



**DRAFT BASIC ASSESSMENT REPORT**  
**UPGRADING OF THE BULK WATER SUPPLY,**  
**KWAHLOKOHLOKO SUB-SUPPLY AREA 1: PHASE**  
**2, KING CETSHWAYO DISTRICT MUNICIPALITY,**  
**KWAZULU-NATAL**

**September 2022**

*EDTEA Ref. No.: To be issued*

*NEAS Ref No: To be issued*

Prepared by:

**TERRATEST (PTY) LTD**

PO Box 794



Hilton, 3245

Telephone: (033) 343 6789

Contact: Ms N. Mkhize

Email: [mkhizen@terratest.co.za](mailto:mkhizen@terratest.co.za)

## VERIFICATION PAGE

<b>TITLE: Draft Basic Assessment Report</b>				
Proposed upgrading of the Bulk water supply, KwaHlokoohloko Sub-Supply Area 1: Phase 2, King Cetshwayo District Municipality, KwaZulu-Natal				
<b>PROJECT NO.:</b> 41863		<b>DATE:</b> 23/09/2022		<b>REPORT STATUS:</b> Draft
<b>CARRIED OUT BY:</b> <b>Terratest (Pty) Ltd</b> 6 Pin Oak Avenue Hilton 3201 Tel: (033) 343 6789 Fax: (033) 343 6788 email: mkhizen@terratest.co.za			<b>COMMISSIONED BY:</b> <b>Eyethu Engineers (Pty) Ltd</b> 49 Richefond Circle, Ground Floor Umhlanga, Durban, 4319 Tel: (031) 303 7630 Fax: (031) 312 9930 email: NirvanaL@eyethu.co.za	
<b>AUTHOR:</b> N. Mkhize			<b>CLIENT CONTACT PERSON:</b> N. Loutan	
<b>SYNOPSIS:</b> Basic Assessment Report for the proposed upgrading of KwaHlokoohloko Sub-Supply Area 1: Phase 2, uMlalazi Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal.				
<b>KEY WORDS:</b> KwaHlokoohloko, Bulk Water Supply Scheme, Basic Assessment Report, Environmental Management Programme, NEMA EIA Regulations, 2014, as amended), King Cetshwayo District Municipality				
© Copyright Terratest (Pty) Ltd				
<b>QUALITY VERIFICATION</b>				
This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882.				
				
<b>VERIFICATION</b>	<b>CAPACITY</b>	<b>NAME</b>	<b>SIGNATURE</b>	<b>DATE</b>
By Author	Snr Environmental Assessment Practitioner	N. Mkhize		23/09/2022
Checked by	Environmental Consultant	J. Cumberledge		23/09/2022
Reviewed by	Environmental Assessment Practitioner	R. Jonas		23/09/2022
Authorised by	Director	J. Norris		23/09/2022

File name:	<a href="#">W:\Enviro\TT\41863 - Kwahlokoohloko SSA1 Phase 2A &amp; 2B\1. PROJECT\7. Reports</a>
------------	--

## Executive Summary

Terratest (Pty) Ltd. has been appointed by Eyethu Engineers (Pty) Ltd., on behalf the King Cetshwayo District Municipality (KCDM), to undertake the environmental services required for the proposed upgrading of the Bulk Water Supply to KwaHlokoohloko Sub-Supply Area 1 (SSA 1): Phase 2. The project is proposed within Municipal Wards 9, 10, 27 and 26 of the uMlalazi Local Municipality of the KCDM. The largest portion of the project falls within the Mpungose Traditional Council area and the remainder of the project within the jurisdiction of the Bhekeshowe Tribal Council.

The proposed development entails upgrading the construction of water pipelines, and a new reservoir as follows:

- DN (i.e., diameter) 500mm pipe: Total of  $\pm 10$ km, from existing reservoir R1-1 (8ML capacity) in KwaHlokoohloko (co-ordinates 28°50'43.82"S; 31°27'31.87"E), up to the new reservoir R1-2;
- DN400mm: Total of  $\pm 4$  km, partly in shared trench with DN500 and running from the new reservoir towards the existing reservoir R2-1 (coordinates 28°48'2.81"S; 31°32'33.41"E) in Habeni;
- DN315 pipe:  $\pm 1.2$ km (in shared trench with DN500 and DN 400) from new reservoir R1-2 (1.55ML capacity) in a westerly direction, pipe will cater for future project; and
- New Reservoir (R1-2): co-ordinates 28°49'52.85"S; 31°32'22.54"E, in KwaMphehlela, capacity of 1.55ML.

The current Phase 2 will tie into Phases 1 and Phase 3C and 3D for which Environmental Authorisations have been received from the KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

Construction of the pipeline and new Reservoir will include clearance of vegetation and the excavation of trenches that will be approximately 1m wide and 2m deep. Construction will require a 15m wide working corridor along the alignment for construction plant movement, material stockpiling etc. A 'soft' and a 'hard' crossing' is proposed for watercourses. Both crossings will however require the use of gabion baskets and reno-mattresses to ensure the protection of the pipe. Gabions will allow for the establishment of flora and fauna post construction.

As water is a basic human need, the proposed project will contribute towards the realisation of the right to water is covered in Section 27 of the Constitution of South Africa, 1996 (Act No. 108 of 1996). Furthermore, the project will contribute towards the realisation of the uMlalazi Local Municipality's 2022/2027 Integrated Development Plan (IDP) towards water supply while also addressing the concerns of KZN citizens where water supply emerged as one of the critical areas that citizens of KZN identified as a challenge to the country and/or the province.

The Basic Assessment (BA) process for the project was undertaken according to the National Environmental Management Act, 1998 (Act No. 107 of 1998), Environmental Impact Assessment Regulations, 2014, as amended. The process was undertaken due to triggered listed activities in Listing Notices 1 and 3 of the above-mentioned legislation.

Based on the identified need for a BA, a Pre-Application Meeting with EDTEA was undertaken on the 24<sup>th</sup> of June 2022. The purpose of the Pre-Application Meeting was to introduce the project to the EDTEA and present and confirm the relevant Listed Activities, Specialist Studies, Public Participation as well as other issues pertinent to the proposed project.

The key areas of the project under the Public Participation Process (PPP) and the undertaking of Specialist Studies were as follows:

- PPP- this involves consultation with the relevant authorities, non-government organisations (NGO's), neighbouring landowners, community members and other identified Interested and Affected Parties (I&APs). A newspaper advertisement was published at the outset of the project to inform the general public of the Basic Assessment (BA) Process. The newspaper advertisement was published in English on page 20 of the 15<sup>th</sup> of July 2022 edition of the Zululand Observer newspaper. Eleven (11) site notice boards (size 61cm x 43cm) were placed along the proposed pipeline alignment on the 19<sup>th</sup> of July 2022. Site Notices were written in English and isiZulu and accompanied by a Layout Map. Notification letters were emailed to identified Key Stakeholders on the 14<sup>th</sup> of August 2022. A total of six (6) Stakeholder/Community Meetings were held between the 13<sup>th</sup> of June 2022 and the 10<sup>th</sup> of August 2022; and
- Specialist Studies- three (3) studies were commissioned and were undertaken under Terratest (Pty) Ltd., and the main findings of the studies were as follows:
  - *Terrestrial Biodiversity Assessment*- Three (3) protected species were identified and due to their occurrence within the pipeline route, either a realignment of the pipe or a permit application for their removal were recommended to ensure their protection;
  - *Freshwater Impact Assessment*. Thirteen (13) watercourse units were rated as 'likely to be affected' by the project in terms of incurring potential construction and/or operation related impacts. The watercourses are either crossed by the proposed pipeline, or the pipeline alignment is sufficiently close to the watercourse that indirect impacts may occur;
  - *Heritage Impact Assessment*- Eight (08) possible heritage sites were noted during the survey. These included possible graves and remains of settlements. It was noted that none of these would be directly impacted by the development. With regards to palaeontology, the pipeline occurs mostly in an area of no/low palaeontological sensitivity.

Concerning alternatives, four (4) were deemed relevant for the project. These were the 'no-go' alternative, which must be discussed in all environmental assessments as well as the 'process', 'routing' and 'design' alternatives. The advantages and disadvantages of each of these were outlined and the preferred alternative was then presented.

With regards to the assessment of impacts, these were divided into the biophysical and the socio- economic environments. The assessment was limited to the Construction and operational phases due to the high levels of impacts anticipated during these phases in comparison to the others. Under the biophysical environment, the assessment covered the impacts on watercourses and flora (plants) including protected plants, as well as fauna (animals) Regarding the socio- economic environment, the impacts assessed were job opportunities; traffic; existing infrastructure and services; visual, dust and air quality; noise impacts, heritage resources and agriculture. The assessment also included proposed mitigation measures to manage these impacts.

This Draft Basic Assessment Report will be circulated to registered I&APs for review and comment for a legislated period of at least 30 days. Comments received on the Draft Basic Assessment Report (DBAR) will be consolidated and included in a Final Basic Assessment Report (FBAR), which will be submitted to EDTEA for a decision on the Environmental Authorisation (EA), without which construction on the project cannot commence.

This Draft Basic Assessment Report has been drafted in accordance with the EIA Regulations, 2014, as amended, and adheres to the requirements contained in Appendix 1 of the above-mentioned Regulations as presented in **Table 1-1**.

#### **TABLE 1-1: Contents of the BAR**

2014 EIA Regulations (as amended)	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
<b>Appendix 1, Section 3 (a)</b>	Details of – (i) The EAP who prepared the report; and the expertise of the EAP; and (ii) The expertise of the EAP, including a curriculum vitae.	Chapter 1 & Appendix G
<b>Appendix 1, Section 3 (b)</b>	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Chapter 1
<b>Appendix 1, Section 3 (c)</b>	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Chapter 1
<b>Appendix 1, Section 3 (d)</b>	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Chapter 1, Chapter 8
<b>Appendix 1, Section 3 (e)</b>	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Chapter 6
<b>Appendix 1, Section 3 (f)</b>	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.	Chapter 5
<b>Appendix 1, Section 3 (h)</b>	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including- (i) Details of all alternatives considered; (ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated. (vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (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 geographic, physical, biological, social, economic, heritage and cultural aspects; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Chapter 9 Chapter 10 Chapter 10 Chapter 9 Chapter 12  Chapter 11 Chapter 12 Chapter 12  N/A N/A

2014 EIA Regulations (as amended)	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Chapter 12
<b>Appendix 1, Section 3 (i)</b>	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 12
<b>Appendix 1, Section 3 (j)</b>	An assessment of each identified potentially significant impact and risk, including- (i) Cumulative impacts; (ii) The nature, significance and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be avoided, managed or mitigated.	Chapter 12
<b>Appendix 1, Section 3 (k)</b>	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Chapter 7
<b>Appendix 1, Section 3 (l)</b>	An environmental impact statement which contains- (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 site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Chapter 13
<b>Appendix 1, Section 3 (m)</b>	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Chapter 7, Chapter 12, Appendix E
<b>Appendix 1, Section 3 (n)</b>	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.	Chapter 14
<b>Appendix 1, Section 3 (o)</b>	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Chapter 1.4
<b>Appendix 1, Section 3 (p)</b>	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.	Chapter 14
<b>Appendix 1, Section 3 (q)</b>	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Chapter 14
<b>Appendix 1, Section 3 (r)</b>	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	Chapter 2

2014 EIA Regulations (as amended)	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	<b>(iv)</b> Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	
<b>Appendix 1, Section 3 (s)</b>	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	-
<b>Appendix 1, Section 3 (t)</b>	Where applicable, any specific information required by the Competent Authority.	-
<b>Appendix 1, Section 3 (u)</b>	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	-

## TABLE OF CONTENTS

<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1 PROJECT LOCATION .....	1
1.2 KEY PROJECT OBJECTIVES .....	1
1.2 BASIC ASSESSMENT PROCESS AND PURPOSE .....	2
1.3 STRUCTURE OF THE BASIC ASSESSMENT REPORT .....	4
1.4 REPORT ASSUMPTIONS, GAPS AND LIMITATIONS.....	4
<b>2. PROJECT TEAM AND AFFIRMATION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) .....</b>	<b>5</b>
2.1 PROJECT TEAM .....	5
2.2 EAP AFFIRMATION .....	5
<b>3. CONSTRUCTION METHODOLOGIES .....</b>	<b>6</b>
3.2 GENERAL PIPELINE CONSTRUCTION.....	6
3.3 RESERVOIR CONSTRUCTION.....	7
3.4 WATERCOURSE CROSSING METHODOLOGY .....	7
3.5 TOPSOIL PROTECTION FOR WATERCOURSE CROSSINGS.....	9
<b>4. DESCRIPTION OF THE RECEIVING ENVIRONMENT.....</b>	<b>10</b>
4.1 PHYSICAL CONDITIONS OF THE RECEIVING ENVIRONMENT.....	10
4.2 VEGETATION .....	16
4.3 HYDROLOGY .....	17
4.4 CLIMATE .....	18
4.2 SOCIO-ECONOMIC ENVIRONMENT.....	18
<b>5. DEVELOPMENT MOTIVATION- NEED AND DESIRABILITY .....</b>	<b>21</b>
<b>6. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES.....</b>	<b>23</b>
<b>7. SPECIALIST STUDIES .....</b>	<b>24</b>
7.1 FRESHWATER IMPACT ASSESSMENT.....	26
7.2 TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT .....	28
7.3 HERITAGE IMPACT ASSESSMENT (INCLUSIVE OF A PALAEOLOGICAL ASSESSMENT) .....	31
7.4 GEOTECHNICAL ASSESSMENT .....	32
<b>8. LISTED ACTIVITIES AND PRE-APPLICATION MEETING.....</b>	<b>36</b>
8.1 APPLICABLE LISTED ACTIVITIES.....	36
8.2 EDTEA PRE-APPLICATION MEETING.....	36
<b>9. ALTERNATIVES.....</b>	<b>37</b>
9.1 NO-GO OPTION.....	39
9.2 PROCESS ALTERNATIVES .....	39
9.3 ROUTING ALTERNATIVES .....	40
9.4 DESIGN ALTERNATIVES .....	40
<b>10. PUBLIC PARTICIPATION.....</b>	<b>42</b>
10.2 NEWSPAPER ADVERTISEMENT .....	42
10.3 SITE NOTICE BOARDS.....	42
10.4 STAKEHOLDER/ COMMUNITY MEETINGS.....	42
10.5 OTHER ENGAGEMENTS.....	43
10.6 INTERESTED AND AFFECTED PARTY REGISTER .....	43
10.7 SUMMARY OF THE ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES.....	43
10.8 CIRCULATION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT.....	44
<b>11. IMPACT ASSESSMENT METHODOLOGY .....</b>	<b>45</b>
11.2 IMPACT MITIGATION HIERARCHY.....	45
11.3 IMPACT ASSESSMENT METHODOLOGY .....	46
<b>12. DESCRIPTION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS.....</b>	<b>51</b>
12.1 THEME 1: IMPACTS ON THE BIOPHYSICAL ENVIRONMENT .....	51
12.1.1 Impacts on watercourses .....	51
12.1.2 Impacts on flora (i.e. plants).....	52



12.1.3 Impacts on protected plant species .....	53
12.1.4 Impacts on fauna (i.e. animals).....	53
12.2 THEME 2: IMPACTS ON THE SOCIO-ECONOMIC ENVIRONMENT .....	54
11.2.1 Impacts on job opportunities .....	54
11.2.2 Traffic on local traffic.....	55
11.2.3 Impacts on existing infrastructure and services.....	55
11.2.4 Visual, dust and air quality impacts.....	56
11.2.5 Noise Impacts .....	57
11.2.6 Heritage resources impacts .....	57
11.2.7 Impacts on agricultural land .....	58
12.3 CUMULATIVE IMPACTS .....	58
<b>13. ENVIRONMENTAL IMPACT STATEMENT .....</b>	<b>60</b>
13.1 SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT .....	60
13.2 SENSITIVITY MAP.....	60
13.3 SUMMARY OF THE POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES.....	60
<b>14. CONCLUSION AND RECOMMENDATIONS .....</b>	<b>61</b>
<b>15. REFERENCES.....</b>	<b>62</b>

## LIST OF FIGURES

FIGURE 1-1: KWAHLOKOHLOKO SSA 1 LAYOUT MAP .....	1
FIGURE 1-2: LOCALITY MAP FOR THE PROPOSED PHASE 2 DEVELOPMENT.....	2
FIGURE 1-3: PROJECT LOCATION IN RELATION TO MUNICIPAL WARDS .....	1
FIGURE 1-4: BASIC ASSESSMENT PROCESS ORGANOGRAM .....	3
FIGURE 3-1: PLAN VIEW OF A 'SOFT' WATERCOURSE CROSSING .....	7
FIGURE 3-2: SECTION THROUGH A 'SOFT' WATERCOURSE CROSSING .....	8
FIGURE 3-3: SECTION THROUGH A 'HARD' WATERCOURSE CROSSING WITH PIPE ENCASED IN CONCRETE.....	8
FIGURE 3-4: SECTION THROUGH A 'HARD' WATERCOURSE CROSSING CLOSE TO BANKS.....	9
<b>FIGURE 4-1 VIEWS TOWARDS EXISTING RESERVOIR (R1-1)</b> .....	10
FIGURE 4-2: VIEWS TOWARDS N400 BEFORE CROSSING R66.....	10
FIGURE 4-3: VIEWS OF THE ND500 ALTERNATIVE ROUTE ALONG INTERNAL GRAVEL ROAD .....	11
FIGURE 4-4: VIEW TOWARDS THE INTERSECTION OF R66 AND P230 .....	11
<b>FIGURE 4-5: VIEW ALONG THE P230</b> .....	11
<b>FIGURE 4-6: VIEW FROM P230 TOWARDS NEW RESERVOIR (R1-2)</b> .....	12
FIGURE 4-7: VIEW CLOSE TO INTERSECTION OR MAIN GRAVEL ROAD AND SECONDARY ROAD LEADING UP TO RESERVOIR R1-2 SITE .....	12
FIGURE 4-8: VIEW ALONG THE SECONDARY ROAD TOWARDS THE NEW RESERVOIR R1-2 SITE.....	13
FIGURE 4-9: TRIG BEACON AT NEW RESERVOIR SITE .....	13
<b>FIGURE 4-10: VIEW FROM NEW RESERVOIR SITE TOWARDS GOEDETROUW DAM (CIRCLED IN RED)</b> .....	13
FIGURE 4-11: HOMESTEADS AROUND THE ND400 NORTH-WEST OF THE NEW RESERVOIR (R1-2) SITE .....	14
FIGURE 4-12 ND 400 TOWARDS EXISTING RESERVOIR (R 2-1) .....	15
FIGURE 4-13: ND 400 TOWARDS EXISTING RESERVOIR (R 2-1) .....	15
FIGURE 4-14: EXISTING RESERVOIR (R 2-1).....	16
FIGURE 4-15: PROPOSED DEVELOPMENT OVERLAID ONTO THE NATIONAL VEGETATION MAP [ECO-PULSE, 2022(A)]. .....	16
<b>FIGURE 4-16: PROPOSED PROJECT IN RELATION TO KEY RIVERS [ECO-PULSE, 2022(B)]</b> .....	17
FIGURE 5-1: MAIN CHALLENGES FACING THE COUNTRY/ KWAZULU- NATAL (KZN PROVINCIAL PLANNING COMMISSION, 2021).....	21
FIGURE 7-1: AGRICULTURAL LAND TO BE IMPACTED BY PROPOSED DEVELOPMENT .....	24
FIGURE 7-2 LOCAL AND REGIONAL DRAINAGE NETWORK FOR THE PROJECT [ECO-PULSE, 2002(B)] .....	27

FIGURE 7-3: MAP SHOWING THE LENGTHS OF PIPELINE ALIGNMENT OF CONCERN AND EXAMPLES OF PREFERABLE ALTERNATIVE ALIGNMENTS [ECO-PULSE, 2002(B)].....	28
FIGURE 7-4: MAP SHOWING THE LOCATION AND EXTENT OF AREAS IDENTIFIED AS ‘CBA: IRREPLACEABLE’ (SHADED IN A HASHED ‘RED’) ACCORDING TO THE TERRESTRIAL CPLAN (EKZMW, 2016), IN RELATION TO THE STUDY SITE [ECO-PULSE, 2002 (A)].....	29
<b>FIGURE 7-5: MAP INDICATING ALTERNATIVE PIPELINE ALIGNMENT RECOMMENDATIONS A – B ALONG WITH THE ORIGINAL PIPELINE ALIGNMENT AND 10M PLANT BUFFER AREAS SHOWN [Eco-PULSE, 2022(A)].</b> .....	30
FIGURE 7-6: DIFFERENT CATEGORIES OF SPECIES OF CONSERVATION CONCERN (SCC) MODIFIED FROM THE IUCN’S EXTINCTION RISK CATEGORIES (REPRODUCED IN PART FROM IUCN, 2012) - EXTRACTED DIRECTLY FROM SANBI (2020) [ECO-PULSE, 2022 (A)] .....	31
<b>FIGURE 9-1: ROUTING ALTERNATIVES FOR THE DN500 PIPE</b> .....	40
FIGURE 11-1: MITIGATION HIERARCHY SHOWING LEVELS OF PREFERENCE (ECO INTELLIGENT, 2016).....	45
WHILE LIMITED AGRICULTURAL LAND WILL BE IMPACTED BY THE PROPOSED DEVELOPMENT, THE IMPACTS ASSOCIATED WITH THIS ARE KEY AS FOOD SECURITY IS IMPORTANT, PARTICULARLY FOR DISADVANTAGED SOCIETIES. <b>FIGURE 7-12-1</b> UNDER <b>CHAPTER 7</b> OF THIS BAR PRESENTS AN EXAMPLE OF AN AGRICULTURAL LAND THAT WILL BE IMPACTED BY THE PROPOSED DEVELOPMENT .....	58

