
Labour intensive construction techniques will be used where practically possible.				
Local community members will be considered for employment.				
Skills training and capacity building will be implemented by the Contractor.				
Liaison with local labour organisations to improve sustainability.				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	18	3

EXTENT	4	<i>The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries</i>		
SEVERITY	3	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.</i>	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	54	MODERATE - POSITIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(iv) *Increased congestion as a result of the proposed upgrades during the construction phase*

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Impact on heritage resources as a result of the proposed construction activities</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or</i>	Slightly Detrimental	Definite

		<i>communities are negatively affected.</i>		
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-30	LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<p><i>The Traffic Management Plan for the construction phase must be implemented.</i></p> <p><i>Any disruptions to traffic must be clearly communicated to the surrounding affected parties.</i></p> <p><i>Routes to divert the traffic will be according to the Traffic Management Plan as it proposes the most practical options for traffic to be diverted if required.</i></p> <p><i>Construction hours will be limited to between sunrise and sunset where practically possible and there will be early notification to affected parties if there is likely to be significant disruptions in any given area.</i></p>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-5	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-15	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(v) *Impact on heritage resources as a result of the road upgrades*

The Heritage Impact Assessment did not record any graves or burial grounds along the proposed access routes to the proposed KZN ASP. However, the possibility of encountering human remains during subsurface earth moving works is considered to be very low because the entire landscape has been altered.

Although the possibility of encountering previously unidentified burial sites is low, should such sites be exposed during subsurface construction work, they are still protected by applicable legislations and they should be protected.

Table 5-55: Impact ratings for impact on heritage resources as a result of the construction of the proposed development

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Impact on heritage resources as a result of the proposed construction activities			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	1
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly Detrimental	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-10	VERY LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				

<i>The footprint impact of the proposed development should be kept to minimal to limit the possibility of encountering chance finds.</i>				
<i>A detailed heritage monitoring procedures are included in the project EMPr for the construction phase, include chance archaeological finds mitigation procedure in the project EMPr.</i>				
<i>The chance finds process will be implemented when necessary especially when archaeological materials and burials are encountered during subsurface construction activities.</i>				
<i>If archaeological materials are uncovered, work should cease immediately and the Amafa aKwaZulu Natali be notified and activity should not resume until appropriate management provisions are in place.</i>				
<i>If during the construction or operations phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefacts of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</i>				
<i>The site manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing Amafa aKwaZulu Natali</i>				
<i>If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and Amafa aKwaZulu Natali are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency rescue permit may be issued by Amafa aKwaZulu Natali for an archaeologist to exhume the remains.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-4	1
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Negligible	Unlikely
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-4	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vi) *Destruction of plant and animal species of conservation concern and protected plant species as a result of the proposed road upgrades*

Certain areas within the study area support populations of plant and animal species of conservation concern as well as provincially protected plant and animal species. Areas include

the coastal forest and road verges. Clearing of vegetation may require the destruction of these species and/or habitat for these species.

Table 5-56: Impact ratings for destruction of plant species of conservation concern and protected plant species as a result of the construction phase of the road upgrades

Impact Table: Construction of road upgrades				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Destruction of plant species of conservation concern and protected plant species			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-15	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-45	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
The construction footprint must be ground-truthed by a suitably qualified botanist prior to construction to identify any individual plants that will be impacted by the construction activities.				
Removal or trimming of individuals of species of conservation concern will require a permit that should be accompanied by a rehabilitation plan specifying either re-establishment or rescue and relocation to a suitable site.				
A permit from Ezemvelo KZN Wildlife (EKZNW) will be required to destroy or relocate any species of conservation concern or provincially protected plant species. A permit from the national authority (DAFF) will be required to remove, cut or destroy a nationally protected species.				

*As part of the development layout (proposed N2 interchange) affects the forest habitat in the north-eastern corner of the study area, it is recommended that a walk-through of the habitat edges to search for *Bradypodion melanocephalum* (KwaZulu Dwarf Chameleon) be undertaken by a suitably qualified ecologist or herpetologist prior to construction. If the species is detected, a site specific Species Management Plan including Search and Rescue Plan must be written by a suitably qualified herpetologist and implemented prior to construction.*

*The Critically Endangered and Protected *Hyperolius pickersgilli* (Pickersgill's Reed Frog) was given a medium likelihood of occurring in the study area. While this rare and localised species was not detected during the field surveys, it does not rule out the possibility of it occurring in the study area. It is therefore recommended that a follow-up survey be conducted by a suitably qualified herpetologist following good spring rains, prior to construction commencing, to confirm the absence/presence of the species.*

An independent Environmental Control Officer (ECO) must be appointed to oversee construction activities. The routing for the pipeline must remain within the road reserve.

Clearance of indigenous woody vegetation, especially in coastal bush must be avoided where possible. The removal of any indigenous vegetation must be limited as much as possible.

The removal or destruction of any threatened or protected plant species will require a permit from EKZNW or DAFF. Before vegetation clearance begins a suitably qualified botanist must undertake a walk-through of the route during the growing season to account for any such species that may have established.

Construction crew camps must not be located adjacent to any natural areas, drainage lines or wetlands.

Fire on site must be prohibited.

The use of construction vehicles and earth-moving equipment in steep areas must be avoided as far as Possible.

Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous grass species found in the area.

POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-8	3
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and</i>	Slightly Detrimental	Definite

		<i>valued, important, sensitive or vulnerable systems or communities are negatively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>No irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-16	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vii) *Increase in spread of alien invasive plant species as a result of construction phase of the road upgrades*

During construction, vegetation will be removed and soil disturbed through for the road upgrades. The seed of alien invasive species that occur on and in the vicinity of the construction area could spread into the disturbed and stockpiled soil and into adjacent natural areas. In addition, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds through dirt in tyres etc.

Table 5-57: Impact ratings for the spread of invasive alien plant species as a result of the proposed road upgrades

Impact Table Construction of road upgrades				
PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Increase and spread of invasive alien vegetation</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-15	3
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or</i>	Moderately detrimental	Definite

		<i>vulnerable systems or communities are substantially affected.</i>		
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-45	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Construction activities must remain within the footprint of the resulting layout plan. No additional natural vegetation must be removed or disturbed to minimise chances of invasion by alien vegetation</i>				
<i>An invasive alien plant species management and monitoring plan must be compiled by a suitably qualified botanist and implemented whereby all emergent invasive species are removed during construction. All alien seedlings and saplings must be removed as they become evident for the duration of construction. Manual or mechanical removal is required, the use of chemical and herbicides must be prohibited due to the sensitive environments downstream</i>				
<i>All construction vehicles and equipment, as well as construction material must be free of plant material. Equipment and vehicles must be thoroughly cleaned prior to access on to the construction site</i>				
<i>Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area</i>				
<i>An invasive alien plant species management and monitoring plan must be compiled by a suitably qualified botanist / rehabilitation specialist and implemented whereby the large alien plant infestations occurring in the valleys and natural areas around the platforms and infrastructure are eradicated and controlled</i>				
<i>All areas cleared of alien vegetation must be rehabilitated with appropriate indigenous plant species found in the area</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-8	2
EXTENT	1	<i>The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-16	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(viii) *Erosion and siltation of drainage lines, wetlands and downstream estuaries as a result of the construction phase of the proposed road upgrades*

During the construction phase, vegetation will be removed, and cut and fill slopes will be exposed. This coupled with the steep slopes within the study area will result in erosion during rainfall, and will cause siltation and clogging of the lower lying wetlands and wooded drainage lines, and eventual siltation of the estuaries downstream.

Table 5-58: Impact ratings for the erosion and siltation of drainage lines, wetlands, and downstream estuaries as a result of the proposed road upgrades

Impact Table: Construction phase of the proposed road upgrades				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Erosion and siltation of drainage lines, wetlands, and downstream estuaries			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
A detailed, ecologically sound stormwater management plan has been compiled by a suitably qualified stormwater engineer in consultation with the Wetland Specialist, Estuarine Ecologist and Biodiversity Specialist, to ensure storm water is managed in a way that does not cause erosion and siltation of downstream habitats, especially the sensitive estuaries.				

<i>During construction, the exposed cut and fill slopes and stock piles must be protected from erosion during rainfall events and high winds. This must be implemented strictly otherwise the impacts on the downstream habitats will be very high.</i>				
<i>During construction and operation, erosion must not be allowed to develop on a large scale before effecting repairs. A strict monitoring plan for erosion must be put in place during construction and operation.</i>				
<i>Following construction, all remaining areas that have been cleared of vegetation must be rehabilitated with appropriate indigenous plant species found in the area. Grass species are recommended to limit erosion potential.</i>				
<i>The stormwater design must include energy dissipaters and silt traps for water entering the natural areas</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(ix) Pollution of drainage lines, wetlands, and downstream estuaries as a result of the construction phase of the road upgrades

During the construction phase, potential spills from construction vehicles, general litter discarded by construction crews, and general construction waste have the potential to contaminate the natural areas. Hydrocarbons from construction vehicles, litter, and general construction waste will be washed into the soil and lower lying drainage lines and wetlands during rainfall. These will pollute the natural areas and the downstream estuaries.