## LIST OF TABLES

TABLE 1-1: CONTENTS OF THE BAR .....	III
TABLE 1-1: TRIBAL /TRADITIONAL COUNCIL DETAILS IN RELATION MUNICIPAL WARDS AND PROPERTY DETAILS.....	1
TABLE 2-1: DETAILS OF THE KEY PROJECT TEAM MEMBERS.....	5
<b>TABLE 4-1: NATIONAL AND PROVINCIAL VEGETATION CLASSIFICATION AND THREAT STATUS [SANBI, 2018; SCOTT-SHAW &amp; ESCOTT, 2011 AS PRESENTED IN Eco-PULSE 2022(A)]</b> .....	17
TABLE 4-2: ESHOWE CLIMATE (CLIMATE-DATA.ORG, 2022) .....	18
<b>TABLE 4-3: SOCIO-ECONOMIC INFORMATION (MUNICIPALITIES, 2012-2022)</b> .....	19
TABLE 4-4: MAIN SOURCE OF DRINKING WATER WITHIN THE UMLALAZI LOCAL MUNICIPALITY PER HOUSEHOLDS (UMLALAZI LOCAL MUNICIPALITY, 2022) .....	20
TABLE 6-1:KEY APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES.....	23
TABLE 7-1: SPECIALIST STUDIES IDENTIFIED BY THE DFFE SCREENING TOOL AND EAP’S DISCUSSION .....	24
TABLE 7-2: LOCATION OF RECORDED SITES (UMLANDO, 2022) .....	32
TABLE 9-1: ALTERNATIVE TYPES AND EAP’S COMMENTS .....	38
TABLE 9-2: COMPARISON OF EXCAVATION METHODS .....	39
TABLE 9-3: COMPARISON OF ROUTING ALTERNATIVES .....	40
TABLE 9-4: COMPARISON OF DESIGN ALTERNATIVES .....	41
TABLE 10-1: DETAILS OF STAKEHOLDER/ COMMUNITY MEETINGS .....	42
TABLE 10-2: KEY ISSUES RAISED DURING PUBLIC PARTICIPATION.....	44
TABLE 11-1: DEVELOPMENT PHASES IN A PROJECT .....	46
TABLE 11-2: ASSESSMENT CRITERIA.....	47
TABLE 12-1: ASSESSMENT OF IMPACTS ON ADJACENT WATERCOURSES .....	52
TABLE 12-2: ASSESSMENT OF IMPACTS RELATED TO PLANTS .....	52
TABLE 12-3: ASSESSMENT OF IMPACTS RELATED TO PROTECTED SPECIES .....	53
TABLE 12-4: ASSESSMENT OF IMPACTS RELATED TO FAUNA .....	54
TABLE 12-5 AVAILABILITY OF JOB OPPORTUNITIES.....	54
TABLE 12-6 COMMUNITY DISRUPTIONS DUE TO UNEQUAL OR UNFAIR JOB OPPORTUNITIES.....	54
TABLE 12-7: ASSESSMENT OF TRAFFIC IMPACTS.....	55
TABLE 12-8: ASSESSMENT OF IMPACTS ON EXISTING INFRASTRUCTURE AND SERVICES.....	56
TABLE 12-9: ASSESSMENT OF VISUAL, DUST AND AIR QUALITY IMPACTS .....	56
TABLE 12-10: ASSESSMENT OF NOISE IMPACTS .....	57
TABLE 12-11: ASSESSMENT OF HERITAGE RESOURCES IMPACTS .....	57
TABLE 12-12: ASSESSMENT OF IMPACTS ON AGRICULTURAL LAND .....	58

## LIST OF APPENDICES

- Appendix A: Locality Map
- Appendix B: Design Layouts
- Appendix C: Correspondence with Competent Authority
  - Appendix C1: Pre-Application Meeting Minutes
- Appendix D: Public Participation
  - Appendix D1: Newspaper Advert and Site Notices
  - Appendix D2: Notification Sheet
  - Appendix D3: Meeting Minutes
  - Appendix D4: Correspondence with I&APs
  - Appendix D5: Comments and Responses Report
  - Appendix D6: Interested and Affected Parties Register
- Appendix E: Specialist Reports
  - Appendix E1: Terrestrial Biodiversity Assessment
  - Appendix E2: Freshwater Assessment
  - Appendix E3: Heritage Impact Assessments
- Appendix F: Management Plans
  - Appendix F1: Environmental Management Programme
  - Appendix F2: Stormwater Management Plan
- Appendix G: Curriculum Vitae and Declaration of EAP
- Appendix H. Screening Tool Report

## ACRONYMS

CV	-	Curriculum Vitae
DBAR	-	Draft Basic Assessment Report
DWS	-	Department of Water and Sanitation
EA	-	Environmental Authorisation
EAP	-	Environmental Assessment Practitioner
EDTEA		KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs
EIA	-	Environmental Impact Assessment
EKZNW	-	Ezemvelo KZN Wildlife
EMPr	-	Environmental Management Programme
HDPE	-	High-density Polyethylene
HIA	-	Heritage Impact Assessment
I&AP	-	Interested and Affected Party
IUCN	-	International Union for Conservation of Nature
KCDM		King Cetshwayo District Municipality
ML	-	Mega-litres
NEMA	-	National Environmental Management Act (Act 107 of 1998)
PPP		Public Participation Process
SAHRIS	-	South African Heritage Resources Information System
SSA	-	Sub-Supply Area
WULA	-	Water Use Licence Application

## 1. INTRODUCTION

Terratest (Pty) Ltd. has been appointed by Eyethu Engineers (Pty) Ltd., on behalf the King Cetshwayo District Municipality, to undertake the environmental services required for the proposed upgrading of the Bulk Water Supply to KwaHlokoohloko Sub-Supply Area 1 (SSA 1): Phase 2. The proposed development entails the upgrading of the bulk water network in KwaHlokoohloko, in the rural outskirts of Eshowe, Umlalazi Local Municipality, KwaZulu-Natal. The proposed development, presented in the Locality Map in **Figure 1.1**, entails the construction of water pipelines, and a new reservoir as follows:

- DN (i.e., diameter) 500mm pipe: Total of  $\pm 10$ km, from existing reservoir R1-1 (8ML capacity) in KwaHlokoohloko (co-ordinates 28°50'43.82"S; 31°27'31.87"E), up to the new reservoir R1-2;
- DN400mm: Total of  $\pm 4$  km, partly in shared trench with DN500 and running from the new reservoir towards the existing reservoir R2-1 (coordinates 28°48'2.81"S; 31°32'33.41"E) in Habeni;
- DN315 pipe:  $\pm 1.2$ km (in shared trench with DN500 and DN 400) from new reservoir R1-2 (1.55ML capacity) in a westerly direction, pipe will cater for future project; and
- New Reservoir (R1-2): co-ordinates 28°49'52.85"S; 31°32'22.54"E, in KwaMphehlela, capacity of 1.55ML.

The DN500 pipes will largely be steel with some sections of High-density polyethylene (HDPE). The DN400 will be mostly HDPE but will comprise steel for the 400m before and after watercourse crossings. The proposed reservoir will be comprised of reinforced concrete reservoir. The proposed project will involve the excavation of trenches on land and through some watercourses (in the case of this project, this will be limited to wetlands, streams, and rivers) or within 32m of the watercourses. The project will also require vegetation clearing. Construction will require a 15m wide working corridor.

The KwaHlokoohloko Sub-Supply Area 1 scheme is currently divided into three (3) separate phases. The status of each of these are as follows:

- Phase 1:
  - *Department of Economic Development, Tourism and Environmental Affairs (EDTEA) Reference number – DC28/005/2011*
  - *Environmental Authorisation (EA): issued on the 31<sup>st</sup> of January 2012*
  - *Location: from an area adjacent to the abstraction point and the Goedetrouw Dam and the purification works up to Reservoir R1-1. Refer to **Figure 1-1** which shows not only Phase 1 but also Phase 2 and 3C and 3D.*
- Phase 2: **CURRENT;**
  - *EDTEA Reference number – To be issued*
  - *NEAS No. - To be issued*
  - *Location- Refer to Locality Map (**Figure 1-2**)*
- Phase 3C and D:
  - *EDTEA Reference number- DC28/0019/2019;*
  - *NEAS No.- KZN/EIA/0001256/2019*
  - *EA issued: 09<sup>th</sup> of October 2022*
  - *Location: Refer to **Figure 1-2**.*

The KwaHlokoohloko Sub-Supply Area 1 will also entail the development of additional phases, Phase 3A and 3B, which will be covered in future applications. Phase 2, this application, will tie into Phases 1 and Phase 3A to 3D to complete the bulk water supply scheme upgrade. **Figure 1-2** shows the current project in context with Phase 1 and 2.

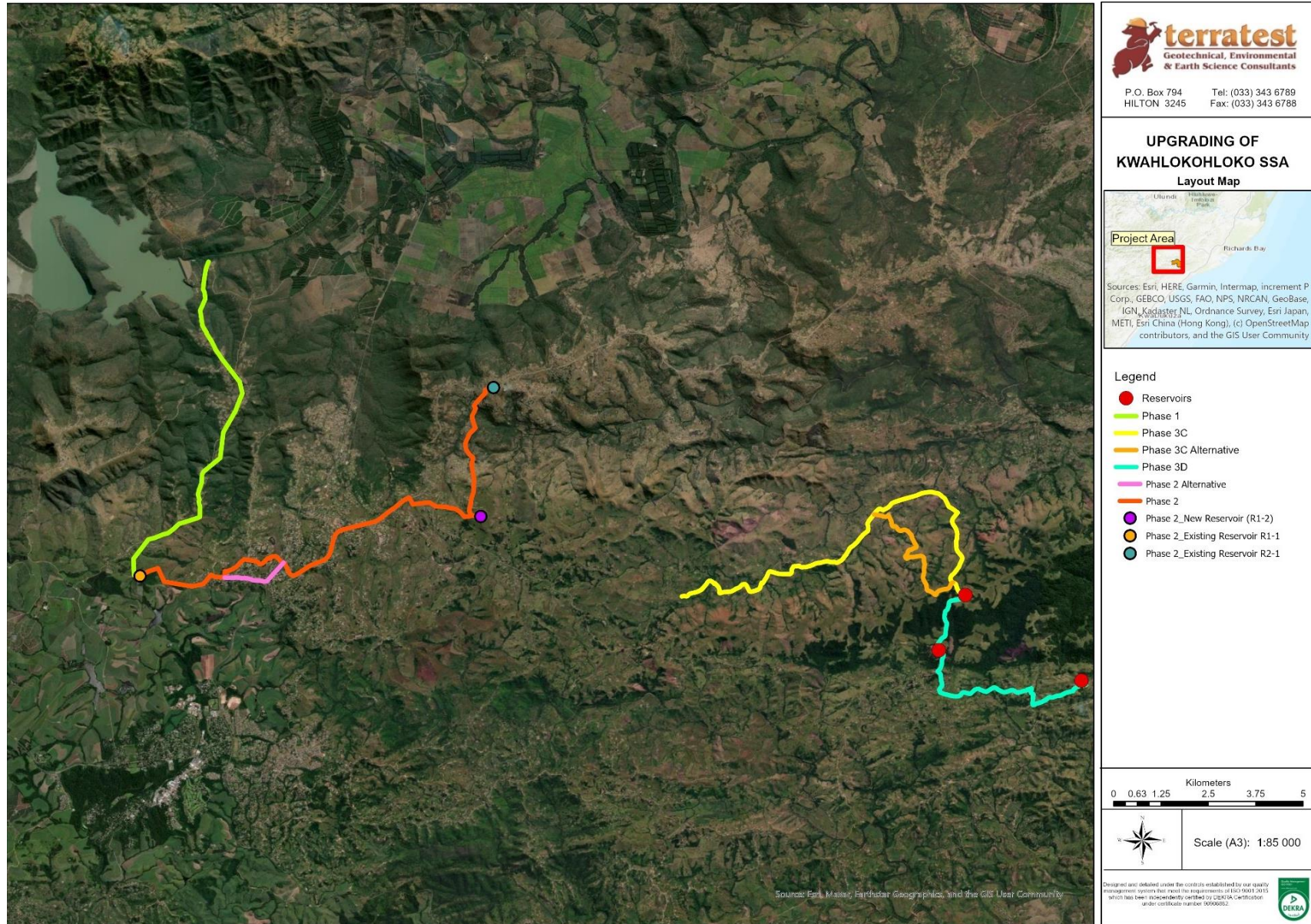


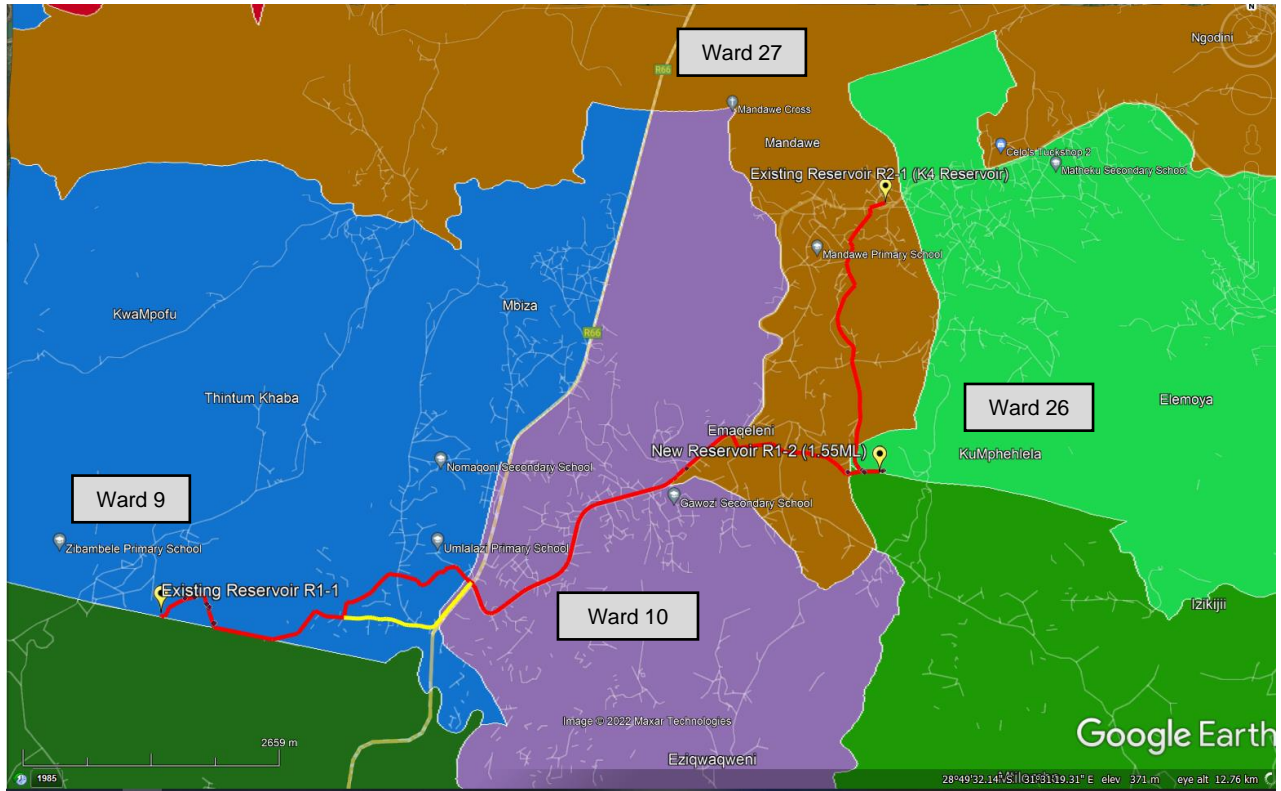
Figure 1-1: KwaHlokoHloko SSA 1 Layout Map



Figure 1-2: Locality Map for the proposed Phase 2 development

### 1.1 Project Location

The project is proposed within Municipal Wards 9, 10, 27 and 26 of the uMlalazi Local Municipality (**Figure 1-3**). The largest portion of the project falls within the Mpungose Traditional Council area as shown in **Table 1-1**. The remainder of the project, including the proposed reservoir (R-2) falls within the jurisdiction of the Bhekeshowe Tribal Council.



**Figure 1-3: Project location in relation to Municipal Wards**

**Table 1-1: Tribal /Traditional Council details in relation Municipal Wards and property details**

Tribal Authority Area	Jurisdiction in line with affected wards	Property Name	SG Code
Mpungose Traditional Council	Wards 9, 10, 27	Farm Mpungose 17627	N0GU000000176270000
Bhekeshowe Tribal Council.	Ward 26	Remaining Extent of Reserve No. 17 (Farm Number 15837)	N0GU000000158370000

### 1.2 Key Project Objectives

The project has the following objectives:

- To provide and improve the quality of water supply to the residents of the KCDM in the following manner:
  - Distribute bulk water from the Regional Reservoir R1-1 in an easterly direction to serve the supply areas: SSA1 (partially), SSA2, SSA3, SSA4, SSA5, SSA6 and SSA7;

- Provide new bulk storage at R1-2 to serve the local reticulation around the new bulk reservoir and throughput storage for the remainder of the bulk system;
- Provide connections at the new bulk reservoir R1-2 and parts of the pipelines for:
  - Reticulation for immediate vicinity. Connection point only;
  - Future pipework towards SSA, 3, 4, and parts of 5. Connection and link to existing bulk feed towards R2-1; and
  - Future pipework towards SSA6, 7 and parts of 5. Connection and pipeline where trenches are shared.
- To uplift the local and surrounding communities through employment opportunities during the construction phase where possible; and
- To ensure skills development and knowledge transfer by providing training during the construction phase to surrounding communities.

## 1.2 Basic Assessment Process and Purpose

Based on the triggered activities under the National Environmental Management Act, 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014, as amended, Listing Notices, a Basic Assessment (BA) process is required for the project. Refer to **Chapter 8** of this Draft Basic Assessment Report (DBAR) for the Listed Activities. The process must be undertaken in such a manner that there is an assessment of environmental outcomes, impacts and residual risks of the proposed Listed Activities being applied for. The findings of the BA process are presented in the Basic Assessment Report (BAR). The outcome of the BA Process is to provide the Competent Authority, the Department of Economic Development, Tourism and Environmental Affairs (EDTEA), with sufficient information to provide a decision on the Application in terms of Environmental Authorisation (EA), in order to avoid or mitigate any detrimental impacts that the activity may impose on the receiving environment. An organogram showing the BA process is shown as **Figure 1-4**.



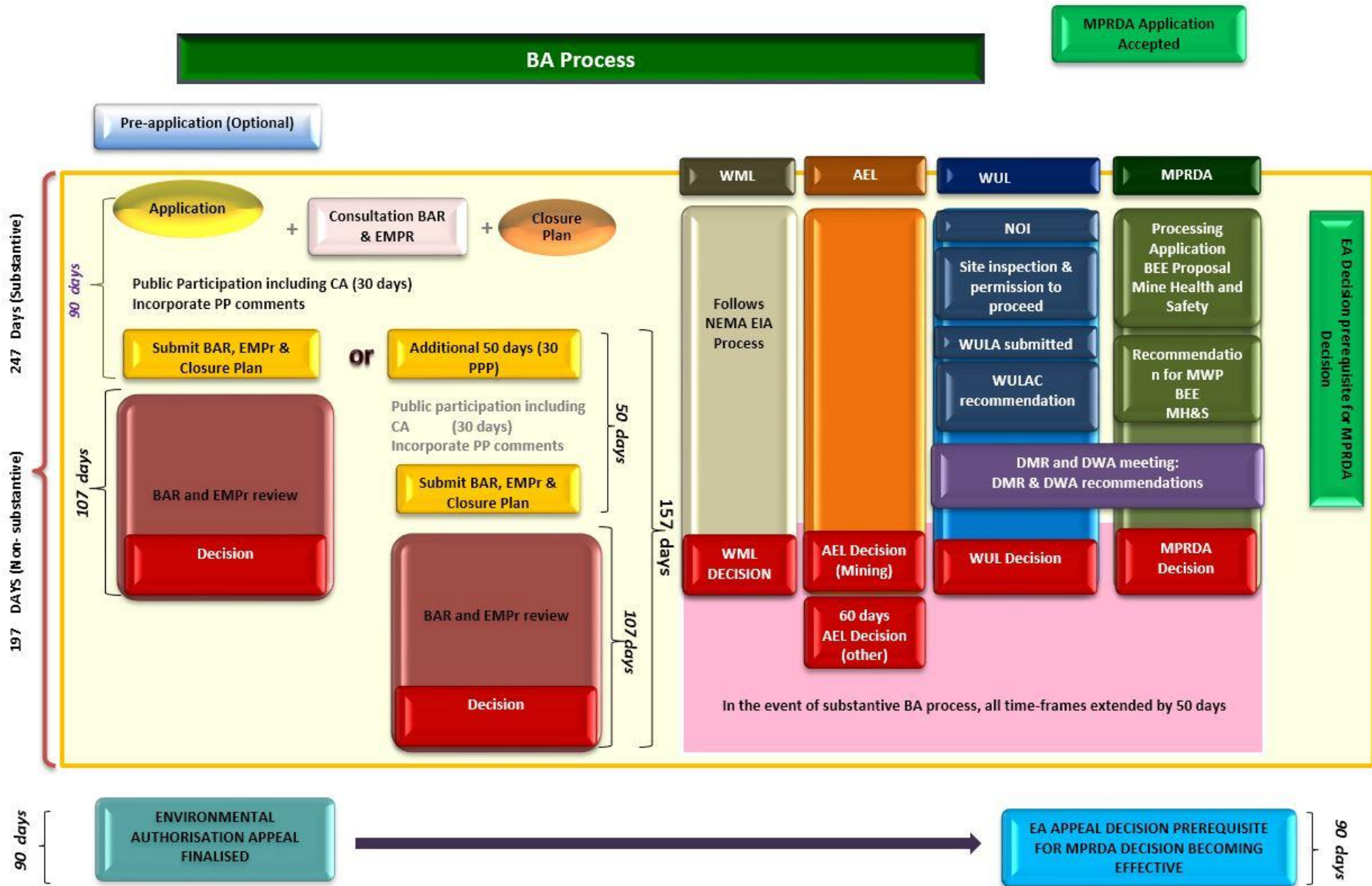


Figure 1-4: Basic Assessment Process Organogram

### 1.3 Structure of the Basic Assessment Report

This report has also considered the requirements outlined in Appendix 1 of the NEMA EIA Regulations, 2014, as amended, regarding the content of the Basic Assessment Report. In addressing these requirements, this BAR is divided into fifteen (15) Chapters, supported by various appendices. The contents of which will be presented as follows in this report:

- **Chapter 1** provides the background and introduction to the development proposal and profiles its proponents. Furthermore, this chapter provides an indication of the BA process that will be followed as well as providing the assumptions, gaps and limitations made in the undertaking of the BA process;
- **Chapter 2** provides details of the project team as well as the EAP affirmation;
- **Chapter 3** details the proposed activity inclusive of the key proposed construction methodologies;
- **Chapter 4** covers the description of the receiving environment;
- **Chapter 5** presents the developments motivation in terms of need and desirability;
- **Chapter 6** details the key legislation applicable to the BA process proposed development;
- **Chapter 7** provides an overview of the findings of the specialist studies;
- **Chapter 8** covers the Listed Activities as well as the details of the pre-application meeting;
- **Chapter 9** is a description and comparative assessment of the alternatives that were considered for the project;
- **Chapter 10** details the Public Participation Process undertaken for the project. It also summarises key outcomes of the process;
- **Chapter 11** presents the Impact Assessment Methodology adopted for this BAR;
- **Chapter 12** is a description and assessment of environmental impacts;
- **Chapter 13** provides the Environmental Impact Statement;
- **Chapter 14** discusses the recommendations and conclusion; and
- **Chapter 15** presents a Reference List for the report.

### 1.4 Report Assumptions, Gaps and Limitations

The following key gaps, assumptions and limitations were made when conducting the BA:

- The project extent, route, pipe sizes, materials and other design details will not change;
- All Interested and Affected Parties were provided with a fair opportunity to provide comments on the project
- The Terrestrial field assessment was undertaken in mid-winter (June/July 2022) outside of the recommended sampling season. For this reason, the assessment did not cover the seasonal variation in conditions at the site.
- Although all watercourses occurring within 500m of the proposed activities were mapped at a desktop level, field investigations were confined to only those areas that stand to be measurably affected by the proposed development

It can be thus concluded that other than the gaps in knowledge, assumptions provided above, and the information presented in various sections of this report, the information used in this report was adequate for the purposes of the current impact assessment.

## 2. PROJECT TEAM AND AFFIRMATION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

### 2.1 Project Team

The key details of the project team involved in undertaking the BA Process for the proposed project are presented in Table 2-1. The Curriculum Vitae (CV) of the EAP is attached to this report as **Appendix G**.

**Table 2-1: Details of the key project team members**

Name and Role on project	Key Qualifications & Professional Registration	Organisation and input to BAR
<b>N. Mkhize</b> Senior Environmental Assessment Practitioner	Masters in Environmental Management, EAPASA (No. 2019/1489)	Terratest (Pty) Ltd: Compilation of Basic Assessment Report and supporting documents
<b>Ryan Kok</b> Wetland / Aquatic Ecologist	MSc. Biological Science, Pr. Sci. Nat., Reg. No.: 122290 (Field: Ecological Science,	Eco-Pulse Environmental Consulting Services: Freshwater Impact Assessment Report
<b>Shaun McNamara</b> Wetland and Aquatic Ecologist	MSc: Geography (Fluvial Geomorphology)	
<b>Ryan Kok</b> Wetland / Aquatic Ecologist	MSc. Biological Science, Pr. Sci. Nat., Reg. No.: 122290 (Field: Ecological Science,	Eco-Pulse Environmental Consulting Services: Terrestrial Biodiversity Impact Assessment Report
<b>Gavin Anderson</b> Heritage Specialist	Master of Philosophy in Archaeology/Social Psychology, ASAPA (Professional Member (No 0005)	Umlando Archaeological Surveys and Heritage Management: Heritage Impact Assessment (inclusive of a Desktop Palaeontological Assessment)
<b>Supporting Document</b>		
Three (3) Geotechnical Reports covering ND500, ND400 as well as the location for the proposed Reservoir (R1-2) were compiled by GroundAfrica Consulting Geotechnical Engineers. The study was not commissioned by JG Afrika. The summary of the findings of these reports are presented in <b>Chapter 7.4</b> .		

The key findings for each of these studies are discussed in **Chapter 7** and the main reports (excluding the Geotechnical Reports) are attached under **Appendix E**.

### 2.2 EAP Affirmation

This report was compiled and prepared by Ntsebo Mkhize, an EAP employed by Terratest (Pty) Ltd. I declare that the information provided in this report is correct and relevant to the activity/ project, that comments from Interested and Affected Parties have been incorporated into this report, that the report has included inputs and recommendations from Specialists and that all relevant project information was made available to Interested and Affected Parties.

Signature of EAP

23/09/2022

Date

### 3. CONSTRUCTION METHODOLOGIES

As discussed in Chapter 1, the proposed development comprises the following:

- DN (i.e. diameter) 500mm pipe: Total of ±10km, from existing reservoir R1-1 in KwaHlokoheko (coordinates 28°50'43.82"S; 31°27'31.87"E), up to the new reservoir R1-2;
- DN 400mm: Total of ±4 km, partly in shared trench with DN500 and running from the new reservoir towards the existing reservoir R2-1 (coordinates 28°48'2.81"S; 31°32'33.41"E) in Habeni;
- DN315 pipe: ±1.2km (in shared trench with DN500 and DN 400) from new reservoir R1-2 in a westerly direction, pipe will cater for future project; and
- New Reservoir (R1-2): co-ordinates 28°49'52.85"S; 31°32'22.54"E, in KwaMphehlela, capacity of 1.55ML.

While example of the layouts for the above-mentioned infrastructure are presented in this BAR, additional layouts are in **Appendix B**. The construction methodologies for the proposed infrastructure are presented in this section of the BAR

#### 3.2 General Pipeline construction

The Construction of the pipeline will include clearance of vegetation and the excavation of pipeline trenches that will be approximately 1m wide and 2m deep. Construction will require a minimum 15m wide working corridor, where space permits. The corridor will allow for construction plant movement, material stockpiling, etc. All construction activities will be carried out in accordance with the Environmental Management Programme (EMPr), attached as **Appendix F**, as well as relevant technical and safety requirements applicable to the nature of the project. The 15m working corridor will be demarcated with a temporary safety barrier, such as danger netting, to prevent public ingress and mitigate the risk of livestock accidents. Demarcating the working corridor will also prevent the construction footprint from increasing in size.

The width of the corridor will be stripped of topsoil to a minimum depth of 200mm and stockpiled as per the EMPr requirements. The steel pipeline will be welded outside of the excavated trench and thereafter laid onto bedding material in the trench using heavy pipelaying machinery. The HDPE pipeline will be thermal butt welded outside of the trench and rolled into the trench. Welding outside of the trench will prevent the trench width from being unnecessarily increased.

Where the pipe crosses a blacktop surfaced road, as is the case of the R66 and P230, pipejacking will be used. This will entail the drilling of a pipe through the ground to minimise surface disturbances. Jacking and receiving pits will be excavated on either side of the road. Sleeve pipes will be lowered into the pit and pushed into the pit face and under the road with hydraulic jacks. Once a length is jacked in, labourers will enter the sleeve and remove material up to the front edge of the jack. The jacking cycle will then be repeated. Once the sleeve is in place, the water conduit pipes will be placed in the sleeve. The pits will be of sufficient length to allow the pipes to be lowered into the pit. Once in the pit, the pipe will be connected to the previous pipe and the whole is further pushed into the sleeve under the road. On completion of the jacking and sleeving process the annulus between the sleeve and the conduit is bricked up and manholes with control valves constructed. The crossing section will then be connected to pipeworks on either side of the road.

All areas affected by construction activities will be reinstated to their previous condition, as far as practicable, if not to an improved condition. In this regard, should infrastructure (e.g. fences) require lifting or excavation for pipeline installation, the affected persons will be notified of construction progress and duration at least prior to the undertaking of the construction activities. A dedicated Community Liaison Officer (CLO) will

facilitate this notification. Photographs will be taken before and after construction activities to ensure that infrastructure is reinstated to the same or better condition, post construction.

### 3.3 Reservoir construction

Reservoir R1-2 will be a circular reinforced concrete with a 1.55ML capacity. The height and diameter of the reservoir will be 19.7m and 6.5m respectively. Various chambers to house the controls of the reservoir will be constructed. A maximum depth of 3.5m below the Natural Ground Line will be excavated for the reservoir and supporting infrastructure. The reservoir will therefore be partially buried below the existing ground level. Material excavated will be used in the rehabilitation of the site. Any excavated rock will be used for landscaping around the reservoir.

### 3.4 Watercourse crossing methodology

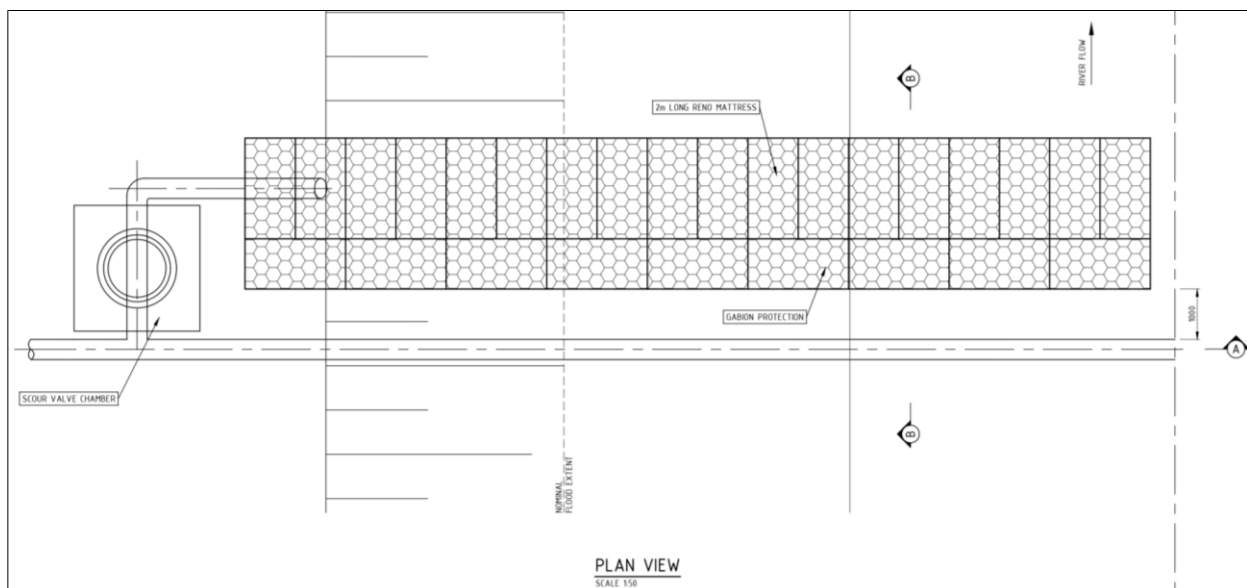
Thirteen (13) watercourse units were rated as 'likely to be affected' by the proposed development due to either pipeline crossings or the close proximity of the pipeline to the watercourse

A 'soft' and a 'hard' crossing' is proposed for watercourses. Both crossings will however require the use of gabion baskets and reno-mattresses to ensure the protection of the pipe. Gabions will allow for the establishment of flora and fauna post construction. The brief methodology for each of the crossing types are presented.

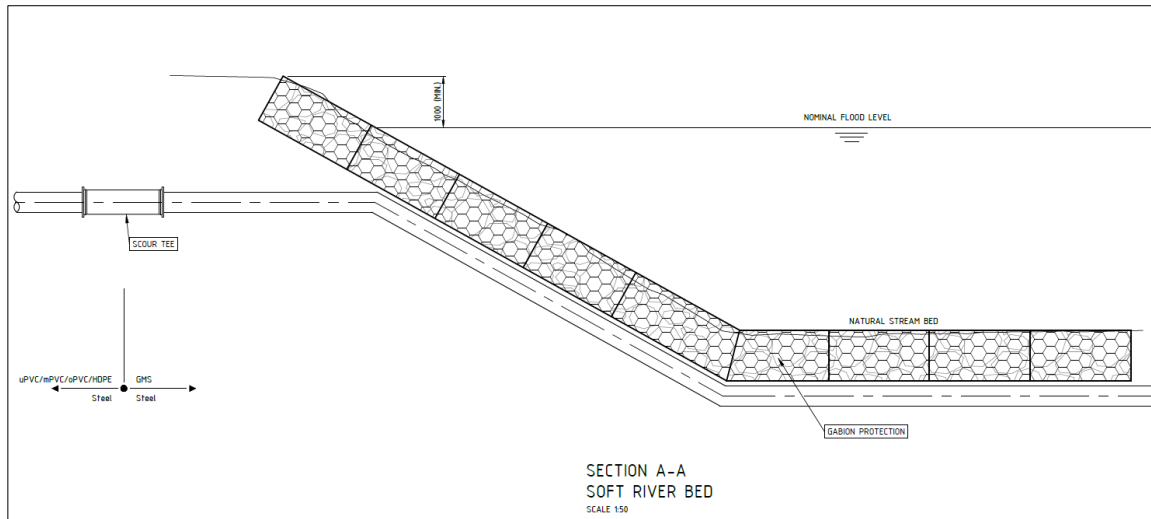
#### 'Soft' Crossing

With the soft crossing, illustrated in **Figures 3-1** and **3-2** mainly for wetlands, the concept is to place the pipe back from the gabion, just in bedding as per specifications and not in concrete. The gabion will serve two (02) functions.

- It is intended to form a shallow silt trap, not for the intention of stopping silt going downstream but so that there is sediment build-up over the pipe to protect the pipe from possible downstream creeping donga; and
- The downstream reno mattress is to flex with any upstreaming creeping erosion and thus protect the pipe.



**Figure 3-1: Plan view of a 'soft' watercourse crossing**

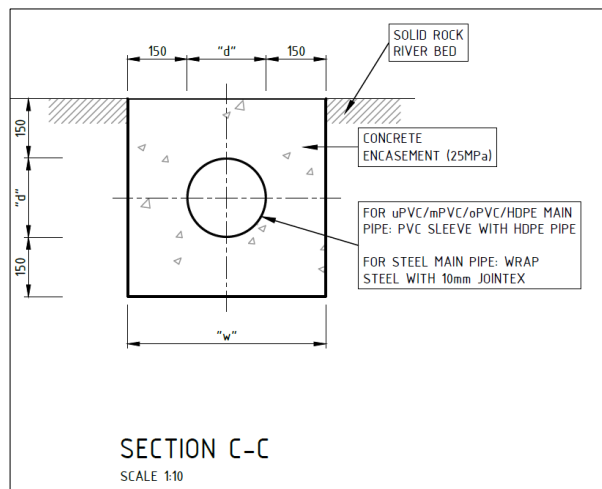


**Figure 3-2: Section through a ‘soft’ watercourse crossing**

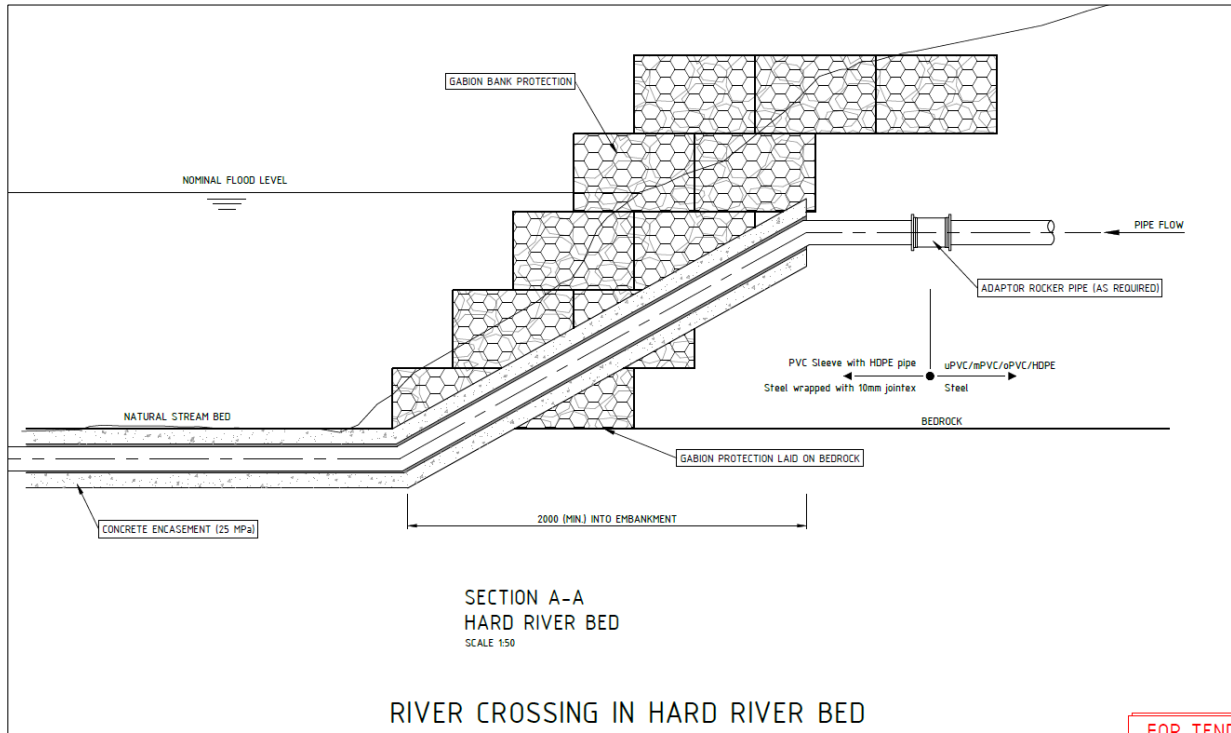
**Hard Crossing**

Some of the drawings that indicate the ‘hard’ crossing, specifically for rocky river beds such as that of the Mateku River, is presented in **Figures 3-3 and 3-4**. The following key activities will be adopted for the ‘hard’ crossing are as follows:

- The rock will be drilled and blasted, and the pipe will be laid below the riverbed. This method is preferred over the use of piers crossing over the watercourse due to the high risk of flooding and in turn damage to the pipe.
- The riverbank will be protected with gabion baskets to prevent scour and erosion around the pipe and to encourage rehabilitation.
- The pipe will be encased in concrete which will be cast- in-situ in the following manner:
  - flowing water will be diverted over the work area in closed conduits;
  - standing water in the trench will be pumped out, but this is not absolutely necessary, concrete can be placed in standing water if worked from one side it will displace the water along and out;
  - once the pipework is in place and joints have been tested the concrete will be cast to fill all voids in the rock bed and trench faces;
  - concrete will be cast to match the top surface of the pre-existing rock.



**Figure 3-3: Section through a ‘hard’ watercourse crossing with pipe encased in concrete**



**Figure 3-4: Section through a ‘hard’ watercourse crossing close to banks**

Other Detailed design drawings for the ‘hard’ crossing are provided in **Appendix B**.

**3.5 Topsoil protection for watercourse crossings**

Any topsoil encountered during watercourse crossings will be stripped to a depth of 200mm and be stockpiled for reuse during the rehabilitation phase. All excavated soil will be stockpiled separately to the topsoil and returned in reverse order to which it was excavated for use as backfill, if found to be suitable. Specific to construction in wetlands, excavated soil must be retained and returned to the pipeline trench in the reverse order to which it was removed.

All indigenous vegetation removed from watercourses during construction will be kept moist and be returned to the disturbed area during the rehabilitation phase. Adequate planning will ensure that any construction through watercourses will occur during the dry season, for the shortest amount of time possible. Further, it will be ensured that no crossing structures impede stormwater flow or act as conduits for erosion both during construction and post-construction.

## 4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

This Chapter serves to provide a brief environmental setting of the proposed project site. The description will include general conditions of the site in terms of site observations as well as desktop studies of the site and its vicinity. The aspects discussed are as follows:

- Physical conditions of the receiving environment;
- Vegetation;
- Hydrology;
- Climate; and
- Socio Economic Environment;

### 4.1 Physical Conditions of the receiving environment

The land use is largely characterised by homesteads with some small-scale substance farming land. Facilities such as schools and small businesses exist in the area. Images of some of the proposed development's vicinity, in relation to the approximate location of the proposed development indicated by a yellow line where applicable, are presented in **Figures 4-1** to **Figures 4-14**



**Figure 4-1 Views towards Existing Reservoir (R1-1)**



**Figure 4-2: Views towards N400 before crossing R66**





**Figure 4-3: Views of the ND500 alternative route along internal gravel road**



**Figure 4-4: View towards the intersection of R66 and P230**



**Figure 4-5: View along the P230**



**Figure 4-6: View from P230 towards new reservoir (R1-2)**



**Figure 4-7: View close to intersection of main gravel road and secondary road leading up to reservoir R1-2 site**



**Figure 4-8: View along the secondary road towards the new reservoir R1-2 site**



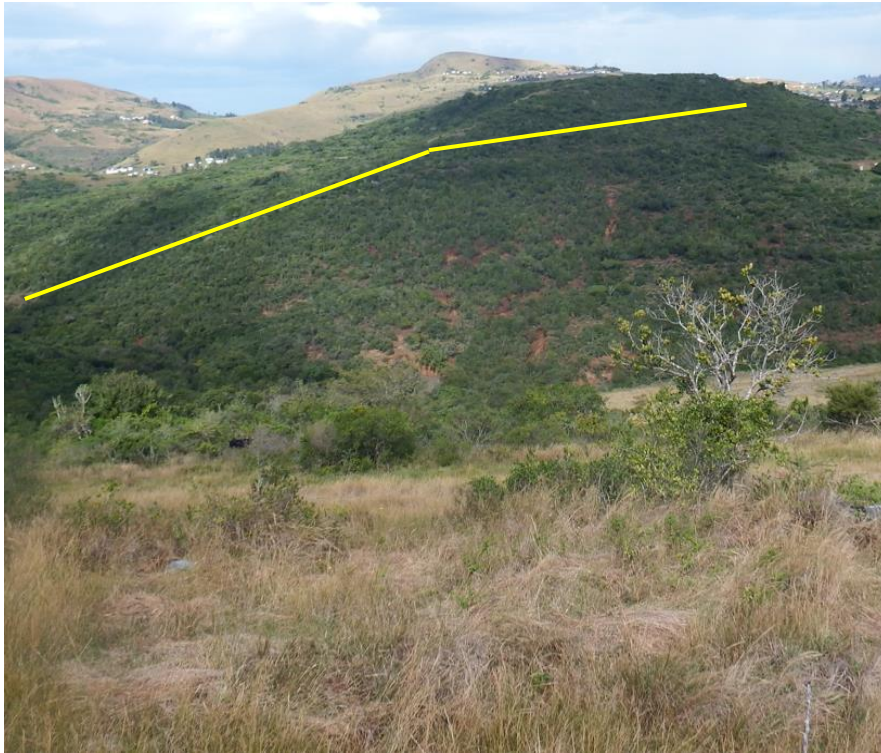
**Figure 4-9: Trig Beacon at new reservoir site**



**Figure 4-10: View from new reservoir site towards Goedetrouw Dam (circled in red)**



**Figure 4-11: Homesteads around the ND400 north-west of the new reservoir (R1-2) site**



**Figure 4-12 ND 400 towards Existing Reservoir (R 2-1)**



**Figure 4-13: ND 400 towards Existing Reservoir (R 2-1)**



Figure 4-14: Existing Reservoir (R 2-1)

### 4.2 Vegetation

The proposed development largely occurs within the *KwaZulu-Natal Coastal Belt Grassland* as presented in **Figure 4-15**. As shown in **Table 4-1**, this vegetation type is **Critically Endangered** and must therefore be protected.