Table 5-59: Impact ratings for the pollution of drainage lines, wetlands, and downstream estuaries as a result of the proposed road upgrades

Impact Table: Construction phase of proposed road upgrades				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Pollution of surrounding natural areas, downstream watercourses and estuaries			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
The construction crews must be educated in the importance of natural resources and must not litter or pollute such areas.				
Adequate disposal and toilet facilities must be provided on site during construction. All refuse generated by construction workers on site must be disposed of in an appropriate manner and removed from site in a regular basis.				
During construction, oil and fuel spills must be prevented with daily vehicle checks. Any spills must be attended to immediately.				
Stormwater channels / outlets must be fitted with litter traps, or litter screens at kerb inlets, which must be inspected and cleared on a regular basis.				
No effluent must be allowed to enter the natural areas.				

<i>Dumping of any form of waste in natural areas by construction workers. Penalties such as fines for non-adherence to this condition should be implemented.</i>				
<i>The development must be fenced to limit human access to the natural areas.</i>				
<i>Visual inspection and water quality monitoring must be undertaken during the construction phase. Immediate remedial action must be implemented in the event of a spill.</i>				
POST-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-10	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-20	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>Medium</i>				

(x) Loss of ecosystem services and ecological corridors

The natural areas within the study area provide essential ecosystem services such as filtering of water in the wetlands before it is transported through the landscape to lower lying areas, especially the estuaries. UCVB wetlands provide essential flood attenuating services and support storm water infrastructure for roads and development. The natural areas on site provide high habitat diversity for flora and fauna and therefore have high biodiversity value. The wooded habitat in the study area (including the coastal forest) support plant species of conservation concern and provincially protected species. The natural areas within the study area also provide essential ecological corridors for movement of fauna and flora through the landscape and between the two estuaries. These essential ecosystem services will be lost or diminished if the natural areas in the study area are destroyed.

Table 5-60: Loss of ecosystem services and ecological corridors as a result of the proposed road upgrades

Impact Table: Construction phase of the proposed road upgrades	
PROJECT PHASE	<i>Construction Phase</i>
DIRECT IMPACT	--

INDIRECT IMPACT	Loss of ecosystem services and ecological corridors			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-18	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-54	MODERATE NEGATIVE		
PROPOSED MITIGATION MEASURES				
Construction activities must remain within the footprint of the area (including construction camps, stock piles etc.).				
All mitigation measures that have been prescribed to prevent erosion, siltation, pollution, the spread of invasive alien plant species, and any other impact that will result in habitat degradation and depletion of ecosystem services must be adhered to.				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Slightly detrimental	Likely

IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(xi) *Altered hydrology, erosion and/sediment regime of wetlands as a result of vegetation clearance*

Vegetation will be cleared in areas adjacent to the proposed road upgrades, and bare surfaces will be exposed. As a result, portions of wetland habitat may be destroyed, erosion and sedimentation activities may become more prominent due to the presence of exposed bare surfaces and the resultant stormwater runoff entering the wetlands.

Table 5-61: Impact ratings for altered hydrology, erosion and sediment/regime of wetlands as a result of vegetation clearance

PROJECT PHASE	<i>Construction Phase</i>			
DIRECT IMPACT	<i>Altered hydrology, erosion and sediment/regime of wetlands as a result of vegetation clearance associated with the road upgrades</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	<i>The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term</i>	-15	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</i>	Moderately Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-45	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>An independent Environmental Control Officer (ECO) must be appointed to oversee construction.</i>				
<i>Implement effective rehabilitation to reverse construction related impacts.</i>				
<i>Avoid impacts to wetlands beyond the construction zone / footprint of the development.</i>				
POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-12	3
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-36	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(xii) *Reduced water quality of wetlands and downstream watercourses, as a result of accidental spillage of hydrocarbons*

Construction vehicles will be present giving rise to the possibility of potential fuel / chemical spills, and water pollution may occur from vehicle oil spills. Surface water pollution of the nearby wetlands and watercourses may occur from vehicle oil spills.

Table 5-62: Impact ratings for reduced water quality of wetlands and downstream watercourses

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Reduced water quality of wetlands and downstream watercourses			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-15	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-45	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				

An independent Environmental Control Officer (ECO) must be appointed to oversee construction.

As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the drainage line (Kotze et al., 2008). During the construction phase the recommended wetland buffer is 30m.

During the construction phase all measures should be taken in order to prevent contamination of wetland areas by vehicles utilised. If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.

Implement best-practice measures to control water pollution risks, including the handling and dispensing of fuels and chemicals.

All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. Additionally, materials not to be stockpiled within the buffer area; all materials should strictly be kept 30 m away from the watercourses on site. Furthermore, during the operational phase, when maintaining and utilising the road, mitigation measures must be developed and implemented to inhibit further degradation of these wetland systems. In the event of an unexpected damage occurring this should be reported to the relevant authority immediately.

An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to hand large spill events (e.g. SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation. Individual operational sites/companies will need to compile their own contingency/spill plans.

No equipment laydown or storage areas must be located within 20m of any watercourse and/or within the 1:100 year flood line of the iLovu and uMsimbazi Rivers.

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-12	2
EXTENT	2	The extent of the impact is rated as site as it will affect only the development area		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or	Slightly detrimental	Likely

		<i>vulnerable systems or communities are negatively affected</i>		
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-20	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(xiii) *Altered ecological processes and biodiversity of wetland habitat, as a result of alien invasive plant establishment*

During construction, there may be altered ecological processes and biodiversity caused by construction activity and the introduction of invasive alien plant species carried by construction vehicles and the lack of proper rehabilitation on site.

Table 5-63: Impact ratings for altered ecological processes and biodiversity of wetland habitat, as a result of invasive alien plant establishment

PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Altered ecological processes and biodiversity of wetland habitat			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-15	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	Moderately Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-45	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				

An independent Environmental Control Officer (ECO) must be appointed to oversee construction.

Surrounding natural vegetation must not be disturbed to minimise chances of invasion by alien vegetation.

An invasive alien plant species management and monitoring plan must be compiled by a suitably qualified botanist and implemented whereby all emergent invasive species are removed during construction.

During the construction phase, all alien seedlings and saplings must be removed as they become evident for the duration of construction and operational phase. Manual / mechanical removal is preferred to chemical control.

All construction vehicles and equipment must be thoroughly cleaned prior to access to the construction site, especially close to the natural drainage lines and the iLovu River.

The tyres of construction vehicles must be inspected before entering the site to ensure no soil material with alien invasive seeds are carried with it.

The focus of the rehabilitation of wetlands and watercourse is to ensure the re-establishments of what was the natural hydraulic regime as much as possible. Where the watercourse's hydraulic regime is improved, the vegetation will improve as well for the riparian habitat which can lead to the reintroduction of riparian specific species. It is, however, not possible to completely re-establish the natural hydrological regime at the catchment level as this is what is needed to improve the current state of the wetlands and watercourses. This is due to the comparatively small-scale site-specific construction at the point of the wetland and watercourse crossings. Nevertheless, the wetland areas and watercourses which are affected at the point of construction can be stabilised to make sure that the current functionality of the wetland and watercourse is not reduced, but restored. The main function of rehabilitation efforts must aim to restore the natural function and improve the aesthetic nature of the wetlands and watercourses.

On site rehabilitation measures to be implemented on site must be in accordance with those stipulated in the Onsite Wetland Rehabilitation Plan compiled by Eco-Pulse (2019).

POST-MITIGATION				
DURATION	2	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term	-10	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-3	The extent of the impact is rated as Local as it affects the development area and adjacent properties	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	No irreplaceable resources will be impacted.		
SIGNIFICANCE	-36	LOW - NEGATIVE		

CONFIDENCE LEVEL
High

(b) **Operational Phase**

(i) *Increased pressure on local roads as a result of the road upgrades*

Increased pressure on local roads is a threat to road safety in general, as it can shorten the life span of the road and lead to higher maintenance and repair costs on local residential roads. During the operation phase, road vehicle traffic is expected to increase, and this will lead to increased pressure on the existing road infrastructure. If this is not well planned and managed, negative impacts including reduced road safety can be expected.