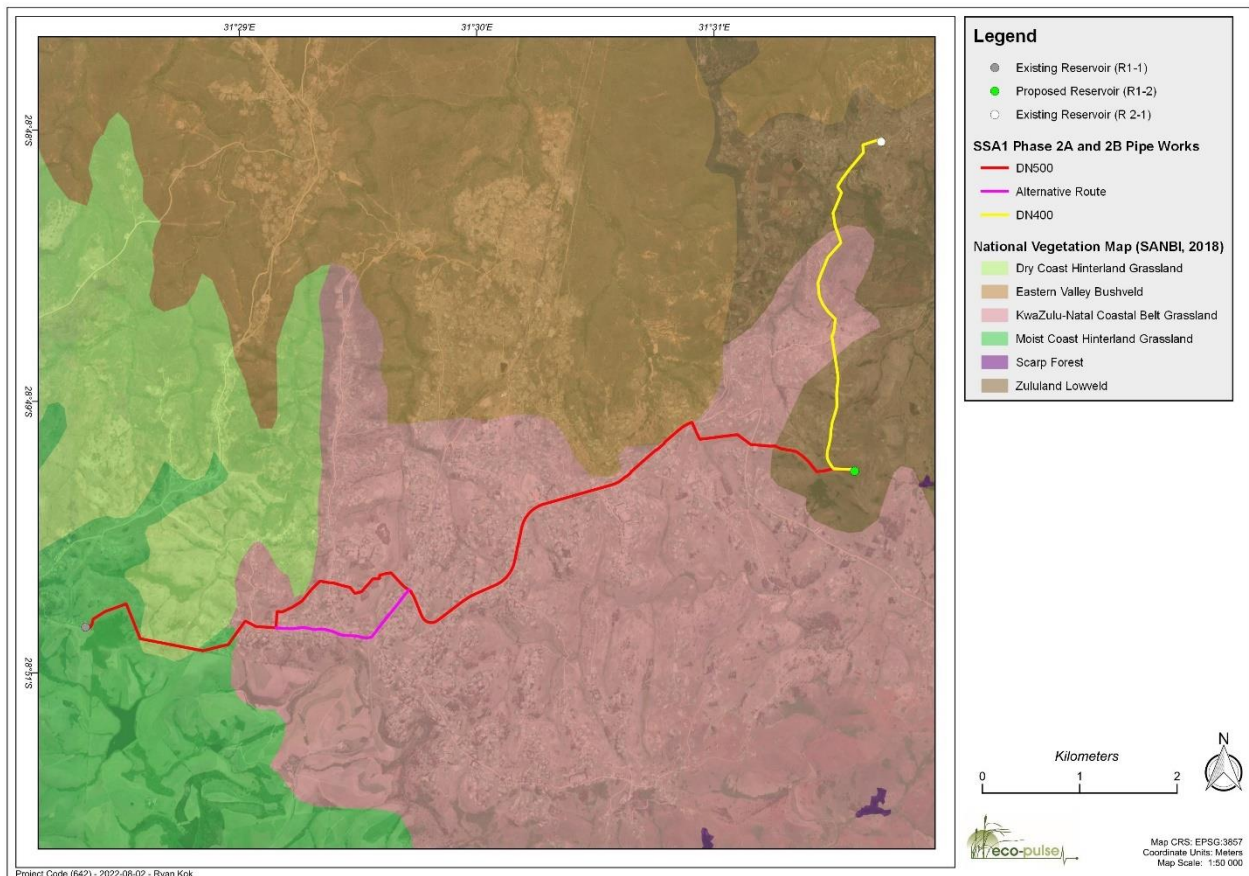


Figure 4-15: Proposed development overlaid onto the National vegetation map [Eco-Pulse, 2022(a)].

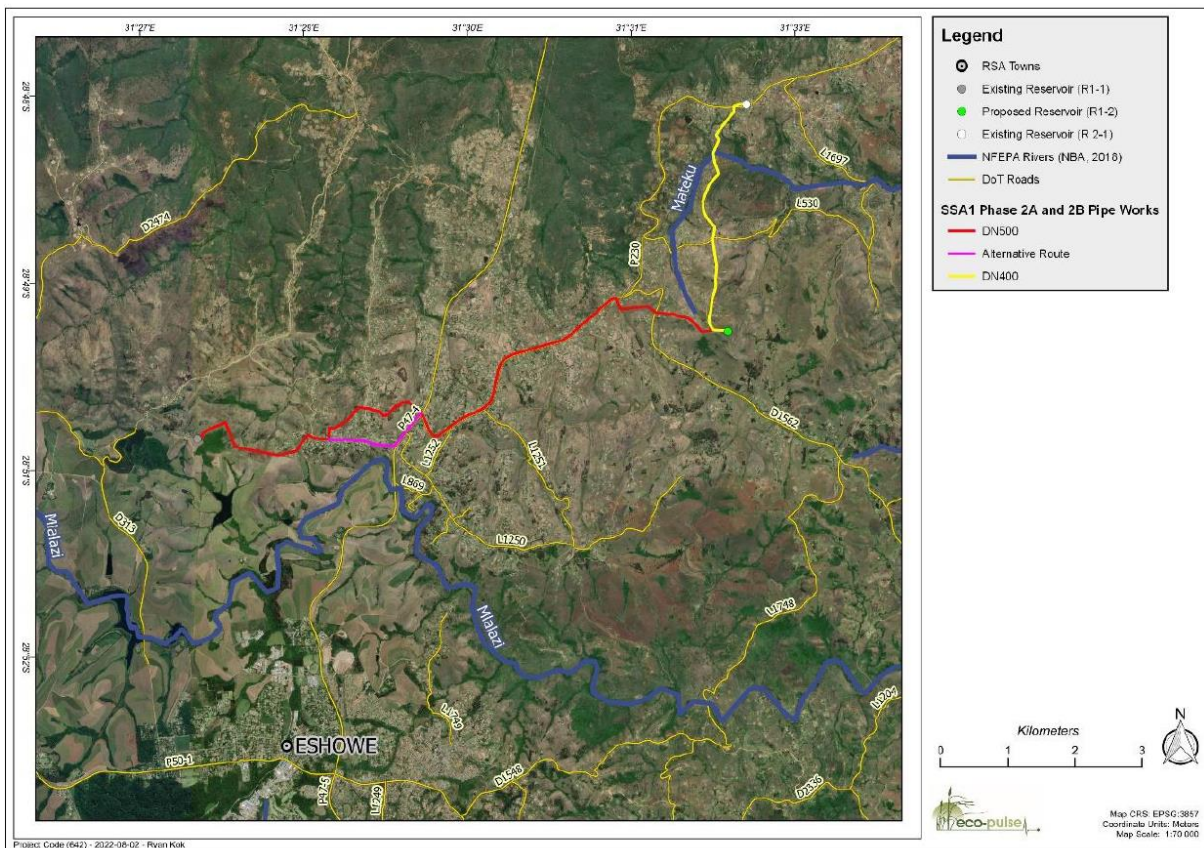
**Table 4-1: National and provincial vegetation classification and threat status [SANBI, 2018; Scott-Shaw & Escott, 2011 as presented in Eco-pulse 2022(a)]**

Vegetation Types	National Threat Status	Provincial Threat Status
KwaZulu-Natal Coastal Belt Grassland	Endangered (EN)	Critically Endangered (CR)
Moist Coast Hinterland Grassland	Vulnerable (VU)	Endangered (EN)
Dry Coast Hinterland Grassland	Vulnerable (VU)	Vulnerable (VU)
Eastern Valley Bushveld	Least Threatened (LT)	Least Threatened (LT)
Zululand Lowveld	Least Threatened (LT)	Vulnerable (VU)

While the protection is desirable, through fieldwork and desktop studies, it was observed that the area is largely built up possibly due to ease of access to the R66 and the P230. Further details concerning the vegetation of the study area are presented under **Chapter 9.2** of the BAR and in greater detail within the Terrestrial Biodiversity Assessment Report in **Appendix E1**.

### 4.3 Hydrology

According to the Freshwater Assessment Report compiled for the proposed project, the study area is located along the dividing ridge between DWS quaternary catchments W12D, W12E, and W13A. The primary rivers draining these catchments are the Mhlatuze, Mhlatuzana, and Umlalazi, respectively. Each of these watercourses ultimately discharge into the Indian Ocean in the area south of Richards Bay. The DN400 pipeline alignment crosses the Mhlatuzana River in its headwater reaches (**Figure 4-16**). All other watercourses in the study area are high order tributaries with relatively small catchment areas. The study area is located within the Pongola – Mtamvuna water management area.



**Figure 4-16: Proposed project in relation to key rivers [Eco-Pulse, 2022(b)]**

As water is a scarce resource, it is important that measures are put in place to ensure that watercourses are protected, mainly during the construction phase of the project.

#### 4.4 Climate

**Table 4-2** presents the key climate parameters of the Eshowe area. The average temperatures are highest in January (23.6°C) and February (23.7°C) and are lowest in June (15.9°C) and July (15.5°C). Rainfall is at its highest between December (100mm) and January (112mm).

**Table 4-2: Eshowe Climate (Climate-Data.org, 2022)**

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C	23.6 °C	23.7 °C	22.9 °C	20.5 °C	18.3 °C	15.9 °C	15.5 °C	17.3 °C	18.8 °C	19.8 °C	21.1 °C	22.8 °C
(°F)	(74.5) °F	(74.6) °F	(73.2) °F	(69) °F	(65) °F	(60.7) °F	(60) °F	(63.1) °F	(65.9) °F	(67.7) °F	(70) °F	(73.1) °F
Min. Temperature °C (°F)	19.8 °C (67.7) °F	19.9 °C (67.9) °F	19 °C (66.2) °F	16.5 °C (61.6) °F	13.7 °C (56.6) °F	10.8 °C (51.5) °F	10.3 °C (50.5) °F	12 °C (53.6) °F	13.9 °C (57.1) °F	15.5 °C (60) °F	17.1 °C (62.7) °F	18.8 °C (65.9) °F
Max. Temperature °C	28.2 °C	28.2 °C	27.6 °C	25.5 °C	24.1 °C	22.3 °C	22 °C	23.6 °C	24.7 °C	25.1 °C	26 °C	27.6 °C
(°F)	(82.8) °F	(82.8) °F	(81.7) °F	(77.9) °F	(75.4) °F	(72.1) °F	(71.6) °F	(74.5) °F	(76.4) °F	(77.2) °F	(78.7) °F	(81.7) °F
Precipitation / Rainfall	112	99	98	67	45	27	42	35	55	86	96	100
mm (in)	(4)	(3)	(3)	(2)	(1)	(1)	(1)	(1)	(2)	(3)	(3)	(3)
Humidity(%)	74%	75%	75%	73%	69%	65%	64%	63%	67%	72%	73%	73%
Rainy days (d)	10	9	9	7	5	4	4	5	6	10	10	10
avg. Sun hours (hours)	7.4	7.6	7.6	7.4	7.8	7.8	7.8	7.7	7.2	6.8	6.7	7.2

In the planning of the project, it is important that construction is planned to take place during times of low rainfall to prevent disruptions to project activities due to possible challenges of access and water filling trenches.

#### 4.2 Socio-Economic environment

The uMlalazi Local Municipality is a Category B<sup>1</sup> municipality located within the KCDM. It is the largest of five municipalities in the KCDM, making up almost a third of its geographical area. The main economic sectors in the uMlalazi Local Municipality are Agriculture (33%) and tourism (10.1%) and manufacturing (5%) (Municipalities of South Africa, 2012-2022).

**Table 4-3** provides demographic information for the uMlalazi Local Municipality based on the 2011 census data and the 2016 community survey. It must be borne in mind that in the case of the latter and in contrast to a census, a community survey is undertaken on a sampling basis and statistics are therefore not collected at every household [Statistics South Africa, undated(a)].

<sup>1</sup> Chapter 7 of the Constitution notes the three different municipal categories:

- **Category A – Metropolitan:** A municipality that has exclusive municipal executive and legislative authority in its area.
- **Category B – Local:** A municipality that shares municipal executive and legislative authority in its area with a Category C municipality within whose area it falls.
- **Category C – District:** A municipality that has municipal executive and legislative authority in an area that includes more than one municipality.



**Table 4-3: Socio-economic information (Municipalities, 2012-2022)**

<b>YEAR</b>	<b>2016 community survey</b>	<b>2011 Census</b>
Population	223 140	213 601
<b>Age Structure</b>		
Population under 15	43.2%	37.2%
Population 15 to 64	51.6%	57.2%
Population over 65	5.2%	5.6%
<b>Dependency Ratio</b>		
Per 100 (15-64)	93.8	74.9
<b>Sex Ratio</b>		
Males per 100 females	86.9	85.4
<b>Population Growth</b>		
Per annum	0.99%	n/a
<b>Labour Market</b>		
Unemployment rate (official)	n/a	35.2%
Youth unemployment rate (official) 15-34	n/a	45.1%
<b>Education (aged 20 +)</b>		
No schooling	20.1%	22.5%
Matric	28.6%	23.0%
Higher education	6.1%	5.7%
<b>Household Dynamics</b>		
Households	46 953	45 062
Average household size	4.8	4.5
Female headed households	56.6%	55.3%
Formal dwellings	62.4%	60.7%
Housing owned	80.7%	50.6%
<b>Household Services</b>		
Flush toilet connected to sewerage	12.3%	13.4%
Weekly refuse removal	13.2%	15.8%
Piped water inside dwelling	15.2%	19.6%
Electricity for lighting	81.3%	58.2%

**Table 4-4: Main source of drinking water within the uMlalazi Local Municipality per households (Umlalazi Local Municipality, 2022)**

INDICATOR	TYPE	NUMBER	PERCENTAGE
Main source of drinking water	Piped (tap) water inside dwelling	7 154	15,2%
	Piped (tap) water inside yard	13 351	28,4%
	Piped water on communal stand	8 244	17,6%
	Borehole in yard	308	0,7%
	Rain-water tank in yard	815	1,7%
	Neighbors tap	758	1,6%
	Public/communal tap	4 831	10,3%
	Water-carrier/tanker	3 479	7,4%
	Borehole outside yard	1 228	2,6%
	Flowing water/stream/river	6 063	12,9%
	Well	0	0,0%
	Spring	552	1,2%
	Other	169	0,4%

Based on the information presented, it is clear that the availability of clean water, regardless of the manner of access needs to be improved within the municipality.

### 5. DEVELOPMENT MOTIVATION- NEED AND DESIRABILITY

As water is a basic human need, the proposed project is of high priority. The current Phase 2 along with Phase 1 and Phase 3C and 3D for which Environmental Authorisations have been issued by the EDTEA will contribute towards the completion of the KwaHlokoHloko Sub-Supply Area 1 Scheme. The right to water is covered in Section 27 of the Constitution of South Africa, 1996 (Act No. 108 of 1996) which also mentions that the state has a responsibility towards the realisation of the access to water.

In a Government Communication & Information System (GCIS) 2021 study as presented in KZN Provincial Planning Commission (2021), water supply emerged as one of the areas that citizens of KZN identified as a challenge to the country and/or the province.

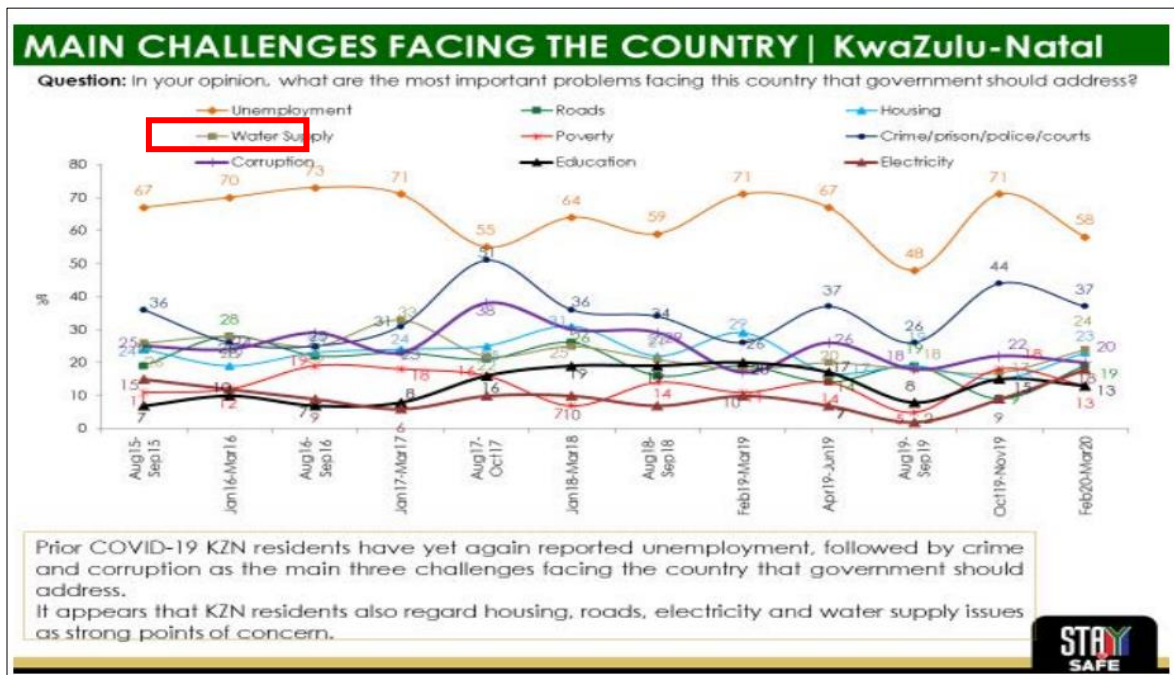


Figure 5-1: Main challenges facing the country/ KwaZulu- Natal (KZN Provincial Planning Commission, 2021)

The uMlalazi Local Municipality’s 2022/ 2027 Integrated Development Plan (IDP), fifth review, notes under Basic Service Delivery, the role of the KCDM as Water Services Authority (WSA) in the area and mentions that “King Cetshwayo District Municipality, in terms of the Water Services Act, is the Water Services Authority in respect of its area of jurisdiction, apart from the City of uMhlathuze. The WSA has a duty to all consumers, or potential consumers, in its area of jurisdiction to progressively ensure efficient, affordable, economical, and sustainable access to water supply and sanitation (collectively referred to as water services). As a WSA, King Cetshwayo District Municipality focuses on water services and on providing at least a basic level of service to consumers in its area of jurisdiction)” (uMlalazi Local Municipality, 2022).

Bulk water supply will likely lead to future reticulation provision, which will have the domino effect of providing household standpipes and sewerage infrastructure in the area, thus improving the standard of living in the identified communities while assisting in preventing waterborne diseases such as cholera.

The possible development initiatives from this project will be the creation of employment opportunities for local labour during the construction of the works, along with increased sales for local merchants able to

supply construction materials and equipment. The local labour will also receive training on various skills that will assist them in seeking employment elsewhere once this project is complete.

## 6. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

**Table 6-1** provides a list of all the applicable legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA Regulations, 2014, as amended. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the Applicant in respect of environmental management for the proposed development. This DBAR specifically focuses on key Environmental legislation, policies and guidelines that include an environmental component

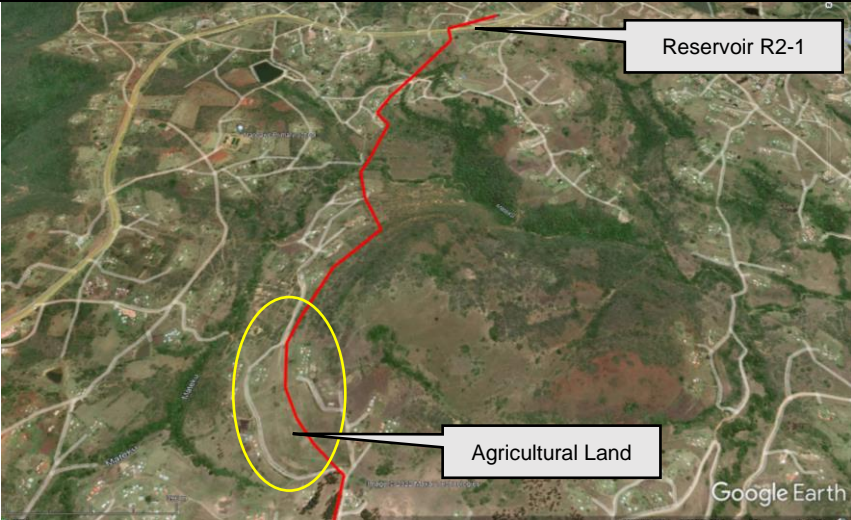
**Table 6-1:Key Applicable legislation, policies and/or guidelines**

<b>TITLE OF LEGISLATION, POLICY OR GUIDELINE AND APPLICABILITY TO PROJECT</b>
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)- due to section 28 on the right to access to water
National Environmental Management Act, 1998 (Act 107 of 1998) – to ensure overall environmental protection whilst realising the proposed development
National Environmental Management Act, 1998 (Act 107 of 1998), Environmental Impact Assessment Regulations, (2014), as amended- to guide the Basic Assessment process
National Water Act (Act 36 of 1998) – for potential of project to impact on watercourses defined under the Act (Section 19 and 21).
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) – for protection of agricultural resources and for control and removal of alien invasive plants.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity.
The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance.
Integrated Environmental Management Guideline; Guideline on Need and Desirability (2017)- This guideline informs the consideration of the need and desirability aspects of a proposed project.
Guideline 4: Public Participation in support of the EIA Regulations (2005)- to aid towards the undertaking of Public Participation in such a manner that all Interested and Affected parties are afforded a fair opportunity to take part in the Basic Assessment Process
Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
Guideline 7: Detailed Guide to Implementation of the Environmental Impact Assessment Regulations (2006).
uMlalazi Municipal Integrated Development Plan, 2022-2027- Contextualises the development into the overall plans of the municipality concerning not only overall service delivery, but the specific need for the provision of clean water to all residents

## 7. SPECIALIST STUDIES

The Screening Tool report generated from the website of the Department of Forestry, Fisheries and the Environment (DFFE) presented a number of studies that must be undertaken for the project. The Report allows an EAP to motivate the reasons for not undertaking studies identified by the Tool. In the undertaking of the Screening Report for KwaHlokoheko, the extent of the project was divided into the Preferred route as well as the section of the line with alternative route closest to Reservoir R1-1 in the Eastern Section of the project. **Table 7-1** presents the studies identified by the Screening Tool as well as the EAP's discussion regarding each studies applicability and the way-forward.