Table 5-64: Impact ratings for increased pressure on local roads as a result of the proposed upgrades

Operation of road upgrades				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Increased pressure on local roads as a result of the proposed road upgrades			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	0	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	0	Negligible	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	Irreplaceable resources will be impacted.		
SIGNIFICANCE	0	VERY LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
It is unlikely that there will be any pressure on the local roads associated with the road upgrades.				
The purpose of the proposed upgrades is to ensure that the local roads can handle the traffic that will be generated as a result of the ASP Development.				
POST-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years	0	3

		<i>and as such is rated as Long Term</i>		
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	0	<i>Negligible</i>	Negligible	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	0	VERY LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(ii) Economic opportunities as a result of the proposed road upgrades associated with the ASP Development

The proposed road has an opportunity to create economic opportunities for the communities along the proposed routes. The informal traders in these areas may benefit from increased transient traffic. Also, increased traffic in this area has an opportunity to induce road upgrades on P578 and P197 roads to accommodate the increased traffic and the community, which would be a huge benefit to the community. The community may also benefit from the employment opportunities created by the establishment of the KZN ASP.

Table 5-65: Impact ratings for economic opportunities as a result of the proposed road upgrades

Operation of road upgrades				
PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Economic opportunities as a result of the proposed road upgrades</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	1	<i>The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved</i>	Slightly beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	21	LOW - POSITIVE		
PROPOSED MITIGATION MEASURES				
<i>Employ the local labour force for the operation of the KZN ASP.</i>				
<i>Consider providing a safe trading area/stall for local traders along the proposed routes or within the KZN ASP to induce the local economy of the community.</i>				
<i>The increased market as a result of the KZN ASP will increase the economy of Illovo beach.</i>				
<i>Rental housing would be in high demand in the area as a result of people that want to stay closer to their place of work. The community can offer rental accommodation.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	2	<i>The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected</i>	Moderately beneficial	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	42	MODERATE - POSITIVE		

CONFIDENCE LEVEL
High

(iii) *Potential health (air quality) impacts as a result of the proposed road upgrades*

Table 5-66: Impact ratings for health (air quality) impacts as a result of the proposed road upgrades

Operation of road upgrades				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Potential health (air quality) impacts as a result of the proposed road upgrades			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term	-8	3
EXTENT	3	The extent of the impact is rated as Local as it affects the development area and adjacent properties		
SEVERITY	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted.		
SIGNIFICANCE	-24	LOW - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Although vehicle-targeted air pollution measures reside with the national government (this may take the form of reformulation of fuels, retrofitting of catalytic converters and the establishment of emission standards to limit the discharge of air pollutants from new motor vehicles), it is may be necessary to implement measures that mitigate emissions from vehicles. This may include: <ul style="list-style-type: none">The requirement that vehicle suppliers or contractors ensure compliance with appropriate emission standards for their fleets.The requirement that all maintenance and repair of vehicles be carried out as prescribed by manufacturer in order to maximize combustion and reduce gaseous emissions.				
POST-MITIGATION				

DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-8	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-24	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(iv) *Impact on sensitive noise receptors as a result of traffic flows along the upgraded roads*

Table 5-67: Impacts of traffic noise on the sensitive receptors along the upgraded roads

Operation of road upgrades				
PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Increased noise impacts as a result of the upgraded roads</i>			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-12	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	<i>Slightly Detrimental</i>	<i>Definite</i>
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-36	LOW NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>There are no mitigation measures - n/a.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-12	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	<i>Slightly Detrimental</i>	<i>Definite</i>
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-36	LOW NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(v) *Ecosystem enhancement and decrease in alien plant infestations*

In order to enhance ecological infrastructure and strengthen ecosystem services in the landscape, the natural areas that fall within the development site can be rehabilitated and habitat restored to structurally sound forest and wetland. This restoration process must include the removal of all existing alien plant infestations from the wooded drainage lines, coastal thicket, and wetland areas, and include planting of appropriate indigenous species. This can become a positive impact, should the proposed development be authorised, and could help compensate for negative impacts.

Table 5-68: Enhancement of ecosystem services and ecological corridors as a result of road upgrades

NO MITIGATION REQUIRED				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	24	2
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	3	<i>The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected</i>	Highly beneficial	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	48	MODERATE POSITIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vi) *Altered hydrology, erosion and/or sediment regime, as a result of the proposed road upgrades*

During the operational phase of the proposed road upgrades, there will be increased hardened surfaces along these roads. The excess or improper management of stormwater may cause higher flows and velocities within watercourses causing erosion and sedimentation.

Table 5-69: Altered hydrology, erosion and/or sediment regime, as a result of increased hardened surfaces

Impact Table: Operation of road upgrades				
PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Altered hydrology, erosion and/sediment regime</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				

DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>Use the principles of Sustainable Urban Drainage Systems (SUDS) to inform storm water management design and implementation.</i>				
<i>Storm water will need to be managed appropriately during operation to ensure flows to downstream wetlands and estuaries mimic natural or pre-development levels.</i>				
<i>Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.</i>				
<i>In order to reduce the post-development flows back to pre-development flows, mitigation measures are required within the proposed development. Mitigation measures include for a combination of attenuation facilities and recommended SuDS methods on each proposed ERF, and in common areas within the development where MAJOR retention facilities have been proposed.</i>				
<i>Erosion protection in the form of Reno mattress, Gabion baskets, stone pitching or rip-rap to be constructed at all storm water discharge points, including downstream and upstream of crossings and attenuation facilities including spillway. The Resident Engineer on site to confirm locality, extent and type of the erosion protection required.</i>				
<i>Minimise high velocities by constructing wide channels, high roughness coefficient and semi-permeable where practically possible. Outlets to be designed to dissipate the high flow velocities to minimise the erosion potential.</i>				
<i>Minimise the number of cumulative discharge points from the proposed development and rather design more but smaller outlet points.</i>				
<i>Include stormwater detention facilities within the network, where practically possible.</i>				

Post-development peak flows to be attenuated back to Pre-development peak flows where practically possible. All proposed development to take place outside of the 1:50 year flood lines and the 1:100 year to be delineated on drawings.

POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	LOW -NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(vii) Reduced water quality of wetlands as a result of the proposed road upgrades

The presence of vehicles in the vicinity of watercourses may lead to oil spills. Furthermore, the water quality of surrounding wetlands may be significantly impacted if there is a leak in a vehicle, thereby causing extensive contamination of watercourses downstream. This can however be mitigated through appropriate infrastructure design to reduce risk of leaks, proper maintenance schedules and operational management plans, including contingency measures in the event of mechanical breakdown, spillage, etc.

Table 5-70: Reduced water quality of wetlands as a result of the adjacent road upgrades

Impact Table: Operation of road upgrades				
PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Reduced water quality of wetlands as a result of the proposed road upgrades</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>An independent Environmental Control Officer (ECO) must be appointed to oversee construction.</i>				
<i>As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the drainage line (Kotze et al., 2008). During the construction phase the recommended wetland buffer is 30m.</i>				
<i>During the construction phase all measures should be taken in order to prevent contamination of wetland areas by vehicles utilised. If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.</i>				
<i>Implement best-practice measures to control water pollution risks, including the handling and dispensing of fuels and chemicals.</i>				
<i>All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. Additionally, materials not to be stockpiled within the buffer area; all materials should strictly be kept 30 m away from the watercourses on site. Furthermore, during the operational phase, when maintaining and utilising the road, mitigation measures must be developed and implemented to inhibit further degradation of these wetland systems. In the event of an unexpected damage occurring this should be reported to the relevant authority immediately.</i>				
<i>An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to hand large spill events (e.g. SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation. Individual operational sites/companies will need to compile their own contingency/spill plans.</i>				
<i>No equipment laydown or storage areas must be located within 20m of any watercourse and/or within the 1:100 year flood line of the iLovu and uMsimbazi Rivers.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5</i>	-7	3

		<i>years and as such is rated as Long Term</i>		
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	LOW -NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

(viii) *Altered ecological processes and biodiversity of wetland habitat, as a result of alien invasive plant establishment*

There will be movement and disturbance within the site. Such a disturbance may give rise to the colonisation of invasive alien plants.

Shading impact on wetland vegetation associated with road bridges across wetlands may also occur. Whilst shading may result in reduced photosynthetic activity and favour shade-loving plants in some instances, the impact is likely to be relatively low given the degraded nature of the wetland vegetation present.