**Table 7-1: Specialist Studies identified by the DFFE screening tool and EAP's discussion**

Specialist assessment	Applicability for preferred route	Applicability for the alternative route	EAP's motivation on way-forward for study
<b>Agricultural Impact Assessment</b>	No	No	Minimal Agricultural land exists along the pipeline route. This was observed in only a few areas of the site such as that shown in <b>Figure 7-1</b> . Furthermore, the location for the proposed new Reservoir (R1-2) is not within an area in which agriculture is practiced.
 <p><b>Figure 7-1: Agricultural Land to be impacted by proposed development</b></p>			
<b>Archaeological and Cultural Heritage Impact Assessment</b>	Yes	Yes	A Heritage Impact Assessment Report has been compiled.
<b>Palaeontology Impact Assessment</b>	Yes,	Yes	The Palaeontological findings are covered in the

<b>Specialist assessment</b>	<b>Applicability for preferred route</b>	<b>Applicability for the alternative route</b>	<b>EAP's motivation on way-forward for study</b>
			Heritage Impact Assessment Report.
<b>Terrestrial Biodiversity Impact Assessment</b>	Yes	Yes	The report has been compiled.
<b>Aquatic Biodiversity Impact Assessment</b>	Yes	Yes	The Freshwater assessment Report compiled for the project covers the Aquatic Biodiversity Assessment Requirements.
<b>Geotechnical Assessment</b>	Yes	Yes	This has been undertaken.
<b>Socio-Economic Assessment</b>	No	No	While the project will have social impacts, the scale of this does not warrant the undertaking of a Socio-Economic Assessment as this would be applicable to projects with high impacts, particularly during the operational phase, e.g. a Mixed-use development project.
<b>Plant Species Assessment</b>	Yes	Yes	A Plant Species Assessment is covered in the Terrestrial Biodiversity Impact Assessment.
<b>Animal Species Assessment</b>	No	No	There were no signs of fauna that would have required the undertaken of an Animal Species Assessment. Measures to ensure the protection of animals will be covered in the EMPr.

In accordance with the requirements of **Appendix 1** of the NEMA EIA Regulations, 2014, as amended, which pertain to the contents of a Basic Assessment Report, a summary of the findings and impact management measures of specialist reports must be presented. Furthermore, there must be an indication on how the findings and recommendations have been included in the BAR.

The Specialist Studies undertaken for this BA are as follows:

- Freshwater Impact Assessment;
- Terrestrial Biodiversity Impact Assessment; and
- Heritage Impact Assessment (inclusive of a Palaeontological Assessment).

These reports are attached in **Appendix E** of this BAR. As discussed under **Chapter 2** of this BAR, Geotechnical Reports compiled for ND500, and ND400 were availed to the EAP as supporting documents. These have not been included under **Appendix E** but are available on request.

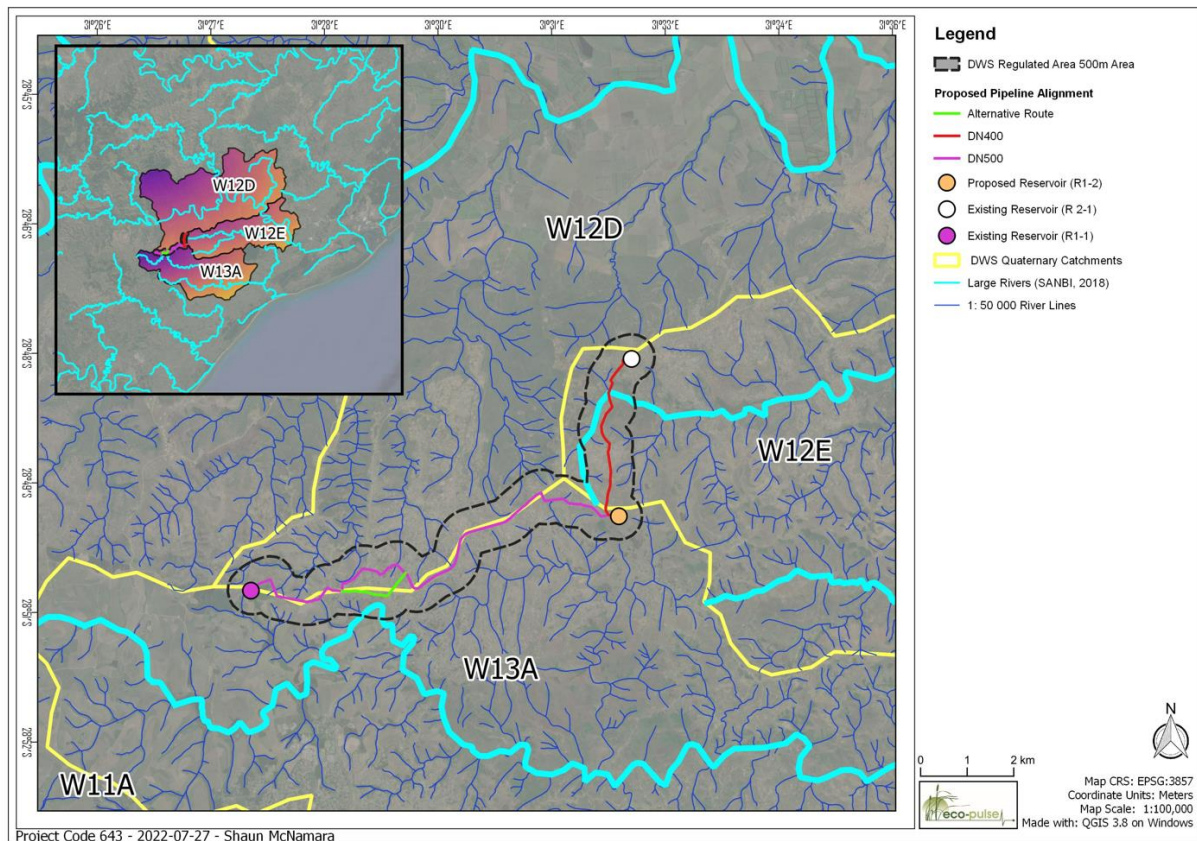
A summary of the findings of each of the studies will be presented.

## 7.1 Freshwater Impact Assessment

The study was compiled by Eco-Pulse Environmental Consulting Services in accordance with the requirements in the latest NEMA Minimum Requirements and Protocol for Specialist Aquatic Biodiversity Impact Assessment as contained in the “Procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes of Section 45 (a) and (h) of the National Environmental Management Act, 1998, when applying for Environmental Authorization”. Furthermore, due to the need for a Water Use Authorisation, the assessment was also undertaken in line with the requirements of the Department of Water & Sanitation (DWS) for Water Use Licensing, as outlined in the ‘Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals’ as set out Government Gazette No. 40713 of 24 March 2017.

Thirteen (13) watercourse units were rated as ‘likely to be affected’ by the project in terms of incurring potential construction and/or operation related impacts. The watercourses are either crossed by the proposed pipeline, or the pipeline alignment is sufficiently close to the watercourse that indirect impacts may occur. The thirteen watercourses comprise ten (10) wetland units and three (3) river / stream units (**Figure 7-2**). One of the watercourses to be crossed by the pipeline is the Mateku system in its upper reaches. There are no watercourses that will be impacted by the construction of the proposed new reservoir.

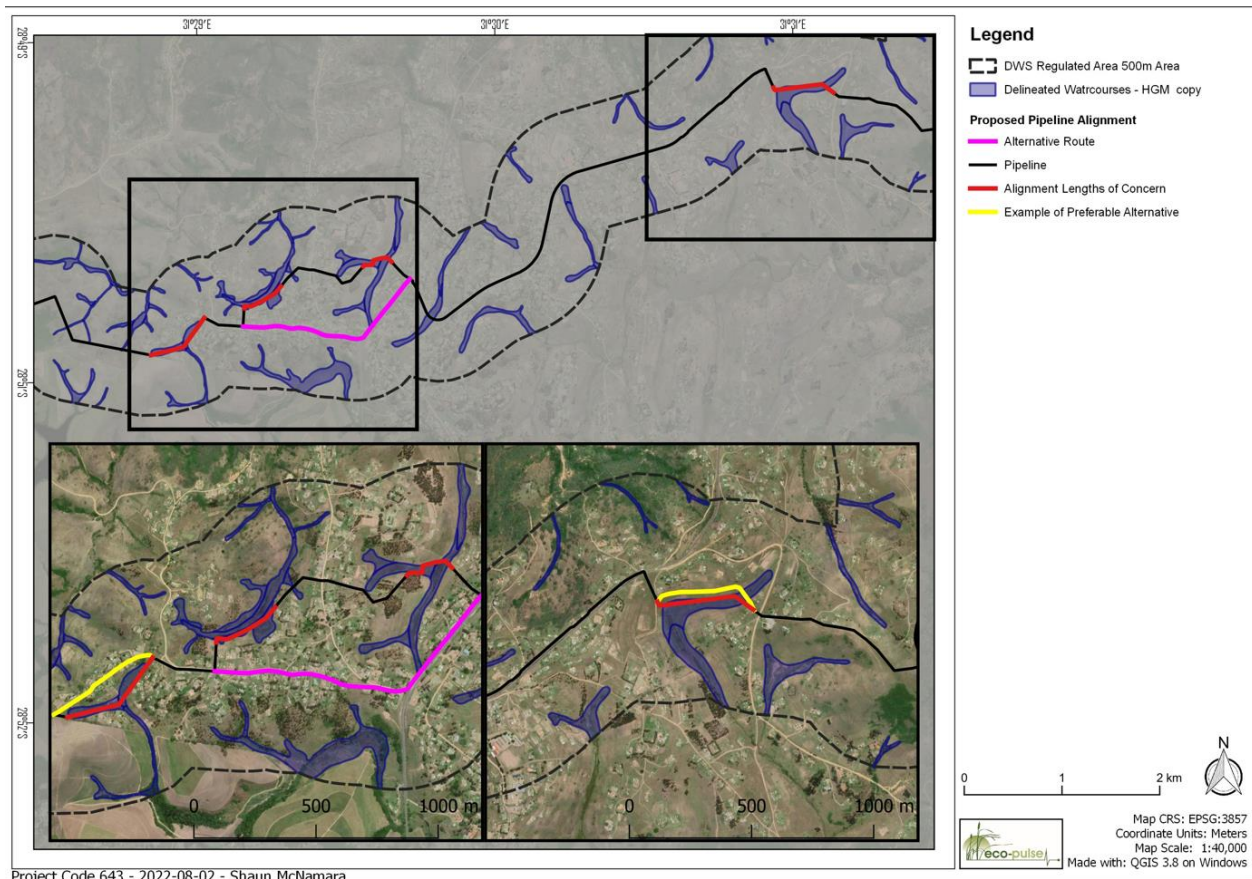




**Figure 7-2 Local and regional drainage network for the project [Eco-Pulse, 2002(b)]**

The key potential impacts associated with the construction phase of the project relate to: (i) direct habitat modification, (ii) altered sediment delivery processes and volumes to onsite watercourses, and (iii) altered water quality of onsite watercourses, largely due to turbidity issues. With the implementation of construction phase mitigation measures however, all potential construction phase impacts can be reduced to a low overall significance. The overall significance of operation phase impacts associated with the upgraded supply scheme is 'Low'. This is due to the low likelihood and intensity of impacts. The DWS Risk Assessment indicates that with effective mitigation all construction and operation phase impacts can be managed down a 'low' overall risk.

In an effort to manage the possible impacts, on watercourses, several alternatives to routes were proposed by the Specialist and are presented in **Figure 7-3**.



**Figure 7-3: Map showing the lengths of pipeline alignment of concern and examples of preferable alternative alignments [Eco-Pulse, 2002(b)]**

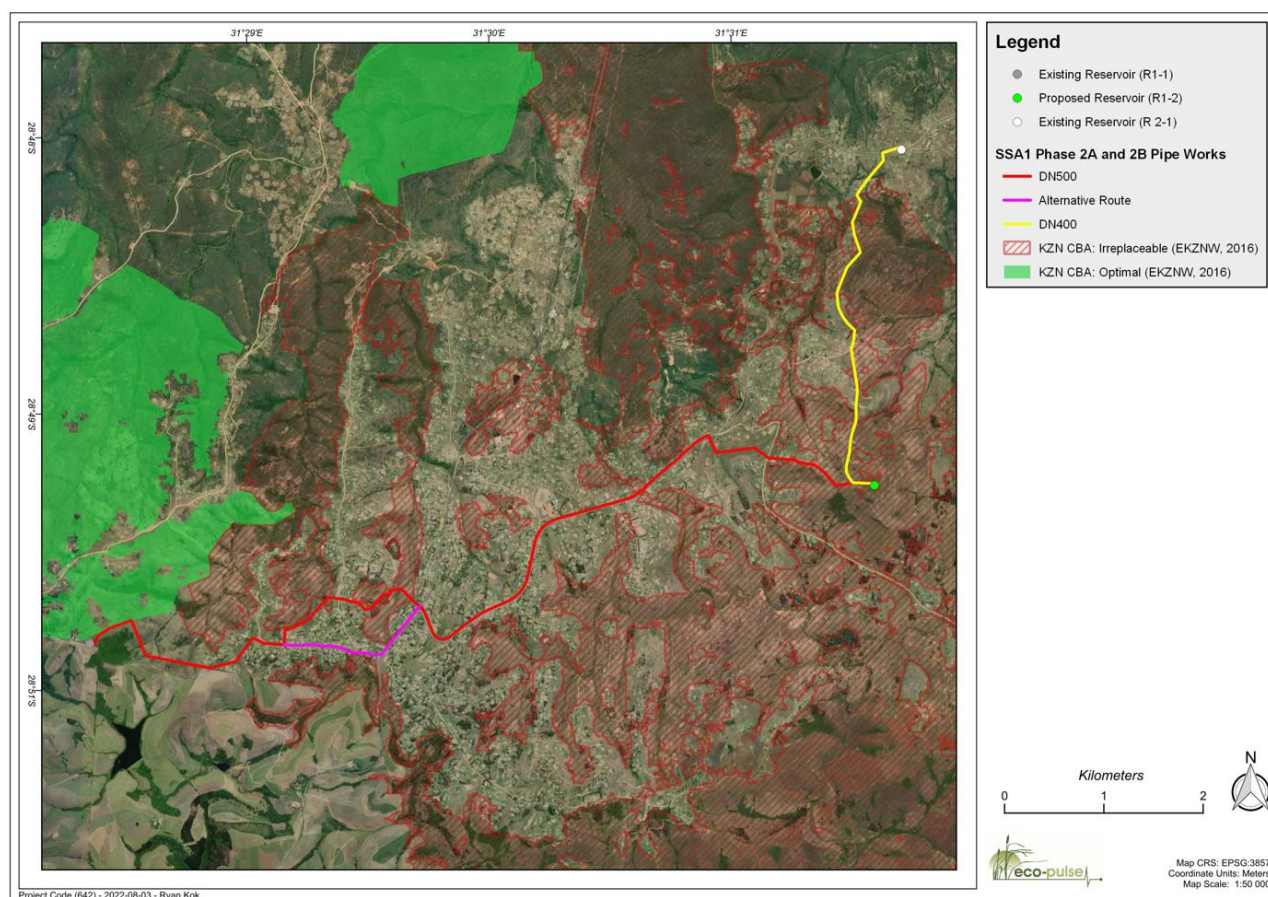
Further details concerning the findings of the Freshwater Impact Assessment are presented in **Appendix E2**.

## 7.2 Terrestrial Biodiversity Impact Assessment

Eco-Pulse Environmental Consulting Services undertook the Terrestrial Biodiversity Impact Assessment in accordance with the requirements of the “Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity” published In Government Notice No. 320, Government Gazette 43110 of 20 March 2020.

Vegetation and habitat were surveyed on the planned development site (proposed footprint of the pipeline and reservoir) and within a 10m servitude (i.e. 5m either side of the pipeline centreline). Various terrestrial vegetation communities were identified and classified according to topographic location, plant species composition, vegetation structure and level of degradation.

The proposed development runs along various Critical Biodiversity Areas (CBA): Irreplaceable (i.e., areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems. The CBA: Irreplaceable occurs largely along the DN400 running North towards existing reservoir R2-1 (**Figure 7-4**).



**Figure 7-4: Map showing the location and extent of areas identified as ‘CBA: Irreplaceable’ (shaded in a hashed ‘red’) according to the terrestrial CPLAN (EKZNW, 2016), in relation to the study site [Eco-pulse, 2002 (a)].**

Further to the above concerning the CBA: Irreplaceable, protected plant species were observed along some sections of the route along the KwaZulu-Natal Coastal Belt and Zululand Lowveld and the Grassland Vegetation Types as shown in **Figures 4-15** as well as **Figure 7-5** which are within a Critically Endangered (CR) and a Vulnerable (VU) provincially threat status as presented in **Figure 7-6**. The identified protected species were:

- *Stangeria eriopus*- Common name, Cycad;
- *Aloe maculata* and *Aloe marlothii* - Common name, Aloe; and
- *Eucomis autumnalis* – Common name, Pineapple Lilly.

The above are provincially protected in accordance with the Nature Conservation Management Amendment Act, 1999 (No. 5 of 1999). To ensure the protection of the above, and at the time of the compilation of this BAR, a Protected Plant Permit Application and Protected Plant Rescue and Translocation Plan was underway. Ordinary Permits will be required from Ezemvelo KZN Wildlife prior to the removal of these plants.

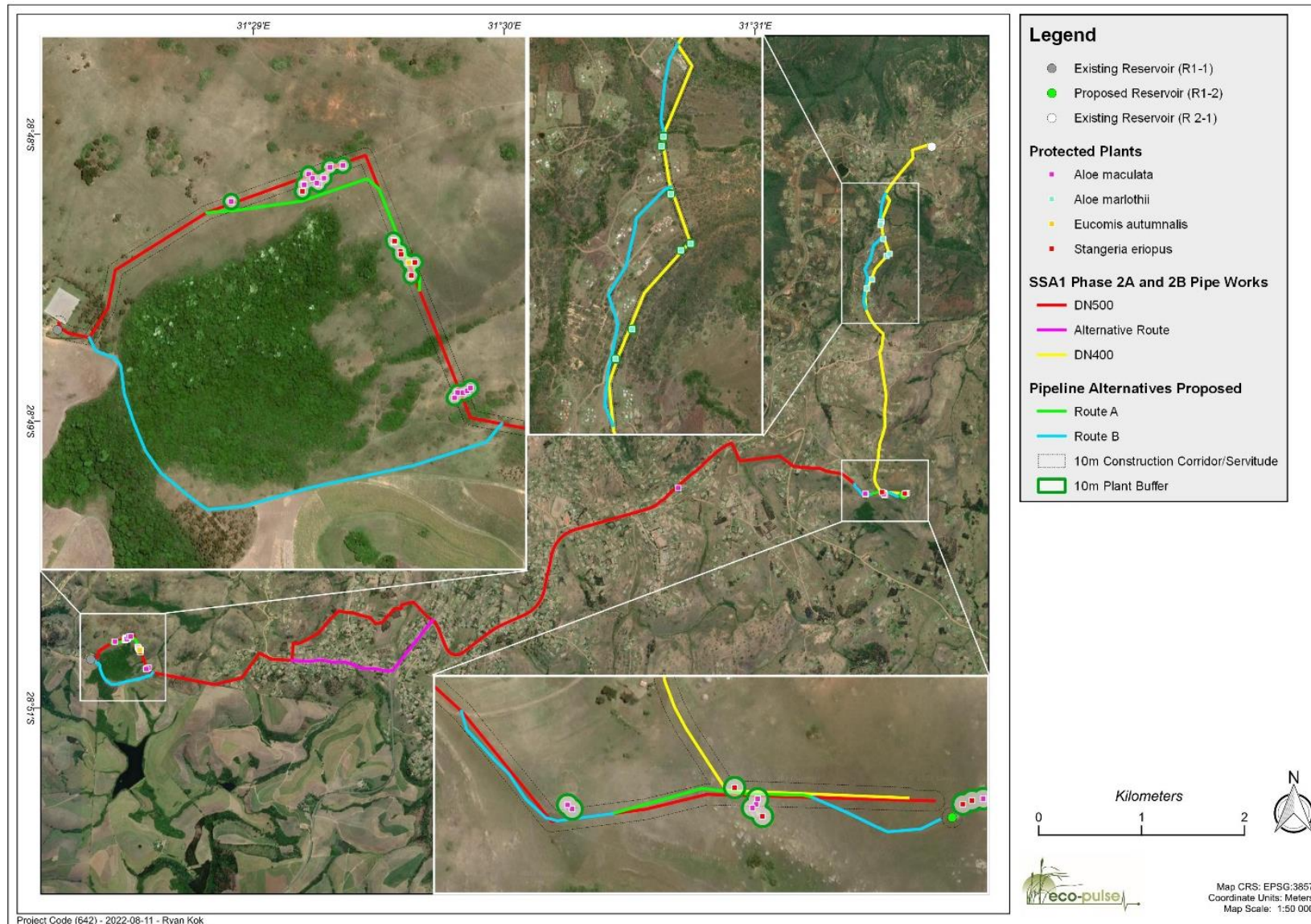
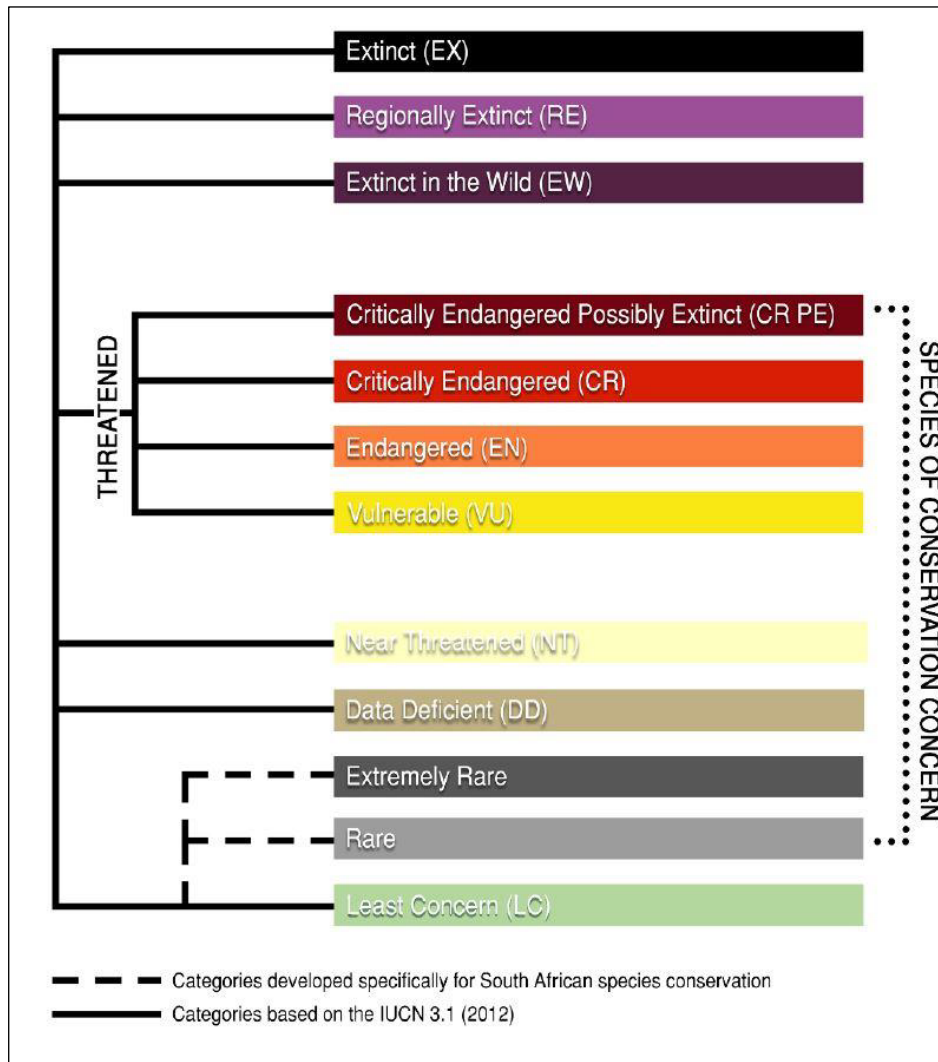


Figure 7-5: Map indicating alternative pipeline alignment recommendations A – B along with the original pipeline alignment and 10m plant buffer areas shown [Eco-Pulse, 2022(a)].