Table 5-71: Altered ecological processes and biodiversity of wetland habitat, as a result of alien invasive plant establishment

Impact Table: Operation of road upgrades				
PROJECT PHASE	<i>Operational Phase</i>			
DIRECT IMPACT	<i>Altered ecological processes and biodiversity of wetland habitat, as a result of invasive alien plant establishment</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-14	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		

SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Moderately detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-42	MODERATE - NEGATIVE		
PROPOSED MITIGATION MEASURES				
<i>In cases where natural vegetation will be cleared as a result of the movement of people or stockpiling of building materials, re-vegetation should take place. Preceding re-vegetation efforts occurring in cleared and degraded wetlands, it is essential that all solid wastes are removed from the HGM unit, as well as their immediate surroundings. Following the removal of solid waste, a mixture of indigenous species should be introduced (Peters and Clarkson 2012). The re-establishment of vegetation will enhance these systems’ capability to maintain biodiversity, it will aid in reducing the velocity and quantity of runoff waters into wetlands, the retardation of water movement though a wetland which will in turn assist with trapping sediment and improving the overall quality of water (Mullins, 2012). Where possible, vegetation should be cut to ground level rather than removing completely so as to assist with binding/stabilising the soil during land-clearing operations.</i>				
POST-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-7	3
EXTENT	3	<i>The extent of the impact is rated as Local as it affects the development area and adjacent properties</i>		
SEVERITY	-1	<i>The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected</i>	Slightly detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	0	<i>No irreplaceable resources will be impacted.</i>		
SIGNIFICANCE	-21	LOW -NEGATIVE		
CONFIDENCE LEVEL				
High				

5.6 Cumulative Impacts

5.6.1 Natural habitat and landscape degradation

The landscape of the study area is mostly transformed and modified by anthropogenic activities such as large scale sugar cane production, roads, settlement, light industry, and a landfill site. The N2 highway borders the site on the east side and the major route P197 on the west side. The existing P491 municipal road is constructed within the uMsimbazi Estuary on the southern border of the site. This small road is in disrepair and is used for illegal dumping of refuse, building rubble, garden refuse, and other waste, especially on the section on eastern side of the N2. These activities and structures have placed immense pressure on the surrounding natural areas in the landscape.

As discussed, the natural areas within the study area provide essential ecosystem services such as water filtration, flood attenuation, ecological corridors and habitat for biodiversity. Further impacts caused by the proposed development will add cumulatively to existing impacts, and will lead to habitat degradation and erosion of the ecological infrastructure that provides the ecosystem services, at a landscape scale.

Table 5-72: Impact ratings for the cumulative impacts of natural habitat and landscape degradation

Impact Table				
PROJECT PHASE	<i>Construction and Operational Phase</i>			
DIRECT IMPACT	--			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	<i>Natural habitat and landscape degradation</i>			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	<i>The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term</i>	-27	3
EXTENT	4	<i>The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries</i>		
SEVERITY	-3	<i>The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected</i>	Extremely Detrimental	Definite

IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-81	VERY HIGH NEGATIVE		
PROPOSED MITIGATION MEASURES				
<p><i>The current development layout and features of the layout are designed to minimise impacts on the surrounding natural areas,</i></p> <p><i>Construction activities must remain within the footprint of the current layout and the construction footprint including service roads, construction camps, stock piles etc. must stay out of all areas containing natural vegetation and areas marked medium-high and highly sensitive.</i></p> <p><i>All mitigation measures that have been prescribed to prevent erosion, siltation, pollution, the spread of invasive alien plant species, loss of ecological corridors, and any other impact that will result in habitat degradation and depletion of ecosystem services must be adhered to.</i></p> <p><i>The existing P491 road on the southern border of the site, especially the section on eastern side of the N2, should be decommissioned and the area rehabilitated back into the estuary</i></p>				
POST-MITIGATION				
DURATION	3	<i>The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term</i>	-12	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	<i>Slightly Detrimental</i>	<i>Likely</i>
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-24	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

5.6.2 Material reduction in estuarine biodiversity on the iLovu and uMsimbazi Estuaries during the construction and operational phase of the ASP

The direct impacts of changes in the quantity and quality of water reaching estuaries and mouth dynamics changes together with the impacts that may arise from light and noise disturbance and will have a cumulative negative effect on overall estuarine biodiversity.

Table 5-73: Impacts to the estuarine biodiversity on the iLovu Estuary during the construction phase of the ASP

Impact Table:				
PROJECT PHASE	Construction Phase and Operational phases			
DIRECT IMPACT				
INDIRECT IMPACT				
CUMULATIVE IMPACT	Changes to water quality, quantity, mouth function and disturbance on the iLovu and uMsimbazi Estuaries are all direct impacts which result from the construction and operation of the ASP			
DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	4	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long-term Term	-20	3
EXTENT	5	The extent of the impact is rated as National as it affects extends beyond two regional/provincial boundaries		
SEVERITY	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected	Highly Detrimental	Definite
IMPACT ON IRREPLACEABLE RESOURCES	1	Irreplaceable resources will be impacted		
SIGNIFICANCE	-60	HIGH - NEGATIVE		
PROPOSED MITIGATION MEASURES				
Mitigation of the water quantity changes by implementation of the stormwater plan.				
Improvement in the estuary habitats within the EFZ by rehabilitation of Site A and onsite rehabilitation of wetlands				
Implementation of a good water quality management programme including monitoring of water quality within the stormwater infrastructure				
Retention dams and other stormwater infrastructure should be put in place to avoid major changes to runoff volume and velocity.				
Wetland rehabilitation, restoration and management should be carried out as soon as possible during or immediately following construction. This will serve to protect streams and aquatic habitats which feed into or are within the EFZ.				
Appropriate environmentally sensitive management rules regarding lights and noise on the site need to be integrated into the environmental management plan				
No material from the cut and fill operation should be dumped or stored in the wetland/estuary areas.				

POST-MITIGATION				
DURATION	3	<i>The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term</i>	-12	2
EXTENT	2	<i>The extent of the impact is rated as site as it will affect only the development area</i>		
SEVERITY	-2	<i>The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected</i>	Slightly Detrimental	Likely
IMPACT ON IRREPLACEABLE RESOURCES	1	<i>Irreplaceable resources will be impacted</i>		
SIGNIFICANCE	-24	LOW - NEGATIVE		
CONFIDENCE LEVEL				
<i>High</i>				

5.7 No-Go Alternative

The “No-Go” alternative refers to the alternative of not embarking on the proposed project. This alternative would imply that the current biophysical and socio-economic environment will prevail.

Without the proposed establishment of the industrial township for the proposed ASP and associated land uses, the status quo as it currently exists, would remain. Thus, in the absence of the proposed development, there would be no provision to realise the goals of the South African Automotive Masterplan (SAAM) to 2035. This Masterplan is intended to develop a clear, strategic roadmap for the development of the South African automotive industry through to 2035 (Barnes & Black, 2017). The SAAM’s 2035 vision is the achievement of “a globally competitive and transformed industry that actively contributes to the sustainable development of South Africa’s productive economy, creating prosperity for industry stakeholders and broader society.”

The four components of global competitiveness, industry transformation, sustainable development, and societal contribution represent the aspirational heart of the SAAM vision (Barnes & Black, 2017). Firstly, should the no-go alternative be implemented, there will be no initiative for the South African automotive industry to be globally competitive (relative to leading international automotive producers). The second component relates to the industry’s contribution to the transformation of the South African economy. This encompasses multiple elements, from employment equity to the greater inclusion of Black-owned firms within the automotive value chain. The no-go alternative will not lead to an impetus for this to be realised.

The third component relates to the sustainable development of the South African economy. The critical elements encompassed within this component relate to the growth of the industry, employment provided, skills developed, and the improved environmental impact of products and production processes. The final component relates to the shared prosperity created by the industry, with the critical elements here comprising the financial health and wellbeing of firms within the value chain, fair employee remuneration, and the broader contribution of the value chain to the South African fiscus. In light of the vision of SAAM, the no-go option is therefore not feasible at this stage.

The Automotive industry plays a significant role in social and economic development and therefore the Government has recognised that vehicle production and component manufacturing are important in creating new sustainable employment opportunities across the automotive value chain and enhancing the trade balance of SA. Should the proposed development not be approved, these objectives would not be attained.

5.8 Environmental Impact Statement

Upon consideration of the impacts associated with the development a number of aspects need to be kept in mind:

- Impacts are associated separately in terms of the proposed layout, sewer pipeline alignment, powerline alignment and proposed road upgrades and the table below are presented accordingly;
- The site is currently utilised for sugar cane cultivation which has historically had an impact on the wetland areas on and abutting the site;
- The proposed development will in itself further impact on environmentally sensitive areas however extensive rehabilitation plans are proposed as part of this Application for Environmental Authorisation as well as the associated application for a Water Use License. The EAP recognises however that an environmental benefit cannot be counterbalanced against an environmental cost;
- The EAP acknowledges the benefits of job creation throughout the construction and operational phases of the develop; and
- The EAP further recognises the impact on local traffic patterns and the sense of place.