**Figure 7-6: Different categories of species of conservation concern (SCC) modified from the IUCN’s extinction risk categories (reproduced in part from IUCN, 2012) - extracted directly from SANBI (2020) [Eco-Pulse, 2022 (a)]**

In an effort to manage negative impacts, on protected plant species, alternatives to routes were proposed by the Specialist and are presented in **Figure 7-5**.

While the Terrestrial Biodiversity Assessment largely focused on flora (i.e. plants), there was a review of available Red List databases which highlighted the possible occurrence of certain amphibians, avifauna (birds), mammals, reptiles, and invertebrates with high threat status.

*Additional details of the Terrestrial Biodiversity Impact Assessment are presented in **Appendix E1**.*

### **7.3 Heritage Impact Assessment (inclusive of a Palaeontological Assessment)**

A Heritage Impact Assessment was undertaken by Umlando: Archaeological Surveys and Heritage

Management and comprised of desktop studies (through the use of Umlando's database collected from various sources) as well as fieldwork.

Eight possible heritage sites were noted during the survey. These included possible graves and remains of settlements as presented in **Table 7-2**. It was noted that none of these would be directly impacted by the development.

**Table 7-2: Location of recorded sites (Umlando, 2022)**

Name	Latitude	Longitude	Name	Description
<b>G3</b>	-28.831262000	31.535988000	House	House foundations in long grass
<b>G4</b>	-28.844557692	31.459937336	g4	House foundations in long grass
<b>H14</b>	-28.843200600	31.474034900	H14	House foundations in long grass. Not affected
<b>House 1</b>	-28.813433333	31.537952778	House 1	2 x possible graves. Not affected
<b>House 2</b>	-28.813664200	31.537755700	House 2	3 graves, H3 Not affected
<b>House 3</b>	-28.814355400	31.537598900	House 3	1 x possible grave Not affected
<b>House 4</b>	-28.815038800	31.537450900	House 4	2 graves Not affected
<b>S7</b>	-28.843913468	31.461422843	S7	House foundations in long grass

Should for some reason the pipeline be re-aligned, the footprint of the pipeline needs to be at least 20m from the edge of the closest grave. In addition to this, sites must be clearly demarcated before and during construction. There must be a 5m buffer between the *grave and the demarcation*.

*With regards to palaeontology, the pipeline occurs mostly in an area of no/low palaeontological sensitivity.*

*The Heritage Impact Assessment presenting further details of the findings are presented in **Appendix E3**.*

#### 7.4 Geotechnical Assessment

As discussed under **Chapter 2** of this Report, three (3) Geotechnical Reports covering ND500, ND400 as well as the location for the proposed Reservoir (R1-2) were compiled by GroundAfrica Consulting Geotechnical Engineers.

The aim of the geotechnical investigation was to determine the conditions of the ground along the proposed infrastructure. This was undertaken to inform the analysis, design, and costing of the infrastructure. The key task of the Geotechnical Study was the excavation of trial holes (positions were either along or as close as possible to the pipeline alignment) to depths of between 0.3m and 3.0m (in some cases up to 3.1m) below PGL (present ground level). The material sourced in the field was tested to contribute towards the project aims.

The following were the key findings of each of the studies as copied directly from the Report:

- **ND500 Pipeline Alignment:**
  - Geological mapping of the area shows the proposed pipeline alignment is underlain by sedimentary rock of the Natal Group and Dwyka Group, Karoo Supergroup.
  - The geotechnical investigation shows that the site is predominantly underlain by sedimentary rock of the Natal Group, Karoo Supergroup. The Natal Group in the area comprises mostly medium to coarse grained sandstone with some thin lenses of purple

mudstone and conglomerate. The sandstone rock is thickly bedded, widely jointed and generally massive.

- Sedimentary rock of the Dwyka Group is present at the start and end points of the identified pipeline alignment, comprising the higher topographical areas. The Dwyka Group in the identified area comprises glacially deposited tillite; however, some thin lenses of interbedded shale and sandstone can be expected.
- Trial hole sidewalls were found to be stable in a freestanding state and temporary shoring will not be necessary.
- Key items pertaining to the way forward based on findings of the study:
  - It is estimated that approximately 70% of the pipeline trenches can be excavated using a standard sized tractor backhoe (TLB). In areas where shallow lying rock is present (less than 1m below PGL) a 20ton excavator will be required. It is estimated that this will be necessary along about 20% of the length of pipeline.
  - Stormwater and Erosion Control Measures: The natural soils in the area are deemed to be susceptible to erosion. Prominent erosion gullies were noted along the sides of steep slopes. Allowance for erosion protection measures over covered pipeline trenches will be required, particularly in areas where the pipeline alignment traverses steep slopes. It is further recommended that pipelines be aligned to gradually rise up the steep slopes rather than be placed perpendicular to the contour levels.
  - Stream Crossings:
    - The planned new pipeline crosses a number of flowing streams. There are no major river crossings. Wetland conditions, comprising saturated soils, are present either side of some of the stream crossings. In these wet areas the use of temporary shoring to keep trench sidewalls from collapsing will be required. In addition, creation of temporary sumps to collect seepage and remove it through pumping will be required;
    - It is understood that the pipeline will be buried under the stream beds at the crossing points. Excavation through these areas will necessitate the use of temporary shoring and the use of coffer dams to allow construction. Once the pipes are buried, scour protection measures, such as gabion baskets or reno mattresses, must be used to protect the underlying pipe.

- **ND400 Pipeline Alignment:**

- Geological mapping of the area shows the proposed pipeline alignment is underlain by the following formations within the Karoo Supergroup:
  - Glacial tillite of the Dwyka Group
  - Medium to coarse grained sandstone of the Natal Group
  - Siltstone, shale and sandstone of the Pietermaritzburg Formation, Ecca Group
  - Siltstone and sandstone of the Vryheid Formation, Ecca Group.
  - Karoo aged intrusive dolerite.

The geotechnical investigation conducted along the earmarked alignment confirms the presence of the aforementioned formations.
- Trial hole sidewalls were found to be stable in a freestanding state and temporary shoring will not be necessary.
- Key items pertaining to the way forward based on findings of the study:
  - It is estimated that approximately 60% of the pipeline tranches can be excavated using a standard sized tractor backhoe (TLB). In areas where shallow lying rock is present (less than 1m below PGL) a 20ton excavator will be required. It is estimated that this will be necessary along about 30% of the length of pipeline.

- Stormwater and Erosion Control Measures: Colluvial and residual soils in the identified area are susceptible to erosion. A number of erosion gullies were noted to have formed in areas masked by loose, unconsolidated sands, resulting in the exposure and undermining of existing pipeline infrastructure. Residual soils derived from the in-situ decomposition of tillite are often found to have dispersive qualities and the formation of erosion gullies is usually pronounced in these soils.
- Stream Crossings: The pipeline alignment will cross the Mateku River at a chainage of 2996m. An assessment of the river crossing point shows that hard to very hard rock dolerite is present at surface within the river channel.
  - Excavation through, and embedment of the new pipeline within the dolerite rock mass will require blasting. Should this be undertaken, it is recommended that the pipe be encased in mass concrete, cast into the surrounding natural rockmass;
  - As an alternative solution; a pipe bridge could be used across the river course. The exposed natural dolerite rockmass will form a competent base upon which steel reinforced concrete pad footings can be seated which in turn will support the pipe bridge structure.
- **New 1.55ml Reservoir Site (R1-2)**
  - Geological mapping of the area indicates the site is underlain by tillite rock of the Dwyka Group, Karoo Supergroup. Tillite is a glacial sedimentary rock which is characterised by erratically-sized rock fragments supported within a very fine-grained matrix. These fragments comprise various rock types of differing origins and colours and are a result of glacial deposition.
  - Unweathered tillite is generally dark grey blue, but weathers to a pale dusty yellowish brown. Highly/Moderately weathered to unweathered tillite rock generally provides a stable base upon which to seat foundations; albeit the possible presence of randomly distributed boulders and large erratics has the potential to create problematic excavation conditions.
  - Residual soils derived from the in-situ decomposition of the tillite rock comprise fine grained clayey silts to silty clays which are commonly susceptible to erosion and have been found to be dispersive. The residual soils are known to be compressible where a deeply weathered profile exists. Ferricrete nodules and cemented concretions are common in the upper sequences of the residual soils.
  - Excavations on site indicate that thick, fine grained, residual soils underlie the site to depths in excess 6.0m below PGL. Large, sub-rounded tillite boulders were observed at surface in the general area and can be expected within the fine-grained residual soils.
  - Key items pertaining to the way forward based on findings of the study:
    - Earthworks
      - Ground preparation will comprise stripping all vegetation along with the near surface colluvial soils across the footprint area of the new cut platform. It is recommended that these initial works are undertaken using a standard sized tractor loader backhoe (TLB). The stripped vegetation and colluvial soils must be stockpiled for later landscaping and land remedial measures which will need to be undertaken at the end of the construction phase.
      - Bulk earthworks on site will require the use of a 20ton excavator.
    - Foundations of the Reservoir
      - It is recommended that the reservoir is founded on a steel reinforced concrete raft foundation which is in turn placed on a mattress of imported gravel. It is imperative that the new reservoir be placed wholly within cut and must not straddle zones of fill.
    - Groundwater and Drainage



- No groundwater was intersected within trial holes excavated on site, albeit some groundwater seepage can be expected after rainfall.
- Generous provision of surface stormwater drainage will be of paramount importance for this site. Formal outfall structures must be designed to dissipate the erosive energy of the stormwater and evenly distribute it non-destructively downslope.

## 8. LISTED ACTIVITIES AND PRE-APPLICATION MEETING

### 8.1 Applicable Listed Activities

As discussed in **Chapter 1** of this DBAR and in terms of the Environmental Impact Assessment (EIA) Regulations, 2014, as amended, promulgated in terms of the National Environmental Management Act, 1998 (NEMA), certain Listed Activities are specified for which either a Basic Assessment (Listing Notice 1 and 3) or a full Scoping and EIA (Listing Notice 2) is required.

The following Listed Activities Listing Notice 1 and Listing Notice 3, requiring a Basic Assessment (BA) Process are applicable to the proposed KwaHlokoheko SSA 1: Phase 2 development:

- **Listing Notice 1, Activity 9:** *“The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—*
  - (i) with an internal diameter of 0,36 metres or more; or*
  - (ii) with a peak throughput of 120 litres per second or more;**excluding where—*
  - (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or*
  - (b) where such development will occur within an urban area. .”*
    - The proposed pipeline length will exceed 1000m (i.e. 1km). It will be a total of approximately 14.3 km (i.e. 14 300m) and will be for the bulk transportation of water outside an urban area and in some areas outside a road reserve. The internal diameters of the pipes will be 500mm and 400mm respectively (i.e. 0.5m and 0.4m).
- **Listing Notice 2, Activity 19:** *“Trenching through watercourses will necessitate the movement of more than 10m<sup>3</sup> of material or more, into or out of a watercourse.”*
  - Construction through watercourses will necessitate the movement of 10m<sup>3</sup> of material or more, into or out of a watercourse.
- **Listing Notice 3, Activity 2:** *“The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres in d) KwaZulu-Natal (dd) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*
  - The capacity of the proposed reservoir R1-2 is 1.55ML (i.e. 1550 cubic metres) and is proposed within a Critical Biodiversity Area).
- **Listing Notice 3, Activity 12:** *“The clearance of an area of 300m<sup>2</sup> or more of indigenous vegetation, (d) in KwaZulu-Natal, (iv) within any critically endangered or endangered ecosystems in terms of section 52 of the NEMBA or prior to publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004, viii) a protected area identified in terms of NEMPAA, excluding conservancies.”*
  - The proposed pipeline runs through some Critical Biodiversity Area (Irreplaceable) areas.

Based on the above proposed activities, a BA Process as discussed and illustrated as in **Chapter 1** of this BAR is required.

### 8.2 EDTEA Pre-Application Meeting

Based on the identified need for a BA, a Pre-Application Meeting was held with Mr M. Mdamba of the EDTEA: King Cetshwayo District on the 24<sup>th</sup> of June 2022. The minutes of the meeting are included in **Appendix C1**. The purpose of the Pre-Application Meeting was to introduce the project to the EDTEA and present and confirm the relevant Listed Activities, Specialist Studies, Public Participation as well as other issues pertinent to the proposed project.

## 9. ALTERNATIVES

In terms of the EIA Regulations (2014), feasible and reasonable alternatives must be identified and considered within the Basic Assessment process. According to the above-mentioned, an alternative is defined as “...in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- (a) property on which or location where it is proposed to undertake the activity;
  - (b) type of activity to be undertaken
  - (c) design or layout of the activity;
  - (d) technology to be used in the activity;
  - (e) operational aspects of the activity; and
- Includes the option of not implementing the activity.”*

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the BA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection.

The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts.

In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the Basic assessment Process and each role is detailed as follows:

The role of the Environmental Assessment Practitioner [i.e. Terratest (Pty) Ltd] is to:

- encourage the proponent to consider all feasible alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;
- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the Proponent (i.e. KCDM) is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social, and economic aspects.

**Table 9-1** outlines the various alternative types that must be assessed for each development. The extent of the applicability of each of these is further presented. It must be highlighted that the alternatives presented

in the table are derived from both the the EIA Regulations, 2014, as amended as well as the the Department of Environmental Affairs and Tourism's (now Department of Environmental Affairs) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it will be further discussed in this report.

**Table 9-1: Alternative types and EAP's comments**

ALTERNATIVE	COMMENT
<b>No-go Option</b>	This alternative <b>must be discussed</b> on all projects as it allows for an assessment of impacts should the activity not be undertaken. The 'No-go Option' is discussed under <b>Chapter 9.1</b> of this BAR.
<b>Activity alternatives</b>	<b>Not applicable.</b> Besides the above-mentioned 'No- no option', there are no other activity alternatives to the proposed activity as the development of the proposed project is the intention of the KCDM.
<b>Location/ property alternatives</b>	<b>Not applicable</b> as it is the intention of the KCDM to provide water to its residents. Furthermore, the project will link with Phase 1 and Phase 3C and 3D for which Environmental Authorisations have been received.
<b>Process alternatives</b>	These are also known as technological and equipment alternative and refer to achievement of the same goal by using a different method or process. As an example, these can be applied to the excavation of trenches for the pipes as well as the foundations for the proposed new reservoir. This alternative is discussed further in this report under <b>Chapter 9.2</b> of this Report.
<b>Demand alternatives</b>	This type of alternative is applicable to the demand for a product or service. That can be met by some alternative means. An example of this would be where there is a need to provide more drinking water. Examples of alternatives can be through managing demand through various methods or providing additional drinking water. This alternative is <b>Not applicable</b> to the proposed project as the best means to provide water is through the proposed method of pipes and reservoirs due to the supply methods as well as the hygienic nature of the supply method.
<b>Scheduling alternatives</b>	These are also known as sequencing or phasing alternatives. The current project is Phase 2 of a project that is divided into three(3) phases based on currently available information. While the phasing alternative is <b>applicable</b> to the Phase 2, the details the sub-division of this had not been finalised at the time of the compilation of this report and for this reason, cannot be discussed further.
<b>Input alternatives</b>	<b>Not applicable</b> to the project but mainly to industries where inputs and in turn outputs are crucial to operations.
<b>Routing alternatives</b>	Routing alternatives are <b>applicable</b> to the project as this alternative is applicable to linear infrastructure such as roads and powerlines as well as the proposed pipeline. <b>Chapter 9.3</b> of this report presents a discussion on routing alternatives.
<b>Site layout alternatives</b>	Alternatives for the site layout have not been provided for the proposed development's reservoir had to be located at one of the highest points along the pipeline alignment to allow for the gravity feeding of water. Based on the above, <b>the Site Layout alternative will not be discussed in this report</b>
<b>Scale alternatives</b>	These alternatives are <b>Not applicable</b> as the proposed scale of the project is based on the identified demand for water within the KCDM. The reduction in the scale will result in a shortage of a water supply, and the increase in the scale will result in financial and other losses due to the development of redundant infrastructure.

ALTERNATIVE	COMMENT
<b>Design alternatives.</b>	These alternatives are <b>applicable</b> to the project due to the proposed pipe crossing of watercourses. These design alternatives are discussed in <b>Chapter 9.4</b> of this Report.
<b>Operational alternatives</b>	This is <b>not applicable</b> to the current project as it does not cover the operational phase.

### 9.1 No-Go Option

The 'no-go' option for the development would entail a situation whereby the proposed project is not undertaken. If the 'no-go option' is considered, such could lead to the continuation of access to treated water within the KCDM. Furthermore, the provision of water is directly related to the responsibility of the KCDM to contribute towards the provision of water as per the right of access to water for all residents of KCDM in line with section 27 of the Constitution of the Republic of South Africa, 1996 ( Act 108 of 1996). *Based on the above, the no-go option is therefore not feasible.*

### 9.2 Process alternatives

The excavations proposed for the development can either be undertaken manually ( through the use of spades, picks, etc. ) or with the use of machinery (e.g. excavators, TLB's etc.). The key advantages and disadvantages of each of these are discussed in **Table 9-2**.

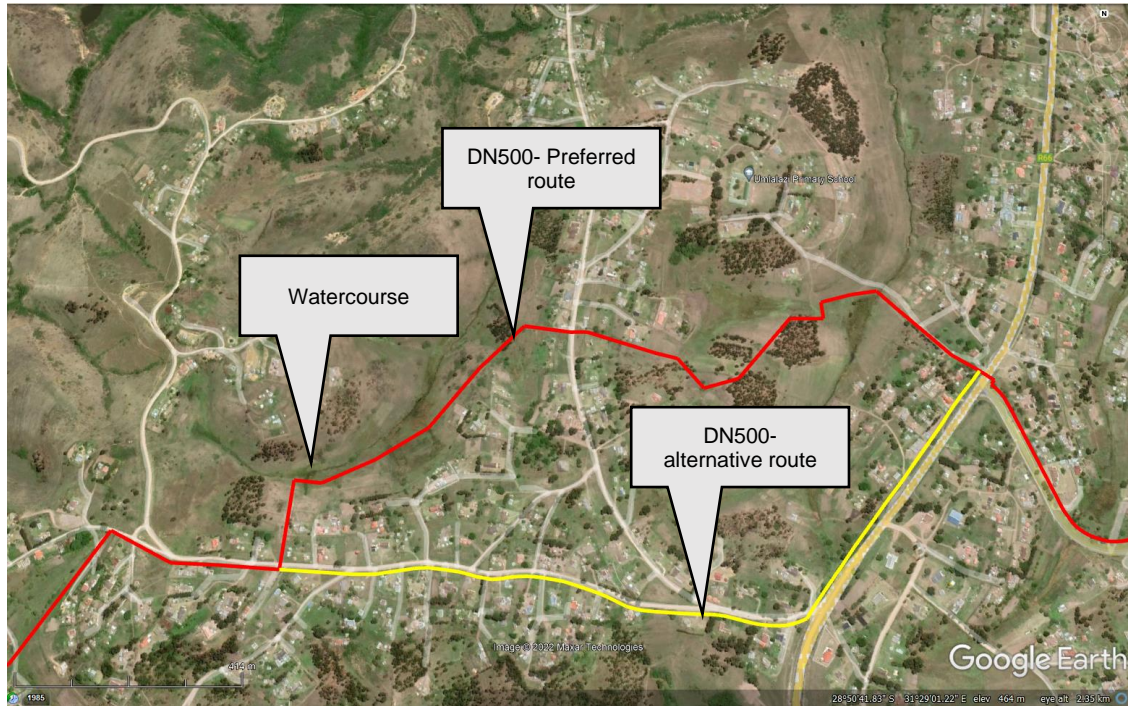
**Table 9-2: Comparison of excavation methods**

PROCESS ALTERNATIVE 1: MANUAL	PROCESS ALTERNATIVE 2: MACHINERY
<u>Advantages</u> <ul style="list-style-type: none"> <li>Labour intensive and therefore desirable for job creation;</li> </ul> <u>Disadvantages</u> <ul style="list-style-type: none"> <li>Not suitable for rocky areas where the manual removal of rock will be challenging</li> <li>Time consuming and can lead to project delays</li> </ul>	<u>Advantages</u> <ul style="list-style-type: none"> <li>Allows for quick excavation</li> </ul> <u>Disadvantages</u> <ul style="list-style-type: none"> <li>High costs associated with the hiring or purchasing of equipment;</li> <li>Reduces the likelihood of the creation of jobs as the method is not labour intensive</li> <li>Large machinery is not suitable for sensitive areas such as the riparian area;</li> <li>Causes adverse environmental impacts as the machinery is highly likely to drive over protected plant species not intended for removal and to result in adverse impacts on watercourses.</li> </ul>

Based on an analysis of **Table 9-2**, it is clear that both methods need to be adopted based on the area on which construction is planned as well as the need to ensure that the project contributes towards job creation, particularly in the Construction Phase.