The tables to follow is thus a summary of all impacts identified as part of the impact assessment process and through specialist studies. Chapter 6 will consolidate the impacts in a discussion around the residuals risks of the project and the consequences to be considered for decision making.

Table 5-74: Summary of Potential Impacts and their associated significance for the sewer pipeline and layout of the development (stand-alone)

Sewer pipeline and layout impacts		
Impact	Significance before mitigation	Significance after mitigation
Construction Phase		
Disturbance by increased noise and lights to the ecological corridors and the iLovu and uMsimbazi Estuaries (this is an impact influencing predominantly) the water bird component of estuaries	High negative	Low negative
Permanent loss of wetland habitat as a result of construction of platforms	High negative	Moderate
Ecological linkages become broken across the site and between the adjacent ESAs and the iLovu and uMsimbazi Estuaries	High negative	Moderate Positive
Loss of Ecological Support habitats of the uMsimbazi Estuary	High negative	Low negative
Destruction of plant species of conservation concern and protected plant species	High negative	Low negative
Increased informal dwellers as a result of construction activities at the site for development	Low negative	Very low negative
Increased criminal activity as a result of construction activity	Low negative	Very low negative
Impact of foreign direct investment as a result of the KZN ASP development	Moderate Positive	Moderate Positive
Impact of Urban renewal	Moderate Positive	Moderate Positive
Operational Phase		
Impacts on aquatic taxa sensitive to changes in water quality, due to accidental spillage of sewage	High negative	Very low negative
Impacts of sewerage spills or contamination on the iLovu and uMsimbazi Estuaries	High negative	Very low negative
Reduced water quality of wetlands as a result of sewerage spills	High negative	Very Low negative
Pollution of the vadose zone and regional water table / groundwater aquifer, as a result of broken sewer lines	Moderate negative	Very low negative
Water quantity changes as a result of modification of the local catchment with extensive areas of hardened and impervious surfaces.	Very high negative	low negative
Water quality changes as a result of pollutants being carried by runoff to the iLovu estuary with highly polluted urban stormwater flushing across hardened surfaces.	Very high negative	low negative
Water quality changes as a result of pollutants being carried by runoff to the uMsimbazi estuary with highly polluted urban stormwater flushing across hardened surfaces.	Very high negative	low negative

Sewer pipeline and layout impacts		
Impact	Significance before mitigation	Significance after mitigation
Disturbance by increased noise and lights to the ecological corridors and the iLovu estuary (this is an impact influencing predominantly the water bird component of estuaries)	Moderate negative	Low negative
Aesthetic impacts on the iLovu and uMsimbazi Estuaries	Moderate negative	Moderate negative
Altered hydrology, erosion and / sediment regime of wetlands	Moderate negative	Low negative
Permanent change of visual character on the nearby receptors	Moderate negative	low negative
Loss of agricultural land as a result of the proposed development	High positive	High positive
Increased pressure on municipal services and existing community facilities	High negative	Low negative
Expanded manufacturing base	Moderate positive	Moderate positive
Increased contribution to municipal rates as a result of change of land use activities	High positive	High positive

Table 5-75: Summary of Potential Impacts and their associated significance for the 11kV and 132kV powerlines

11kV and 132kV Powerline Development	Preferred	
Impact	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE		
Increased erosion potential and siltation of downstream watercourses due to construction and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Changes to stream flow characteristics as a result of excavation activities and compaction of soil due to construction vehicle movements and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Increase in sedimentation and turbidity due to the clearing of vegetation through or in the vicinity of watercourses and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Degradation of water quality of non-perennial and perennial river systems situated downstream of the site, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Pollution of vadose zone and regional water table / groundwater aquifer during soil excavations / construction activities	low negative	Very low negative

11kV and 132kV Powerline Development	Preferred	
Impact	Significance before mitigation	Significance after mitigation
Increased potential for soil erosion, caused by removal of vegetation during construction and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Altered hydrology, erosion, and/sediment regime as a result of construction of the powerline and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Reduced water quality of wetlands and watercourses, as a result of construction activities and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Altered ecological processes and biodiversity of wetland habitat as a result of increased spread of invasive alien plant activities and associated infrastructure developments (e.g. pipeline, site layout)	Moderate negative	low negative
Impact on heritage and archaeological resources as a result of construction activities	Very low negative	Very low negative
Increased noise generation due to construction activities and the movement of construction vehicles and associated infrastructure developments (e.g. pipeline, site layout)	Low negative	Very low negative
Increase in ambient dust levels and air emissions, due to construction activities and associated infrastructure developments (e.g. pipeline, site layout)	Low negative	Very low negative
Increased traffic caused by construction of the proposed powerline the movement of construction vehicles and associated infrastructure developments (e.g. pipeline, site layout)	Low negative	Very low negative
Skills transfer and capacitating of local communities during construction	Very low positive	Moderately positive
Disturbance / destruction of indigenous vegetation including protected species	Moderate negative	low negative
OPERATIONAL PHASE		
Increased potential for electrocution of birds, as a result of the presence of powerlines	Moderate negative	Very low negative
Increased potential for collision of birds, as a result of presence of the powerlines	High negative	Very low negative
Altered hydrological processes, erosion and/sediment regime of the nearby wetlands, as a result of maintenance activities	Very low negative	Very low negative
Altered ecological processes and biodiversity as a result of spread of alien invasive plant species	Moderate negative	Very low negative
DECOMISSIONING PHASE		

11kV and 132kV Powerline Development	Preferred	
Impact	Significance before mitigation	Significance after mitigation
The proposed 11kV and 132kV transmission powerlines will not be decommissioned in the future, as it will be permanent electrical infrastructure that will be owned and maintained by the eThekweni Municipality. It is also not envisaged that the sewer pipeline will not be decommissioned.		

Table 5-76: Summary of Potential Impacts and their associated significance for Access Road Upgrades

Access Road Upgrades	Preferred Alternatives	
Impact	Significance before mitigation	Significance after mitigation
CONSTRUCTION PHASE		
Increased pressure on local roads and traffic congestion	Low negative	Very low negative
Inconvenience and nuisance to the local community	Low negative	Very low negative
Economic opportunities	Low positive	Moderate positive
Impact on heritage resources as a result of the proposed construction activities	Very low negative	Very low negative
Destruction of plant species of conservation concern and protected plant species	Moderate negative	Very low negative
Increase and spread of invasive alien vegetation	Moderate negative	Very low negative
Erosion and siltation of drainage lines, wetlands, and downstream estuaries	Moderate negative	Low negative
Pollution of surrounding natural areas, downstream watercourses and estuaries	Moderate negative	Low negative
Loss of ecosystem services and ecological corridors	Moderate negative	Low negative
Altered hydrology, erosion and sediment/regime of wetlands as a result of vegetation clearance	Moderate negative	Low negative
Reduced water quality of wetlands and downstream watercourses	Moderate negative	Low negative
Altered ecological processes and biodiversity of wetland habitat	Moderate negative	Low negative
OPERATIONAL PHASE		
Increased pressure on local roads	Very low negative	Very low negative
Economic opportunities	Low positive	Moderately positive
Potential health (air quality) impacts	Low negative	Low negative
Increased noise impacts	Low negative	Low negative

Access Road Upgrades	Preferred Alternatives	
<i>Impact</i>	<i>Significance before mitigation</i>	<i>Significance after mitigation</i>
Ecosystem enhancement and decrease in alien plant infestations	Moderate positive	moderate positive
Altered hydrology, erosion and/sediment regime	Moderate negative	Low negative
Reduced water quality of wetlands	Moderate negative	Low negative
Altered ecological processes and biodiversity of wetland habitat, as a result of invasive alien plant establishment	Moderate negative	Low negative

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6 CONSEQUENCES

6.1 Defining the Implications of the Impacts for Decision-Making

In the specialist studies, impacts were defined as a potential change to the environment as a result of the construction or operation of the proposed project. From twenty-nine specialist studies, as well as the identification of impacts by the EAP during the Basic Assessment process, a myriad of potential impacts were identified and significance ascribed to each of those impacts, as the EIA regulations require.

In order to provide simplification, it is necessary to recognise that many of the impacts presented in the preceding chapter, are in fact a series of changes that result in one overarching consequence. For example increased alien vegetation, increased soil erosion and pollution of watercourses are all presented as separate impacts but the consequence of all the impacts is to potentially result in a material reduction of the environmental quality. It is this consequence that is central to the decision making process.

As such, the approach has been to interrogate the specialist studies and identify and describe the collective implications of all the impacts presented. In the process a distinction is then made between the collective implication of the various impacts (e.g. material reduction of environmental quality) and the causes of the implication (e.g. increased alien vegetation, increased soil erosion and pollution of watercourses etc.). These implications have then been presented as either potential environmental costs (where the implications are negative) or as potential environmental benefits (where the implications are positive). Please refer to the figure below for an illustration of consequences derived from various impacts as will be discussed in the sections to follow.

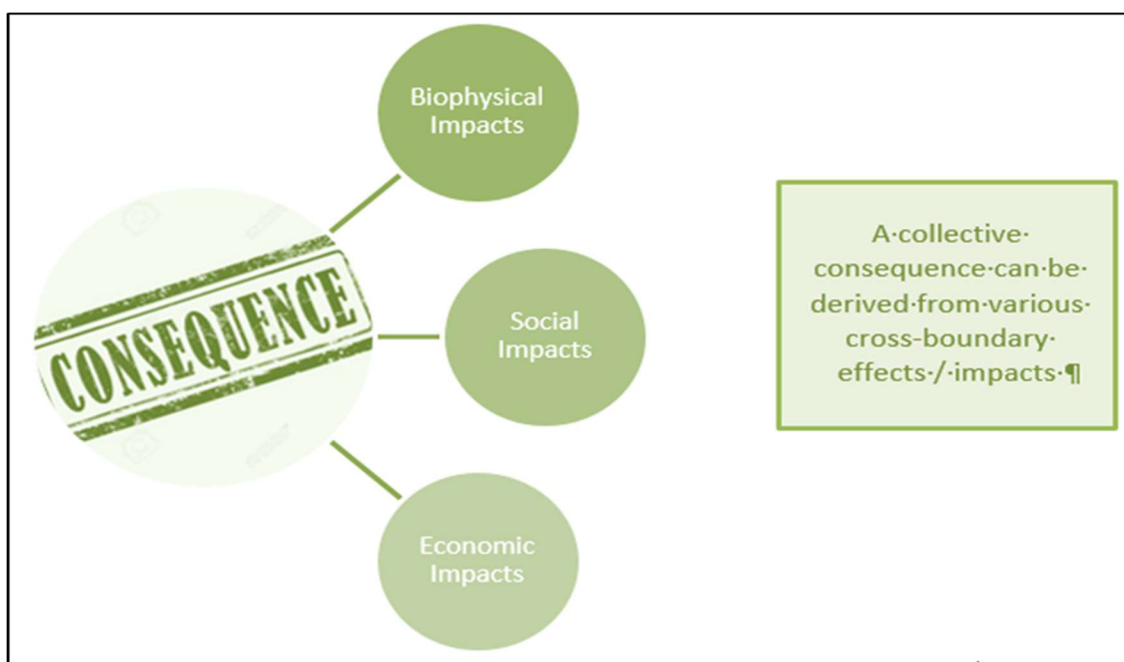


Figure 6-1: Illustration of Consequences Derived from Various Impacts

6.1.1 Environmental Costs

The following potential environmental costs have been identified from the specialist studies that were conducted for the Basic Assessment on the proposed development:

- Social Reductions / Deteriorations
 - Nuisance (Noise, Aesthetics, Traffic, Dust, Landowner Disturbance etc.)
 - Loss of Heritage Features
 - Reduction of Livelihoods
 - Social Ills and Diseases (Increased Morbidity)
 - Traffic Congestion
- Biophysical Reductions / Deteriorations
 - Material Reductions in Environmental Quality resulting from the following:
 - Destruction of Indigenous Vegetation and Protected Plant Species
 - Spread of Alien invasive Plant Species
 - Erosion / Sedimentation / Turbidity
 - Reduced Water Quality of Wetlands, Watercourses and Water Resources including the iLovu and uMsimbazi Estuaries and Groundwater Resources.

6.1.2 Potential Environmental Benefits

The following potential benefits have been identified from the specialist studies that were conducted for the proposed development:

- Socio-Economic Benefits:
 - Improved human Welfare and Opportunities to Create Livelihoods
 - Investment and Upskilling of the Local Community
 - Skills transfer and capacity building in local community
- Biophysical Benefits:
 - Ecological Linkages
 - Onsite Wetland Rehabilitation
 - Ecosystem Enhancement and a Decrease in Alien Plant Infestations
 - Increased Protection of Critical Biodiversity Areas.

6.1.3 Nuisance

Nuisance was determined to be a **MODERATE** inherent risk. The most significant causes of irritation and nuisance to surrounding residents is listed as follows:

- Noise Generation
- Change in Aesthetics/Sense of Place
- Unacceptable Social Behaviour
- Dust/deterioration of air quality
- Traffic congestion

(a) Noise Generation

Noise will result from the movement of vehicles, trucks and other associated machinery used during the construction phase. However, the noise associated with construction activities will be of short term, localised and will only last during the construction phase of the project.

The noise impacts will have very low significance, provided the recommended mitigation measures are implemented.

(b) Dust/deterioration of air quality

Construction related environmental pollution impacts due to possible dust pollution and increased vehicle exhaust emissions may arise. The appointed Contractors will be responsible for ensuring the health and safety of their employees, in line with the requirements of the Occupational Health and Safety Act. Such compliance will, by extension, protect / limit exposure of the surrounding residents to environmental pollution impacts.

(c) Change in Aesthetics/Sense of Place

The presence of construction vehicles, equipment and construction rubble / stockpiles may be unsightly if no proper mitigation measures are in place. However, this impact will be of a short-term duration and will only take place during the construction phase.

(d) Unacceptable Social Behaviour

This impact is defined as types of behaviour that may be considered deviant or antisocial, such as excessive alcohol consumption, illegal drug use, prostitution, petty crime and vandalism. It is expected that this potential impact would only occur to a certain degree during the construction phase. There is a risk that the presence of “incoming” workers and or the influx of jobseekers can exacerbate deviant social behaviour in the communities they occupy.

(e) Traffic Congestion

It is anticipated that the project may have a short-term negative impacts on the local road network, as a result of the closure of lanes where construction will take place during development. However, this will be a short-term impact as it will only take place during construction. This may lead to traffic congestion and delays, as well as inconvenience and frustration for road users, especially the residents.

Based on all of the causes above, the residual risk was calculated to be Moderate to Low (Table 6-1)

Table 6-1: The Residual Risk of Nuisance

Environmental Cost	NUISANCE		
Inherent risk (before mitigation)	MODERATE		
Risk after mitigation	LOW		
Causes of risk	Likelihood of causes		
	ASP	SEWERLINE	11kV Powerline
	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK
Noise	Moderate-Likely=Moderate	Moderate-Likely=Moderate	Moderate-Likely=Moderate
Aesthetics/Sense of Place	Moderate – Definite=Moderate	Moderate – Definite=Moderate	Moderate – Definite=Moderate
Unacceptable Social Behaviour	Low-Likely=Low	Low-Likely=Low	Low-Likely=Low
Traffic congestion	Low – Definite=Low	Low – Definite=Low	Low – Definite=Low
Dust generation/air quality	Low – unlikely=Low	Low – unlikely=Low	Low – unlikely=Low
Overall Residual Risk	Moderate-Low	Moderate-Low	Moderate-Low

6.1.4 Heritage Resources

The environmental cost of a loss of Heritage Resources is a **LOW** inherent risk.

Heritage sites have special attributes which contribute to the cultural identity of a local population and of humanity as a whole. Heritage sites may be related to religious and cosmological beliefs, constitute a source of aesthetic inspiration, can provide wildlife sanctuaries and form the basis of important local traditions.

The proposed development site comprises a hugely modified landscape in terms of heritage significance due to extensive sugar cane cultivation and existing infrastructure such as roads and services infrastructure.

If any items or artefacts deemed to have any significant importance are uncovered during the construction phase of the project, the necessary actions as outlined within this report must be implemented.

The consequence associated with the impact on heritage is Negligible, the likelihood of the Loss of Heritage Resources was considered to be Unlikely, resulting in a Low residual risk.

Table 6-2: The Residual Risk of Heritage Resources

Environmental Cost	HERITAGE		
Inherent risk (before mitigation)	LOW		
Risk after mitigation	VERY LOW		
Causes of risk	Likelihood of causes		
	ASP	SEWERLINE	Powerlines
	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK
Degradation of Heritage and Archaeological Resources	Very Low – Unlikely=Low	Very Low – Unlikely=Low	Very Low – Unlikely=Low
Overall Residual Risk	Low	Low	Low

6.1.5 Temporary Reduction in the Creation of Livelihoods during the Construction Phase

At its simplest, livelihood is defined as a 'means of securing the necessities of life' and there is concern that the proposed project will have the effect of reducing people's livelihood. Reduction in livelihoods was therefore determined to be **MODERATE** inherent risk.