### 9.3 Routing alternatives

An alternative to the DN500 pipe is proposed in the Western section of the project to avoid impacts on the watercourse as shown in **Figure 9-1**. Both the advantages and disadvantages of each of these routes are presented in **Table 9-3**.



**Figure 9-1: Routing alternatives for the DN500 pipe**

**Table 9-3: Comparison of routing alternatives**

ROUTING ALTERNATIVE 1: NORTHERN SECTION	ROUTING ALTERNATIVE 2: SOUTHERN SECTION WITHIN ROAD RESERVE
<p><u>Advantages</u></p> <ul style="list-style-type: none"> <li>• No limitations on space for trench width and working area</li> <li>• The presence of services that may be negatively impacted by the development is low</li> <li>• Low to no impacts on traffic</li> </ul> <p><u>Disadvantages</u></p> <ul style="list-style-type: none"> <li>• Sensitive area running parallel to a watercourse.</li> </ul>	<p><u>Advantages</u></p> <ul style="list-style-type: none"> <li>• Absence of ecologically sensitive areas</li> </ul> <p><u>Disadvantages</u></p> <ul style="list-style-type: none"> <li>• Existing services may be negatively impacted by the proposed infrastructure during construction</li> <li>• Limitations on the width of the trench and working area which must include adequate space for the movement of personnel and machinery</li> <li>• Impacts on traffic</li> </ul>

### 9.4 Design alternatives

The design alternatives for the project are largely related to the crossings of watercourses where the crossings are unavoidable. The alternatives are discussed in **Table 9-4**.

**Table 9-4: Comparison of design alternatives**

DESIGN ALTERNATIVE 1: PIERS OVER WATERCOURSES	DESIGN ALTERNATIVE 2: DREDGING FOR UNDERGROUND PIPE
<p><u>Advantages</u></p> <ul style="list-style-type: none"> <li>• Reduced impacts on the watercourse</li> </ul> <p><u>Disadvantages</u></p> <ul style="list-style-type: none"> <li>• High probability of flood risks to exposed piping. This will in turn result in interruptions in the supply of water</li> </ul>	<p><u>Advantages</u></p> <ul style="list-style-type: none"> <li>• Likelihood of damage to pipe due to flooding is negated as protective measures for the pipe will be put in place.</li> </ul> <p><u>Disadvantages</u></p> <ul style="list-style-type: none"> <li>• High probability of disturbance to the watercourse bed, banks, and water quality mainly during construction</li> </ul>

Based on the above and subsequent to the project Engineers input, it emerged that alternative 2 is the preferred alternative. While the negative impacts associated with this alternative will be high, these will large be limited to the construction phase. Furthermore, with adherence to mitigation the measures presented in the EMPr is **Appendix F**, the negative impacts can be minimised. According to the project Engineers, the high flood risks associated with the use of piers over the river is a great disadvantage for the project.

## 10. PUBLIC PARTICIPATION

The Public Participation Process (PPP) is conducted to afford any Interested and Affected Party (I&AP) sufficient opportunity to provide comments; and to also provide the decision makers sufficient information to ensure an informed decision making. To fulfil the necessary public participation required as part of the BA Process, various PPP activities undertaken in line with Chapter 6 the NEMA EIA Regulations, 2014, as amended, were/ are in the process of being conducted by the EAP. These are discussed below:

### 10.2 Newspaper Advertisement

A newspaper advertisement was published at the outset of the project to inform the general public of the BA Process. An English advertisement was published on page 20 on the 15<sup>th</sup> of July 2022 edition of the *Zululand Observer* newspaper. A copy of the advertisement is presented under **Appendix D1** of this BAR.

### 10.3 Site Notice Boards

Eleven (11) site notice boards (size 61cm x 43cm) were placed along the alignment on the 19<sup>th</sup> of July 2022. Site Notices were written in English and isiZulu and accompanied by a Layout Map. A copy of the Site Notice Board as well as proof of the placement is presented under **Appendix D1** of this report.

The purpose of the site notice was to inform neighbours and community members of the proposed BA Application. The details of the EAP were also provided to allow for the participation of any member of the public through requests for additional project information, asking of questions, to register as an I&AP in the Application, etc.

### 10.4 Stakeholder/ Community Meetings

A total of six (6) Stakeholder/Community Meetings were held between the 30<sup>th</sup> of May 2022 and 10<sup>th</sup> of August 2022. Details of meetings held up to the 19<sup>th</sup> of June 2022 are shown in **Table 10-1**. These meetings were aimed at informing the above-mentioned parties about the project and also obtaining their inputs.

**Table 10-1: Details of stakeholder/ community meetings**

Meeting date	Stakeholders/ Community	Meeting Format
30 <sup>th</sup> of May 2022	Ward 9, 10, 27, 26 and 14 Councillors (it was in this meeting that it was established that the pipe will not run through Ward 14)	Face-to-face
13 <sup>th</sup> of June 2022	Ward 26 and 27 Community, Ward 27 Cllr, and Tribal Authority Leaders	Face-to-face
14 <sup>th</sup> of June 2022	Ward 10 Community and Cllr	Face-to-face
15 <sup>th</sup> of June 2022	Mpungose Tribal Authority Leaders and Ward 10 Cllr	Face-to-face
19 <sup>th</sup> of June 2022	Ward 9 Community, Mpungose Tribal Authority Leaders, and Ward 9 Cllr	Face-to-face
19 <sup>th</sup> of June 2022	Ward 10 Community	Face-to-face

The Minutes of each of the meetings are under **Appendix D3**.

It must be mentioned that in addition to the above, an online meeting with Chief TS Mpungose of the Mpungose Tribal Authority was held on the 10<sup>th</sup> of August 2022. In addition to the Chief, other parties present



in the meeting were the EAP and officials from the KCDM. One of the key outcomes of the meeting was a request made by Chief TS Mpungose that prior to the start of construction, he would like to meet with relevant KCDM officials to further discuss the project.

Further to the above, it is important to state that meetings between the leaders of the Mpungose Tribal Authorities as well as the KCDM were held from as early as 2018. The EAP did not form part of these interactions and therefore cannot report on the discussions and/or outcomes of these meetings.

### 10.5 Other Engagements

On the 14<sup>th</sup> of July 2022, a Notification sheet (**Appendix D2**) was emailed to various Government Departments to obtain their comments on the project. These included the following key parties;

- KZN Department of Transport, Eshowe area;
- Ezemvelo KZN Wildlife;
- Eskom, KZN Operating Unit;
- Department of Agriculture and Rural Development;
- Department of Water and Sanitation; and
- uMlalazi Local Municipality.

Proof of correspondence with the above-mentioned is presented under **Appendix D4** and a Comments and Responses Report has been compiled and presented as **Appendix D5**.

It must be stated in the correspondence with all I&APs, it was stated that they would be afforded with an opportunity to provide comments on the Draft BAR should they not have any comments based on the information provided in the initial notification phase.

### 10.6 Interested and Affected Party Register

From the onset of the project, a database of persons, organizations and organs of state identified as I&APs was opened and will be maintained until a decision on the Environmental Authorisation is received. The register is based on information received during interactions with various stakeholders and members of the public. Due to the Protection of Personal Information Act, 2013 (Act No. 4 of 2013), the database will only be included in the copy of the DBAR that will be submitted to the EDTEA as **Appendix D6**.

### 10.7 Summary of the issues raised by interested and affected parties

One of the requirements of the NEMA EIA Regulations, 2014, as amended, is that there needs to be 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”.

In the undertaking of the Basic Assessment process for the proposed project, the key issues that were raised and the manner in which these were incorporated into the Basic Assessment process/ project are presented in Table 10-2.

**Table 10-2: Key issues raised during public participation**

<b>Issue</b>	<b>Manner of incorporation into the Basic Assessment process/ project</b>
Project team to ensure that community members are notified of the project and that the project team is introduced to the community	Various public meetings were undertaken and project team members were present to allow for their introductions to community members
Pipeline should not be constructed on land where consent from the landowner has not been granted	There was a realignment of the western section of the project to cater for the concerns of a community member who requested compensation for the use of their land if the area above the pipeline cannot be used for the construction of infrastructure such as housing.
The protection of the biophysical environment must be prioritised during all project phases and a comprehensive EMPr must be compiled for the project	Measures to protect the environment have been covered in the BAR and EMPr.
Existing services must be protected	This has been stated in the BAR and EMPr.

### **10.8 Circulation of Draft Basic Assessment Report for Comment**

Copies of the Draft BAR will be availed to all interested and affected parties, as well as the EDTEA, in either hardcopy or soft-copy versions. It must be noted that in terms of the EIA Regulations, 2014, as amended, a minimum 30-day commenting period will be afforded to all I&APs and the EDTEA. Should no comments be received within the 30-day commenting period, it will be assumed that these parties have no comments to provide. The Final BAR, incorporating comments received will be prepared for submission to the EDTEA who have a maximum period of 107 days to review the Final BAR and provide their decision.

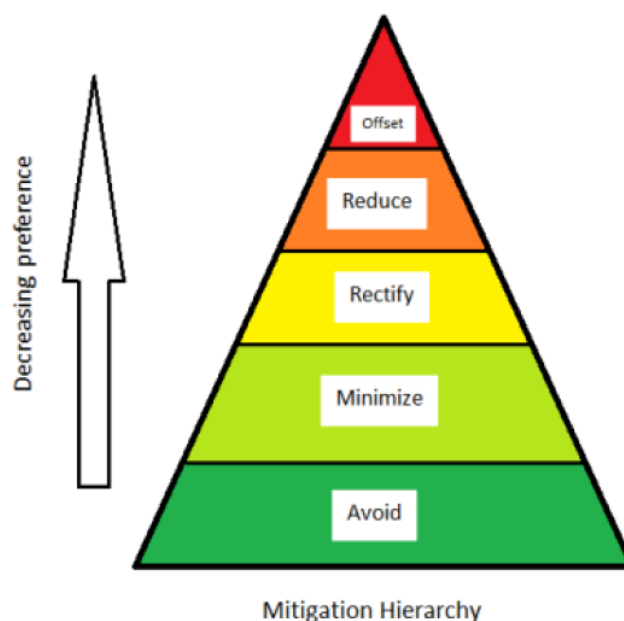
## 11. IMPACT ASSESSMENT METHODOLOGY

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the BA Process. Based on the requirements of the impact assessment, impacts identified, and issues and concerns raised are assessed with regards to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their nature, extent, duration, intensity, and probability.

In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision, unless they can be effectively mitigated to a low significance, whereas impacts with a high significance - despite mitigation - would influence the decision to proceed with the proposed development.

### 11.2 Impact Mitigation Hierarchy

The Impact Mitigation Hierarchy provides steps that must be used in mitigating adverse impacts of a project and in turn ensuring environmental protection. There are various levels of preference for mitigation options with the most preferred method and the first step as avoidance and the least and final method as offset. Refer to **Figure 11.1** for an illustration of the Mitigation Hierarchy.



**Figure 11-1: Mitigation Hierarchy showing levels of preference (Eco Intelligent, 2016)**

Each of the mitigation Hierarchy levels will be discussed and contextualised to the planned proposed KwaHlokoohloko SSA 1: Phase 2 project:

- **Step 1: Avoidance-** Although this is the most preferred form of mitigation and is related to the no-go option discussed in **Chapter 9** of this report, it is not suitable to the proposed project as it means that the project will not go ahead, and water supply shortages will continue within the KCDM;
- **Step 2: Minimisation-** This entails the reduction of adverse environmental impacts through various means based on the recognition that environmental impacts cannot be fully avoided in the proposed activity. The minimisation of adverse impacts will be adopted for the proposed project, particularly during the construction phase. The Mitigation measures proposed are discussed in **Chapter 12** of this report as well as in the EMPr attached as **Appendix F**.

- **Step 3: Rectification-** Where an impact has already taken place, rectification entails the implementation of corrective measures to avoid further adverse environmental impacts. Rectification is linked to Section 28 of the National Environmental Management Act, 1998 (Act 107 of 1998) concerning a 'Duty of care and remediation of environmental damage'. Section 28(1) states the following:
  - *'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.'*
- **Step 4: Reduction-** This is applicable where the above-mentioned rectification is not possible. Rectification requires new management practices and/or changes in methodology to ensure environmental protection.
- **Step 5: Environmental Offset-** although this will not be applicable to on the proposed development, it is meant to cater for the effects of the development through compensation of biodiversity losses by measures such as the establishment of new plants on another area outside the pipeline route where it is not possible to avoid the clearance of vegetation or rehabilitate the disturbed areas.

### 11.3 Impact Assessment Methodology

In accordance with the NEMA EIA Regulations, 2014, as amended the EAP is required to assess the significance of potential impacts in terms of the following criteria:

- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Reversibility of impacts; and
- Impact on irreplaceable resources; and
- Cumulative impacts.

Activities within the framework of the proposed development and their respective construction/decommission and rehabilitation phases, give rise to certain impacts. Typical key Development Phases on a project are shown in **Table 11-1**.

**Table 11-1: Development phases in a project**

<b>PHASES OF A PROJECT IN WHICH IMPACTS WILL OCCUR</b>
<b>Preconstruction/ decommission phase</b>
All activities undertaken before construction/decommission phase including specialist studies and assessments
<b>Construction/decommission phase (pre- rehabilitation phase)</b>
All activities on site up to the start of construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts that would be associated with planning.
<b>Rehabilitation phase</b>
All activities undertaken to ensure the site is restored to its original state as far as possible, or exceeding the original state
<b>Monitoring phase (post- rehabilitation phase)</b>
All activities after Rehabilitation, including the operation and maintenance of the proposed

<b>PHASES OF A PROJECT IN WHICH IMPACTS WILL OCCUR</b>
development.

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure. The methodology that will be used comprises of the following four steps:

- Step 1: Identification of positive and negative impacts of the project;
- Step 2: Identification of the significance rating of the impact before mitigation;
- Step 3: Identification of the mitigation measure and the mitigation efficiency; and
- Step 4: Identification of the significance rating of the impact after mitigation;

**8.3.1. Assessment Criteria**

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents to the EIA regulations (2006) and integrated environmental management series published by the Department of Environmental Affairs and Tourism (DEAT) currently Department of Forestry, Fisheries and the Environment (DFFE). In addition to this, it is a requirement of the National Environmental Management Act (NEMA) EIA Regulations, 2014, as amended, Appendices 1 and 2 that an Impact and Risk Assessment process be undertaken for the Basic Assessments and Environmental Impact Reporting. The Assessment Criteria is based on the following:

- Nature of impact;
- Extent;
- Duration;
- Intensity;
- Probability;
- Determination of significance; and
- Reversibility of impact.

Each of these are explained in **Table 11-2**.

**Table 11-2: Assessment Criteria**

<b>ASSESSMENT CRITERIA</b>
<p><b>i). Nature of Impact</b></p> <p>This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how.</p>
<p><b>b) Extent</b></p> <p>The physical and spatial size of the impact. This is classified as:</p> <p style="margin-left: 40px;"><b>i) Site</b></p> <p>The impact could affect only a specific portion of the proposed activity development, e.g. bridge across a river as part of a large road project</p> <p style="margin-left: 40px;"><b>ii) Local</b></p> <p>The impacted area extends only as far as the activity, e.g. a footprint of the specific activity</p> <p style="margin-left: 40px;"><b>iii) Regional</b></p>

<b>ASSESSMENT CRITERIA</b>
The impact could affect areas such as neighbouring farms, transport corridors and the adjoining towns.
<b>c) Duration</b>
The lifetime of the impact; this is measured in the context of the lifetime of the proposed project.
<p><b>i) Short term</b></p> <p>The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.</p>
<p><b>ii) Medium term</b></p> <p>The impact will last up to the end of the phases, thereafter it will be entirely negated.</p>
<p><b>iii) Long term</b></p> <p>The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.</p>
<p><b>iv) Permanent</b></p> <p>The only class of impact which will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.</p>
<b>d) Intensity</b>
Is the impact destructive or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as:
<p><b>i) Low</b></p> <p>The impact alters the affected environment in such a way that the natural processes or functions are not affected.</p>
<p><b>ii) Medium (Moderate)</b></p> <p>The affected environment is altered, but function and process continue, albeit in a modified way.</p>
<p><b>iii) High</b></p> <p>Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.</p>
<b>e) Probability</b>
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:
<p><b>i) Improbable</b></p> <p>The possibility of the impact occurring is very low, due either to the circumstances, design, or experience.</p>
<p><b>ii) Probable</b></p> <p>There is a possibility that the impact will occur to the extent that provisions must be made.</p>
<p><b>iii) Highly probable</b></p> <p>It is most likely that the impacts will occur at some or other stage of the development. Plans must</p>

<b>ASSESSMENT CRITERIA</b>
<p>be drawn up before the undertaking of the activity.</p> <p style="text-align: center;"><b>iv) Definite</b></p> <p>The impact will take place regardless of any prevention plans, and mitigation actions or contingency plans are relied on to contain the effect.</p>
<b>f) Reversibility of impact</b>
<p>Natural or human aided intervention:</p> <p style="text-align: center;"><b>(i) Irreversible</b></p> <p>The impact will be permanent.</p> <p style="text-align: center;"><b>(ii) Long Term</b></p> <p>The impact is reversible within 3 to 10 years after construction.</p> <p style="text-align: center;"><b>(iv) Short term</b></p> <p>The impact is reversible within 2 years after construction.</p>
<b>g) The degree to which the impact can cause irreplaceable loss of resources</b>
<p style="text-align: center;"><b>(i) Low</b></p> <p>The impact result in the loss of resources but the natural, cultural, and social processes/functions are not affected.</p> <p style="text-align: center;"><b>(ii) Medium</b></p> <p>The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner.</p> <p style="text-align: center;"><b>(iii) High</b></p> <p>The impact result in irreplaceable loss of resource.</p>
<b>h) Significance of impact with or without mitigation</b>
<p>Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:</p> <p style="text-align: center;"><b>i) No significance</b></p> <p>The impact is not substantial and does not require any mitigation.</p> <p style="text-align: center;"><b>ii) Low</b></p> <p>The impact is of little importance but may require limited mitigation.</p> <p style="text-align: center;"><b>iii) Medium (Moderate)</b></p> <p>The impact is of importance and therefore considered to have a negative impact (or positive impact, .e g job creation). Mitigation is required to reduce the negative impacts to acceptable levels or enhance the positive impacts</p> <p style="text-align: center;"><b>iv) High</b></p> <p>The impact is of great importance. Failure to mitigate, with the objective of reducing the negative impact to acceptable levels and enhancing the positive impacts, could render the entire development option or entire project proposal unacceptable ( in the case of negative impacts) or acceptable (in the case of positive impacts)</p>

To maintain consistency, all potential impacts that have been identified during the BA process will be listed in impact assessment tables. The assessment criteria used in the tables will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability.



## 12. DESCRIPTION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

A BAR must contain all the information that is necessary for a good understanding of the nature of issues identified during the Basic Assessment (BA) process. The BAR must include a description of environmental issues and potential impacts, including cumulative impacts, mitigation measures that have been identified and other aspects as outlined in Appendix 4 of the NEMA EIA Regulations, 2014, as amended. This chapter describes the environmental issues and impacts as identified during the BA Process for the KwaHlokoheko SSA 1, Phase 2 based on the EAP's interactions with I&APs and site assessments. Examples of proposed mitigation measures to address the impacts are presented in this Chapter while a complete list of mitigation measures are detailed the EMPr attached as Appendix F1 of this report.

While the key project phases that arise in a development were outlined under **Chapter 11** of this BAR, the assessment in the current Chapter will only be limited to the Construction phase as well as the Operational phase as these are the phases in which the greatest impacts are likely to arise.

The main objective of this Chapter of the BAR is to provide independent and scientifically sound information on the impacts identified during the Basic Assessment (BA) Process for the proposed project. Based on the requirements of the impact assessment, impacts identified, and issues and concerns raised are assessed with regards to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. It must be reiterated that the Impact Assessment Methodology discussed in **Chapter 11** of this report was used to assess the project impacts.

The potential impacts identified and elaborated on in this chapter have been presented as follows:

- Theme 1: Impacts on the Biophysical Environment; and
- Theme 2: Impacts on the Socio-Economic Environment.

In both themes, the potential impacts for all project phases of the projects are assessed according to.

- nature, significance and consequences of the impact and risk;
- extent and duration of the impact and risk;
- probability of the impact and risk occurring;
- the degree to which the impact and risk can be reversed;
- the degree to which the impact and risk may cause irreplaceable loss of resources; and
- the degree to which the impact and risk can be avoided, managed, or mitigated.

In this report, impacts with a *low significance* are considered to have no influence on the decision to proceed with the proposed development. Impacts with a *moderate significance* will influence the decision unless they can be effectively mitigated to a low significance, whereas impacts with a *high significance* despite mitigation would influence the decision to proceed with the proposed development. The impacts discussed in this section were identified by the Project Team (including specialists) and were augmented by input from the I&APs during the public review of the Environmental Impact Report.