The most significant causes of a potential reduction in livelihoods in the surrounding community were grouped as follows:

- Influx of temporary workers and their impact on the local community
- Social ills and diseases (increased morbidity)
- Concerns about governance, transparency and equal benefit

(a) Influx of temporary workers, Social Ills and Diseases

Construction projects often attract optimistic work seekers from near and far that are looking for opportunities to improve their living standard through employment. Rumour of a proposed development is often enough to make people decide to move to the area.

Construction companies often have a core skill of labourers with specialised skills that travel with them from site to site. The in-migration of people to an area is often associated with a number of social ills, such as drug and alcohol abuse, unwanted pregnancies, increase in crime, increase in sexually transmitted diseases and HIV/AIDS, cultural changes and additional pressure on infrastructure. Given that there are several vulnerable groups in the area, the potential impact of social ills on these groups is an additional concern.

The Client will need to make a concerted effort to make preferential use of local labour for low / unskilled positions as well as create awareness regarding the potential concerns that may arise in local communities should an influx for temporary workers be experienced in the area.

Furthermore, there could be a rise in informal settlements. The local authorities must be vigilant of the potential for this to take place and plan accordingly. Criminal activities may also rise with the influx of people to the area. From the outset, there should be sustained stakeholder engagement sessions with the surrounding communities, tribal authorities, councillors and any other relevant stakeholders to make clear the availability of employment opportunities that may or may not arise as a result of the development of the KZN ASP so as to ensure there are no unrealistic expectations regarding employment opportunities.

(b) Concerns about Governance, Transparency and Equal Benefit

Proposed projects and developments often generate uncertainty, anxiety or fear and sometimes, the impacts perceived in anticipation of the planned intervention, can be greater than the impacts that ultimately result from the intervention. The risk is likely for this project.

These impacts include uncertainty, annoyance, dissatisfaction due to a failure of the project to deliver promised benefits and an experience of moral outrage.

Based on all of the causes above, the likelihood of Reduction in Livelihoods occurring was determined to be Likely resulting in a Low residual risk.

Table 6-3: The Likelihood of Reduction in Livelihoods

Environmental Cost	REDUCTION IN LIVELIHOODS		
Inherent risk	MODERATE		
Risk after mitigation	VERY LOW		
Causes of risk	Likelihood of causes		
	ASP	SEWERLINE	11kV Powerline
	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK
Influx of temporary workers and job seekers	Very Low – Likely=Low	Very Low – Likely=Low	Very Low – Likely=Low
Social ills and diseases (increased morbidity)	Very Low – Likely=Low	Very Low – Likely=Low	Very Low – Likely=Low
Overall Residual Risk	Low	Low	Low

6.1.6 Material Reductions in Terrestrial Ecology

Material reductions in biophysical environmental attributes constitutes a **HIGH** inherent risk. The potential material reductions in terrestrial ecology will be brought about by the combination of disturbance to the critically endangered vegetation types, the loss of indigenous vegetation during vegetation clearance activities as well as the degradation of sensitive watercourse features situated throughout the study area.

The most significant causes of a potential reduction in material reductions in biophysical environmental attributes were as follows:

- Destruction of indigenous vegetation and faunal habitat
- Spread of alien invasive plant species
- Changes to ecological linkages and overall biodiversity of terrestrial ecosystems, freshwater ecosystems and estuaries
- Destruction of plant species of conservation concern and/ protected plant species
- Loss of ecosystem services and ecological corridors
- Permanent loss of wetland
- Pollution of drainage lines, wetlands, downstream watercourses and estuaries
- Altered hydrological processes, water quantity changes, erosion / sedimentation regimes
- Loss of ecosystem services and ecological corridors
- Change in quality and quantity of hydrological attributes of the estuaries

The detailed impact assessment indicates that the overall significance of the impact significance associated with the above impacts can be mitigated to low negative significance.

Based on all of the causes above, the likelihood of Material Reductions in Biophysical Environmental Attributes was determined to be Definite to Likely with a low consequence after mitigation therefore a Low Residual Risk

Table 6-4: The Likelihood of Biophysical Reductions / Deteriorations

Environmental Cost	BOPHYSICAL REDUCTIONS/DETERIORATIONS		
Inherent risk	HIGH		
Risk after mitigation	LOW		
Causes of risk	Likelihood of causes		
	ASP	SEWERLINE	Powerlines
	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK
Disturbance of species constituting conservation value	Low-Likely=Low	Low-Likely=Low	Low-Likely=Low
Loss and disturbance of indigenous vegetation	Low-Definite=Low	Low-Definite=Low	Low-Definite=Low
Degradation of sensitive watercourse features	Low-Definite=Low	Low-Definite=Low	Low-Definite=Low
Spread of alien invasive plant species	Low-Likely=Low	Low-Likely=Low	Low-Likely=Low
Erosion / sedimentation / turbidity	Low-Likely=Low	Low-Likely=Low	Low-Likely=Low
Loss of ecosystem services and ecological corridors	Low-Likely=Low	Low-Likely=Low	Low-Likely=Low
Overall Residual Risk	Low	Low	Low

6.1.7 Improved Environmental Quality

Improved environmental quality associated with the proposed development has been determined to constitute a **MODERATE** inherent benefit, involving the following main activities.

(a) Ecological linkages/corridors between the two estuaries

The proposed development layout avoids construction of platforms in the steep valleys and other areas supporting natural vegetation. However, should the construction footprint extend beyond the current development footprint, there could be destruction and degradation of the natural vegetation. In addition, edge effects from construction activities are expected. These natural areas comprise high species richness and support populations of plant species of conservation concern as well as provincially protected plant species. These habitats also perform important functions as ecological corridors and habitat filtration mechanisms as wooded drainage lines upstream of the uMsimbazi and iLovu Estuaries. The uMsimbazi Estuary is a biodiversity hotspot and the iLovu Estuary is also a significant ecological asset. With the ecological linkages proposed between the two estuaries i.e. construction of culverts within the central boulevard on site, the impact will be moderate positive as it will facilitate the improvement in stream and wetland function and linkages with the estuary habitat, carrying capacity and aquatic migration routes.

(b) Wetland rehabilitation for the direct loss of wetland habitat and ecosystem services provided by the wetlands on the development property

The losses within the iLovu catchment can be mitigated through the rehabilitation of Site A, as identified by Eco-Pulse (2019), and nett-gain is achieved within the landscape. Impacts within the uMsimbazi catchment can be mitigated through the rehabilitation of the valley-bottom wetlands within the greater study site. The reduced extent of the KZN ASP contributed to the significance being reduced from Moderate to Low mitigation. The incorporation of the SUDS within the development layout would further assist in addressing the slight functional target deficit, as it is anticipated that the run-off entering the systems from the development site would be cleaner. Furthermore, the rehabilitation of the valley-bottom wetlands within the greater study site will also assist in buffering the impacts associated with the ongoing agricultural activities on the uMsimbazi estuary.

(c) Decommissioning of the P491 Road

The provincial road P491, which is in a state of disrepair, is situated within the Estuarine Functional Zone of the uMsimbazi Estuary and is currently responsible for a number of negative impacts on the estuary and biophysical environment surrounding it. Negative impacts include the spread of invasive alien plant species, illegal dumping of solid waste, pollution associated with the disintegrating road surface, and interference with the natural flows of the estuary due to the physical barrier. In order to help compensate for negative impacts, and as

part of the offset strategy, this road should be decommissioned and the area rehabilitated and restored to estuarine habitat.

As this road currently serves as a direct link, mainly for pedestrian traffic, between the P197 and the R102, a strategy would need to be discussed with the relevant authorities to find a solution for maintaining the link for people and still achieving the decommissioning required for ecosystem enhancement. A suggestion would be to construct an elevated boardwalk for pedestrian traffic only.

The extreme eastern end of the P491 is currently used by a private landowner for access to the R102. This portion of the road would need to be maintained to allow the landowner access to the land parcel.

(d) Ecosystem enhancement and decrease in alien plant infestations

In order to enhance ecological infrastructure and strengthen ecosystem services in the landscape, the natural areas that fall within the development site can be rehabilitated and habitat restored to structurally sound forest and wetland. This restoration process must include the removal of all existing alien plant infestations from the wooded drainage lines, coastal thicket, and wetland areas, and include planting of appropriate indigenous species. This can become a positive impact, should the proposed development be authorised, and could help compensate for negative impacts.

(e) Increased protection for Critical Biodiversity Areas

The areas that support natural vegetation and habitat in the study area are all classified as CBA: Irreplaceable according to the KZN BSP (Escott et al., 2016¹). This includes the coastal thicket/scrub within the steep valleys and drainage lines on site. As part of the restoration process on site, there would be removal of all existing alien plant infestations as required by NEMBA, as well as planting of appropriate indigenous species within these CBA's. In addition, this CBA along with the other rehabilitated areas in the study area (including wetlands) could then be proclaimed as formally protected conservation servitudes through D'MOSS. This can become a positive impact, should the proposed development be authorised, and could help compensate for negative impacts.

Based on all of the improvements above, the likelihood of Improved Environmental Quality occurring was determined to be Definite resulting in a Moderate residual benefit.

¹ Escott, B.J., Elliott, F. and Livingstone, T-C. (eds)(2016): KwaZulu-Natal Biodiversity Spatial Planning Terms and Processes, Version 3.3, Unpublished Report, Biodiversity Spatial Planning and Information Division, Ezemvelo KZN Wildlife.

Table 6-5: The Likelihood of Improved Environmental Quality

Environmental Cost	IMPROVED ENVIRONMENTAL QUALITY		
Inherent risk	LOW		
Benefit after mitigation	MODERATE		
Causes of risk	Likelihood of causes		
	ASP	SEWERLINE	11kV Powerline
	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK
Ecosystem enhancement and Decrease in alien plant infestation	Moderate Positive-Definite =Moderate Positive	N/A	N/A
Increased protection for CBAs	Moderate Positive-Definite =Moderate Positive	N/A	N/A
Overall Residual Benefit	Moderate Positive	Moderate Positive	Moderate Positive

6.1.8 Improved Human Welfare

As with all projects, we can't ignore the benefits to society. Improved human welfare has therefore been determined to be **MODERATE** inherent benefit. Through this impact assessment, the following will result in an overall improved human welfare:'

- Employment creation and decrease in unemployment
- Labour opportunities for vulnerable groups such as youth and women
- Associated project expenditure and investment
- Skills transfer and capacity building

Overall there would be positive benefits to the surrounding local communities and Municipality resulting in a Moderate residual benefit.

Table 6-6: The Likelihood of Improved Human Welfare

Environmental Cost	IMPROVED HUMAN WELFARE		
Inherent Benefit	MODERATE		
Benefit after mitigation	MODERATE		
Causes of risk	Likelihood of causes		
	ASP	SEWERLINE	11kV Powerline
	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK	CONSEQUENCE-LIKELIHOOD=RESIDUAL RISK
Employment creation and decrease in unemployment	Moderate- Definite= Moderate Positive	Moderate- Definite= Moderate Positive	Moderate- Definite= Moderate Positive
Opportunities for vulnerable groups such as youth and women	Moderate- Definite= Moderate Positive	Moderate- Definite= Moderate Positive	Moderate- Definite= Moderate Positive
Skills transfer and capacity building	Moderate- Definite= Moderate Positive	Moderate- Definite= Moderate Positive	Moderate- Definite= Moderate Positive
Associated project expenditure and investment – expanded manufacturing base	Moderate-Definite=Moderate Positive	Moderate-Definite=Moderate Positive	Moderate-Definite=Moderate Positive
Foreign direct investment	Moderate-Definite=Moderate Positive	Moderate-Definite=Moderate Positive	Moderate-Definite=Moderate Positive
Urban Renewal			
Overall Residual Benefit	Moderate Positive	Moderate Positive	Moderate Positive

6.2 Conclusion and EAPs Recommendations

All key issues associated with the alternatives for this project, as identified during the Basic Assessment, have been investigated by the specialist team and categorised in terms of their biophysical and socio-economic parameters (please refer to **Appendix D** for the specialist reports). Following the assessment of the implications of the impacts for decision-making, the consequences and residual risk and benefits associated with the development of the proposed KZN ASP, associated sewer pipeline and 11kV and 132kV powerlines were summarised as follows:

- The likelihood of Nuisances occurring ranged from Unlikely to Definite, and the consequence ranged from Moderate to Low resulting in a Moderate- Low Residual Risk.
- The likelihood of the Loss of Heritage Resources was considered to be Unlikely with the consequence being very low after mitigation, resulting in a Low residual risk. Although the possibility of encountering previously unidentified heritage resources such as burial sites is low, should such sites be exposed during subsurface construction work, the chance finds process must be implemented where necessary. From a heritage and archaeological perspective, the proposed ASP site and access points are feasible.
- The likelihood of Reduction in Livelihoods occurring was determined to be Likely with the consequence being low resulting in a low residual risk. A concerted effort must be made to make preferential use of local labour for low / unskilled positions. Furthermore, the local authorities must be vigilant of the potential for informal settlements and an increase in criminal activities to take place and plan accordingly.
- The likelihood of Material Reductions in Biophysical Environmental Attributes was determined to be Unlikely but Possible for the sewer line and powerline options resulting in a Low to Moderate residual risk. All impacts can be mitigated and are included in the EMP. The powerline Option 1 is the most feasible alternative and can be authorised with the condition that the entire route is fitted with anti-collision devices such as bird flight diverters / flappers.
- The likelihood of Material Reductions in Biophysical Environmental Attributes for the ASP, sewer and powerlines were determined to range between Definite and Likely with a low consequence after mitigation resulting in a Low Residual Risk.
- Based on all of the improvements above, the likelihood of Improved Environmental Quality occurring was determined to be Definite resulting in a Moderate residual benefit.
- Overall there would be positive benefits to the surrounding local communities and Municipality resulting in a Moderate residual benefit.

6.2.1 Conditions for the Authorisation

Despite majority of the impacts being considered to have a low residual risk after the implementation of the prescribed mitigation measures (as per Chapter 5 and the site specific EMPr), the EAP strongly recommends that the following conditions be included into the Environmental Authorisation to ensure that the residual risk remains low:

- 1) All environmental enhancements described in section 6.1.7 of this chapter, in the Impact Assessment (Chapter 5) and the EMPr must be realised to ensure that the residual risks remains low and the benefit of the project is enhanced;
- 2) An Advisory Committee comprised of conservation authorities including the EPCPD, EKZNW, EDTEA, DWS, DEA and DAFF must be established to guide the requirements of the project from an environmental perspective;
- 3) In order for habitat and landscape degradation to be prevented, the current development footprint and features of the layout designed to minimise impacts on the surrounding natural areas must not be altered;
- 4) For the potential impacts on water quality and quantity changes in the estuaries to be mitigated, storm water must be managed as per the Storm Water Management Plan and SuDs implementation;
- 5) On-site rehabilitation of wetlands must be undertaken and guided by the on-site wetland rehabilitation plan as contained in the Wetland Specialist Reports;
- 6) The formal process for the decommissioning of the road P491, led by the KZN Department of Transport (KZN DoT), must begin as soon as notification of the authorisation and subsequent appeals process is complete;
- 7) In order to help compensate for negative impacts resulting from the proposed development, a rehabilitation and restoration plan must be written by a suitably qualified restoration ecologist and implemented by a suitably qualified rehabilitation specialist with experience in working with forest habitats, for the natural areas that fall within the development site, and immediately adjacent. This restoration process must include the removal of all existing alien plant infestations from the wooded drainage lines, coastal thicket, and wetland areas, and include planting of appropriate indigenous species to restore the habitat to structurally intact forest and wetland. This rehabilitation and restoration plan must include long-term follow-up, monitoring and evaluation.
- 8) For the entire operational phase of the development, the natural areas in the development site must be monitored for invasive alien plant species, and immediately controlled by ecologically accepted techniques. The use of herbicides must be strictly prohibited to avoid impacting on sensitive habitats downstream;
- 9) All natural areas in the development area that are designated as CBAs, as well as areas proposed for rehabilitation such as wetlands currently under sugar cane, should be proclaimed as formally protected conservation servitudes through D'MOSS, with guidance from eThekweni Municipality's EPCPD;

- 10) The applicant must ensure financial provision is planned for and secured for all rehabilitation and restoration activities.
- 11) An Environmental Control Officer must be appointed for the duration of the construction and post construction phases of the project to monitor the construction and rehabilitation activities.
- 12) The recommendations made by the specialists as per the specialist reports must be adhered to.
- 13) Surface and groundwater monitoring must be implemented as per the recommendations by the specialists.

6.2.2 Assumptions and Limitations

- 1) Please note that this report was informed by the information provided by the Applicant, project engineers, town planners, engagement with the state departments and findings of various specialist studies and site investigations undertaken at the time of compilation of this report;
- 2) The specialist studies conducted meet the minimum requirements, and as such, no additional studies were undertaken;
- 3) All spatial data available to the EAP was utilised in the assessment of the proposed development. It was not deemed necessary for additional spatial data to be obtained; and
- 4) All preferred alternatives are assumed to be feasible and reasonable.