### 12.1 Theme 1: Impacts on the Biophysical Environment

#### 12.1.1 Impacts on watercourses

As discussed in the project's Freshwater Impact Assessment Report compiled for the proposed project, thirteen (13) watercourse units were rated as 'likely to be affected' by the proposed development due to either pipeline crossings or the close proximity of the pipeline to the watercourse. **Table 12-1** is an assessment of the potential impacts of the proposed rehabilitation on watercourses.

**Table 12-1: Assessment of impacts on adjacent watercourses**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Regional	Medium term	Medium	Highly probable	Long term	Medium	Medium	Low
Operational	Negative	Site	Short Term	Low	Probable	Short term	Medium	Medium	Low

Proposed mitigation measures to manage potential impacts on the ecological integrity of the watercourse are as follows:

- Construction activities within or in close proximity to watercourses should be limited to the dry winter season wherever possible;
- Pipeline should be rerouted where possible;
- When working within watercourses, downstream silt traps / curtains should be installed to capture sediment eroded from the working area prior to construction activities commencing within the watercourses;
- These silt traps must be regularly monitored and maintained and replaced / repaired immediately as and when required. The ECO must sign-off on these measures prior to construction activities within the watercourses commencing;
- Watercourses must be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, sewage, cement, oils, fuels, chemicals, wastewater;
- An appropriate number of chemical, portable toilets (1 toilet for each gender and for every 30 workers) must be provided for labourers during the Construction Phase. These must be maintained in a satisfactory condition and must be a minimum of 100m away from any water resources or outside of the 1:100 year flood line; and
- Under no circumstances should water for construction and other purposes (excluding emergencies) be obtained directly from watercourses (e.g., rivers, wetlands, etc.) but from neighbouring existing taps or through the use of a water cart brought to site.

### 12.1.2 Impacts on flora (i.e. plants)

To allow for the development of the proposed project, some indigenous plant species may need to be removed. **Table 12-2** presents an assessment of the impacts associated with the protected plants identified on site

**Table 12-2: Assessment of impacts related to plants**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Short term	Medium	Highly probable	Short term	Medium	Medium	Low
Operational	Negative	Local	Short term	Low	Probable	Short Term	Low	Medium	Low

The proposed mitigation measures to avoid adverse impacts arising as result of the removal of indigenous plant species is as follows:

- Vegetation clearing/stripping must only be done as the construction front progresses.

- Clearing of vegetation should only be limited to large trees and shrubs (the are not protected species) as well as all invasive plant species within the area planned for rehabilitation.
- In order to avoid uprooting of indigenous plants, where there are not trees or shrubs but groundcovers, these must be trimmed to a height of at no less than 10cm to allow for the movement of construction vehicles whilst also catering for natural rehabilitation after the end of construction activities;
- Construction workers must not remove flora or collect seed from any plants outside the areas on which vegetation clearing will be undertaken;
- Threatened or Protected Species (TOPS) must not be removed without the issuing of a permit (see the assessment of impacts of protected plant species under 11.1.3 )
- Open fires on site must only be permitted to demarcated areas within the site camp. A fire extinguisher should be available in close proximity to any areas demarcated for the making of open fires;
- Prevention of erosion, and where necessary rehabilitation of eroded areas.
- Only indigenous plants must be used in the landscaping of the site; and
- Rehabilitation of disturbed areas as soon as construction has ended in the area that has been disturbed.

### 12.1.3 Impacts on protected plant species

Four (4) protected plant species were identified either along the pipeline alignment or in close proximity to this. **Table 12-3** presents an assessment of the impacts associated with the protected plants identified on site

**Table 12-3: Assessment of impacts related to protected species**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Permanent	High	Highly probable	Irreversible	High	High	Low
Operational	Negative	Local	Permanent	Medium	Highly probable	Irreversible	High	High	Low

The proposed mitigation measures to avoid adverse impacts arising as result of the removal of protected plant species is as follows:

- Pipeline should be rerouted where possible to avoid negative impacts on the protected plant species;
- An appropriate protected plant rescue and translocation plan will need to be developed with a focus on rescuing and transplanting >50 protected plants if the original pipeline alignment is authorised without re-alignment;
- Ordinary Permits will be required from Ezemvelo KZN Wildlife if protected species listed are to be handled in any manner during construction of the proposed development. These permits must be acquired prior to plant translocation proceeding; and
- Protected plants that will not be removed but which may be affected by project activities must be demarcated to avoid possible negative impacts during construction or maintenance during the operational phases.

### 12.1.4 Impacts on fauna (i.e. animals)

Although there was no fauna identified on the site during the assessment processes, these do likely occur

along the proposed development alignment and must be protected. The animals that may be encountered may be wild or domestic. The impact assessment for the impacts on fauna is shown in **Table 12-4**.

**Table 12-4: Assessment of impacts related to fauna**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Medium	Medium	Probable	Long term	Medium	Medium	Low
Operational	Negative	Site	Short term	Medium	Probable	Short term	Medium	Medium	Low

The proposed mitigation measures for the protection of the fauna that possibly occurs on site are as follows;

- All construction activities must be limited to daylight hours unless otherwise agreed with the Developer, CLO, Ward Councillor and Traditional Leaders
- The extent of the construction site must be demarcated and no vegetation that could be the habitat for faunal species must be removed outside of the construction area;
- Employees must be trained on how to deal with fauna species as intentional killing and setting of traps will not be tolerated. In the case of a problem animal e.g. snake, a specialist must be called in to safely relocate the animal; and
- Trenches must be inspected regularly for fauna that may have fallen in and become trapped. All fauna found in trenches must be rescued.

## 12.2 Theme 2: Impacts on the Socio-Economic Environment

### 11.2.1 Impacts on job opportunities

The proposed project is highly likely to create job opportunities for the local people. While these opportunities will largely be realised during the construction phase, this will aid in improving the socio-economic conditions of various community members. The impacts on job opportunities can be divided into: a) availability of job opportunities; and b) community disruptions due to unequal or unfair job opportunities. The assessment of these impacts is presented in **Tables 12-5** and **12-6**.

**Table 12-5 Availability of job opportunities**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Positive	Regional	Short term	Medium	Highly Probable	Long term	Medium	Medium	High
Operational	Positive	Regional	Short term	Low	Probable	Short term	Low	Medium	Low

**Table 12-6 Community disruptions due to unequal or unfair job opportunities**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Regional	Medium term	Medium	Highly Probable	Long Term	Medium	High	Low
Operational	Negative	Local	Permanent	Medium	Probable	Short Term	Medium	Medium	Low

Key mitigation measures are as follows:

- Inform the surrounding communities, public and private business of the proposed activity as soon as possible. This will serve to ease potential social anxiety;
- The KCDM should maximise the use of local contractors and local labourers and where possible by developing a strategy for their involvement in the tender and construction processes;
- A communication strategy should be implemented to guard against rumours about employment creation opportunities as well as unrealistic job expectations;
- Relevant local community structures must be consulted beforehand when local community appointments are planned; and
- Ensure that adequate lines of communication are implemented to deal with any public grievances.

### 11.2.2 Traffic on local traffic

The movement of construction vehicles during the construction phase of the proposed development can result in an increase in traffic congestion on local roads. Traffic will also be affected by activities such as the construction of the pipeline which will include the crossing the R66 as well as two(2) crossings of the P260. The assessment of this impact is indicated in **Table 12-7**.

**Table 12-7: Assessment of traffic impacts**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Medium term	Medium	Probable	Short term	High	High	Low
Operational	Negative	Local	Short Term	Low	Improbable	Short term	Medium	Low	No significance

The key proposed mitigation measures for the management of traffic brought about by project activities are as follows:

- The Contractor must compile a Traffic Management Plan indicating the routes that construction vehicles must adhere to, the speed limits of the vehicles as well as the locations for the placement of warning signs. These routes must be communicated to all sub-contractors;
- There must be an erection of signage warning motorists and pedestrians about the presence of construction vehicles as well and the need to reduce speeds. This is largely applicable to the specially along the P230 and R66 (if the DN500 alternative route that runs along the R66 is used);
- Contractor must communicate road safety to community members through the Community Liaison Officer (CLO);
- Construction activities must be limited to daytime hours. Where this must extend to any time after dark, the Contactor must ensure that community members that are most likely to be affected are informed of this and roof of their consultation kept; and
- Construction vehicles must not exceed speeds on 10km within the construction site.

### 11.2.3 Impacts on existing infrastructure and services

The proposed activities could result in damage to various infrastructure ranging from buildings, fences, electrical infrastructure, road infrastructure (mainly the R66 and P609 as discussed in **11.2.2** above), agricultural land, etc. Any damage to the existing infrastructure is considered negative and mitigation measures must therefore be out in place to ensure the protection of the infrastructure. **Table 12-8** is an assessment of the impacts on infrastructure.

**Table 12-8: Assessment of impacts on existing infrastructure and services**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Regional	Medium	High	Highly probable	Long term	Medium	Medium	Low
Operational	Negative	Regional	Short term	Low	Probable	Short term	Low	Medium	Low

The main mitigation measures proposed to ensure the protection of infrastructure are as follows;

- The Contractor shall ensure that existing services e.g. roads, sewer pipes, manholes, etc are not damaged or disrupted. Prior to construction, the Contractor must obtain drawings indicating required by the contract and obtain the permission of the service provider to disrupt the service and agreements concerning the reinstatement (incl. timing and costs) of the service must be reached ;
- Where infrastructure outside the boundaries of the construction is damaged due to construction activities, e.g. movement of construction vehicles, the owner of the infrastructure must be consulted and arrangements for repairs made by the Contractor

#### 11.2.4 Visual, dust and air quality impacts

Construction sites are unsightly and can affect an area's sense of place. The clearance of vegetation for the pipeline alignment will further result in adverse visual impacts. The construction of the new reservoir (R1-2) will result in visual impacts throughout the construction and operational phase of the project. **Table 12-9** is an assessment of the project visual impacts.

**Table 12-9: Assessment of visual, dust and air quality impacts**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Medium term	Medium	Probable	Short term	Low	Medium	Low
Operational	Negative	Site	Short Term	Low	Probable	Short Term	N/A	N/A	N/A

In order to mitigate the potential visual Impacts, the following key measures are proposed:

- Shadecloth must be utilised to conceal and minimise the visual impact of the construction site;
- Domestic waste generated from the site camp must be kept in bins with lids and removed every week or more often as the need arises and be disposed of at a registered landfill.
- Implement dust suppression measures (wetting or application of soil binding compound) in all areas that will be affected by construction activities and where dust will be generated. Dust suppression must also be undertaken during windy and dry weather conditions.
- All construction vehicles transporting friable materials such as sand must be covered by a tarpaulin or wetted down;
- Screening of highly reflective material must be undertaken;
- There must be rehabilitation of the pipeline alignment and disturbed areas around the proposed reservoir once the final testing of the infrastructure has been undertaken and it is ready for operation; and
- The material of the new reservoir should not be highly reflective

### 11.2.5 Noise Impacts

Construction sites are synonymous with noise impacts. High noise levels can have an adverse impact on both site labourers as well as the public, including occupiers of adjacent land. The assessment of noise impacts that may occur during the construction and operational phases for the proposed development are presented in **Table 12-10**.

**Table 12-10: Assessment of noise impacts**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Short term	Medium	Probable	Short term	Medium	Medium	Low
Operational	Negative	Site	Short term	Low	Probable	Short term	Low	Low	Low

The proposed mitigation measures to address noise impacts in the undertaking of construction activities are as follows:

- The working hours stipulated in the Construction permit, where applicable, must be adhered to. Where this is not applicable, work must be limited between sunrise and sunset. Working hours during weekends must be agreed between the KCDM, the Contractor, Community Liaison Officer (CLO), Ward Cllr and Tribal authority Leaders;
- All construction vehicles must be in a good working order to reduce possible noise pollution;
- Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting, or whistling, radios, sirens or hooters, motor revving, etc;
- Noisy activities must take place only during working hours. The Contractor must inform all I&APs in writing 24 hours prior to any planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the neighbouring residents, e.g. rock blasting

### 11.2.6 Heritage resources impacts

Construction activities such as clearing, excavations and grading could expose or damage features of heritage and cultural value beneath the surface. Features of heritage value (e.g. graves) were not observed along the pipeline route during the site visits. As the length of the proposed development will exceed 300m in length, consultation with the responsible heritage resources authority, KwaZulu-Natal Amafa and Research Institute, is important. This is based on Section 38 (1)(a) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999). Refer to **Table 12-11** for an assessment of the project's potential impacts on heritage resources.

**Table 12-11: Assessment of heritage resources impacts**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Local	Short term	Medium	Probable	Short term	Medium	Medium	Low
Operational	Negative	Local	N/A	N/A	N/A	N/A	N/A	N/A	N/A

To protect Heritage Resources on site, the following key mitigation measures are proposed:

- A no-go buffer (5m specified by Heritage specialist) must be implemented around all identified graves and other identified heritage sites.

- Should any potential human remains be found on site, the South African Police Service (SAPS) should also be contacted. No SAPS official may disturb or exhume such remains, whether of recent origin or not, without the necessary permission from Amafa.
- No structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Amafa.
- Sources of all natural materials (including topsoil, sands, natural gravels, crushed stone, asphalt, etc.) must be obtained in a sustainable manner and in compliance with the heritage legislation.
- Should any historically significant finds (e.g. artefacts, human remains or sites of cultural or archaeological importance) be uncovered, work must cease in the affected area which must be demarcated and the Provincial Heritage Resources Authority, Amafa KwaZulu-Natal Amafa and Research Institute (033 394 6543) must be immediately contacted by the Contractor directly or through the Environmental Control Officer. Work in the area can only be resumed once the site has been completely investigated and the Amafa aKwazulu- Natal has given permission to the Developer/ Contractor to resume activities.

### 11.2.7 Impacts on agricultural land

While limited agricultural land will be impacted by the proposed development, the impacts associated with this are key as food security is important, particularly for disadvantaged societies. **Figure 7-12-1** under **Chapter 7** of this BAR presents an example of an agricultural land that will be impacted by the proposed development

Construction activities such as clearing, excavations could result in a loss of crops. Refer to **Table 12-12** for an assessment of the project's potential impacts on heritage resources.

**Table 12-12: Assessment of impacts on agricultural land**

Project phase	Nature of impact	Extent	Duration	Intensity	Probability	Reversibility	Irreplaceable loss of resources	Significance without mitigation	Significance with Mitigation
Construction	Negative	Site	Medium term	Medium	Highly probable	Short term	Medium	Medium	Low
Operational	Negative	Site	Short term	Medium	Probable	Short term	Medium	Medium	Low

To protect agricultural land on site, the following key mitigation measures are proposed:

- Construction activities should be undertaken after crop harvesting, if possible;
- Routes for construction vehicles must be agreed between the Developer, Contractor and the landowner and must be clearly demarcated;
- Possible compensation must be agreed between the Developer and the landowner should land become unusable due to the construction and operation of the proposed development;

### 12.3 Cumulative Impacts

The NEMA EIA Regulations (2014) defines a "cumulative impact" in relation to an activity, as the past, current, and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities. This is required on the basis that the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts originating from similar or diverse activities or undertakings in the area.



The environmental impacts that will emanate from the activities associated with the proposed development and operation of the Bulk Water Supply project for KwaHloko SSA 1: Phase 2 have already been discussed in this BAR. Mitigation measures to reduce negative impacts and enhance the positive impacts during the Construction and Operational Phases of the project have been discussed in this report and are prescribed in detail in the EMP in **Appendix F**.

## 13. ENVIRONMENTAL IMPACT STATEMENT

The NEMA EIA Regulations, 2014, as amended, states the following requirements for an environmental impact statement

- (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 site indicating any areas that should be avoided, including buffers; and*
- (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;*

Each of these are presented as follows:

### 13.1 Summary of the key findings of the environmental impact assessment

- Protected Plant Species occur along three areas of the pipeline alignment as discussed in the summary of the specialist findings in **Chapter 6** of this BAR as well as in the Terrestrial Biodiversity Assessment Report in **Appendix E1**. As the rerouting of the pipe will require additional assessments of the pipe to investigate impacts on watercourses, heritage resources and other socio-economic aspects a relocation of the protected plant species has been recommended;
- Some parts of the pipeline will run adjacent and in some cases across watercourses resulting in negative impacts which can however be mitigated. Refer to the summary in **Chapter 6** and the details in Freshwater Assessment Report in **Appendix E2**;
- While there were no heritage resources identified to occur directly along the pipeline alignment, a distance of at least 20m must be kept to ensure the protection of heritage resources.

### 13.2 Sensitivity Map

Some sensitivity Maps are presented in **Chapter 6** of this BAR as well as in the Specialist Reports in **Appendix E**. Key to this is the map indicating the proximity of protected plant species in relation to the pipeline alignment presented in this BAR as well as in the Terrestrial Biodiversity Assessment Report in **Appendix E1**.

### 13.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

The proposed development will largely bring about negative impacts to key biophysical features such as watercourses and the identified protected plant species. The main socio-economic environmental impacts that are of a negative nature are those on existing infrastructure and services and on local traffic where the proposed pipes will be constructed adjacent to or where they cross existing roads. Mitigation measures to address all the negative impacts have been presented in **Chapter 11** of this BAR as well as in the EMP in **Appendix F**. The positive impact that will arise from the proposed project will be job opportunities that will arise mainly during the construction phase. Measures to enhance these impacts have also been presented in the BAR and the EMP.

## 14. CONCLUSION AND RECOMMENDATIONS

This Basic Assessment Report has provided a comprehensive assessment of the potential environmental impacts associated with the proposed upgrading of the Bulk Water Supply for the KwaHloko SSA 1. These impacts have been identified by the EAP and the specialists involved in the study undertaken for the proposed development. The key findings of the Basic Assessment Process are discussed in this report. The impact assessment has revealed that while the Construction and Operational Phases will have the greatest environmental impacts, mitigation measures to reduce the negative impacts and enhance the positive are available. It is important that the proposed project is authorised to ensure the availability of clean water. When weighing up the positive and negative impacts assessed and taking the need and desirability of the proposed development into account, **it is the opinion of the EAP that the proposed development be authorised by EDTEA on condition that the proposed mitigation measures put forward in this Basic Assessment Report and the accompanying EMP are implemented on site.** In addition, it is recommended that the EDTEA subject the proposed application to the following conditions:

- a. All adjacent residents and service providers (especially those whose infrastructure will be directly impacted by the proposed development, e.g. KwaZulu Natal Department of Transport) must be informed of the commencement of construction activities at least 30 days in advance;
- b. An Environmental Control Officer (ECO) must be appointed prior to the pre-construction phase of the project to monitor all construction and rehabilitation activities and ensure the demarcation of all sensitive areas. The ECO must undertake environmental awareness training for all senior site personnel prior to the pre-construction phase;
- c. Prior to the commencement of construction, the Contractor must prepare an 'Environmental Protection Plan' for the protection of natural areas around the site. The Plan shall cover all environmental protection works and shall also include descriptions of environmental safeguards and emergency procedures;
- d. All areas on which vegetation clearing is planned must be demarcated in consultation with the ECO and movement of personnel or vehicles must not be allowed outside these areas;
- e. The Contractor's site camp must be located within a disturbed area and no less than 20m from heritage features and protected plant species and outside 100m from the edge of any watercourse. The location of these areas must be approved by the ECO and relevant landowner in writing;
- f. In addition to the acquisition of a permit for the relocation of the protected plant species identified to be growing in the vicinity of pipeline alignment, the Contractor and personnel must be trained to recognise the protected plant species identified to be growing in the vicinity of the site;
- g. Rehabilitation of areas disturbed by construction activities must be progressive and not left until the end of the project;
- h. The Contractor must be trained to recognise possible heritage features. Should there be a sign of such objects, construction must halt in that area immediately and a suitably qualified heritage specialist must be called to investigate through the ECO;
- i. the Environmental Authorisation (EA), if issued by the EDTEA, must be valid for a period of no less than five (05) years from date of signature in order to account for any unforeseen circumstances; and
- j. The issuing of an EA does not negate the authorisation holder from obtaining all other required environmental approvals

## 15. REFERENCES

Climate-Data.org, 2022. **Climate Eshowe (South Africa)**. <https://en.climate-data.org/africa/south-africa/kwazulu-natal/eshowe-12807/>. Accessed 05<sup>th</sup> September 2022.

Department of Environmental Affairs and Tourism, 2004 **Integrated Environmental Management Information Series, Criteria for Determining Alternatives in EIA**, Pretoria.

Eco intelligent, 2016. **Mitigation Hierarchy: Levels of mitigation in Environmental Impact Assessment**. <https://eco-intelligent.com/2016/12/11/levels-of-mitigation-in-environmental-impact-assessment/>. Accessed 30<sup>th</sup> August 2022.

Eco-Pulse Consulting, 2022(a). Proposed KwaHlokoohloko Sub-Supply Area (SSA) 1, Phase 2, Water Supply Project: **Terrestrial Biodiversity Assessment Report**. Unpublished specialist report. Report No. EP642-01. Version 1.2. 31<sup>st</sup> August 2022.

Eco-Pulse Consulting, 2022 (b). Proposed KwaHlokoohloko Sub-Supply Area (SSA) 1, Phase 2, Water Supply Project: **Specialist Freshwater Impact Assessment Report**. Unpublished specialist report. Report No. EP643-01. Version 3. 29<sup>th</sup> August 2022.

KZN Provincial Planning Commission, 2021. **KZN Provincial Growth and Development Strategy, 2021**. <http://www.kznppc.gov.za/images/downloads/PGDS2021.pdf>. Accessed 09<sup>th</sup> September 2022.

Municipalities of South Africa (2012-2022). **uMlalazi Local Municipality (KZN284)**.: <https://municipalities.co.za/demographic/1111/umlalazi-local-municipality>. Accessed: 07<sup>th</sup> September 2022

South Africa, 1998. **National Environmental Management Act 107 of 1998**.

South Africa, 2014. **National Environmental Management Act 1998 (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014**.

South Africa, 1996, **Constitution of the Republic of South Africa 1996**.

Statistics South Africa, undated. **Community Survey 2016**. [http://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-Statistical-releas\\_1-July-2016.pdf](http://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-Statistical-releas_1-July-2016.pdf). Accessed 08<sup>th</sup> September 2022.

Umlando: Archaeological Surveys and Heritage Management, 2022. **Heritage Impact Assessment of The KwaHlokoohloko Sub-Supply Area Phase 2**. Unpublished specialist report. Version 3. 20<sup>th</sup> August 2022

Umlalazi Local Municipality (2022). 2022-2027 **Integrated Development Plan: Fifth Review**.