

terratest

**Geotechnical, Environmental
& Earth Science Consultants**

DRAFT BASIC ASSESSMENT REPORT

**Proposed Wembezi Water Conservation and Demand
Management Bulk Water and Reticulation Scheme
Upgrade, Inkosi Langalibalele Local Municipality,
uThukela District Municipality, KwaZulu-Natal**

January 2018

Prepared by:

TERRATEST (PTY) LTD

PO Box 794

Hilton, 3245


Telephone: (033) 343 6789

Contact: Ms L. Dralle

Email: dralle@terratest.co.za

VERIFICATION PAGE

TITLE: Proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade, Inkosi Langalibalele Local Municipality, uThukela District Municipality, KwaZulu-Natal

PROJECT NO.: 41646	DATE: 23/01/2018	REPORT STATUS: Draft		
CARRIED OUT BY: Terratest (Pty) Ltd Pietermaritzburg PO Box 794 Hilton 3245 Tel: (033) 343 6789 Email: drallel@terratest.co.za		COMMISSIONED BY: uThukela District Municipality PO Box 116 Ladysmith 3370 Tel: (036) 638 5100 Email: sanele@uthukeladm.co.za		
AUTHOR: B. Ndaba		CLIENT CONTACT PERSON: S. Zikalala		
SYNOPSIS: Basic Assessment Report for the proposed upgrade of the Wembezi Bulk Water Scheme and associated reticulation.				
KEY WORDS: Bulk and reticulation water scheme, upgrade, Basic Assessment, Environmental Management Programme, EIA Regulations (2014, as amended), GNR 326.				
© Copyright Terratest (Pty) Ltd				
QUALITY VERIFICATION				
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.				
				
VERIFICATION	CAPACITY	NAME	SIGNATURE	DATE
By Author	Environmental Consultant	B. Ndaba	pp.	23/01/2018
Checked by	Environmental Scientist	L. Dralle		23/01/2018
Authorised by	Executive Associate	M. van Rooyen		24/01/2018

File name:	T:\02 ACTIVE Projects Terratest\41646 - Wembezi BA (MvR - TKS)\1. PROJECT\7. Reports
-------------------	--

Executive Summary

Terratest (Pty) Ltd has been appointed by the uThukela District Municipality to undertake the necessary environmental services required for the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme, Inkosi Langalibalele Local Municipality, KwaZulu-Natal. The proposed upgrade includes the installation of a new 8.8km High-density Polyethylene (HDPE) 750mm diameter (\emptyset), rising main bulk pipeline from the existing pump station at George Cross Water Treatment Works, to a new 10 Mega-litre (MI) bulk storage reservoir located in Wembezi. The proposed rising main bulk water pipeline will be aligned to run alongside an existing \emptyset 355mm steel rising main which currently serves an existing 10MI Wembezi Reservoir, within an existing servitude.

The project also includes for the upgrade of the existing water reticulation scheme in Wembezi, which will amount to the replacement of approximately 160 993m of reticulation pipeline, ranging from \emptyset 75mm unplasticized polyvinyl chloride (uPVC) to \emptyset 500mm HDPE. All reticulation will be constructed within the same footprint as the previously installed network, barring new household connections required for previously unconnected households.

The proposed upgrade is required as Wembezi experiences severe water losses from the existing, dated infrastructure and supply is therefore unreliable. The neighbouring area of Ntabamhlophe feeds off the Wembezi infrastructure, and as this is failing, the area of Ntabamhlophe also receives an unreliable supply of water, if any at all. The proposed development therefore forms part of a larger project, which aims to upgrade water infrastructure and potable water supply in both the areas of Wembezi and in the neighbouring area of Ntabamhlophe. An additional aim of the upgrade is to stop the unnecessary and extreme water losses currently experienced in the area and is thus also considered to be a water conservation initiative.

The public participation process undertaken involves consultation with the relevant authorities, non-government organisations (NGO's), neighbouring landowners, community members and other identified Interested and Affected Parties (IAPs). Newspaper advertisements were published at the outset of the project to inform the general public of the Basic Assessment (BA) Process. An advertisement was published in isiZulu on 30 June 2016 in the Ilanga newspaper and in English on 01 July 2016 in The Witness newspaper. Five (5) site notice boards were placed on site and around the area on 24 June 2016 and five (5) on 23 June 2017. The 2016 notice boards made reference to the 2014 EIA Regulations i.e. GNR 982, GNR 983 and GNR 985, while the 2017 notice boards included for the amended 2014 EIA Regulations i.e. GNR 326, GNR 327 and GNR 324. Notification sheets in the form of flyers were also distributed to passers-by whilst the site visit was being conducted on the 24 June 2016. The flyers were written in isiZulu. A Public Meeting was not deemed necessary as significant interest has not been received by the community.

In terms of specialist input, a Heritage Impact Assessment was undertaken by UMLANDO: Archaeological Surveys & Heritage Management to determine if any items of cultural or historical value would be impacted by construction activities; a Phase 1 Palaeontological Impact Assessment was undertaken by Gideon Groenewald to determine if any palaeontological artefacts, or remains, would be impacted on during construction; and a Biodiversity and Watercourse Identification, Delineation and Functional Assessment was undertaken by Terratest (Pty) Ltd to determine the impact that the proposed construction would have on surrounding watercourses and the receiving biophysical environment.

No fatal flaws to development were identified by any of the specialists. The area is considered to be highly disturbed due to historical agricultural practices in respect of the proposed rising main bulk pipeline and as a result of dense human settlement in respect of the proposed reticulation network upgrade.

The Draft BA Report and Environmental Management Programme (EMPr) have been circulated to registered IAPs for review and comment as part of the legislated 30 day public participation process. Comments received on the Draft BA Report and EMPr will be consolidated and included into a Final BA Report, which will be submitted to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA) for a decision on Environmental Authorisation (EA). Construction cannot commence until such time as a positive EA is obtained.

This BA Report has been drafted in accordance with the EIA Regulations (2014, as amended) and adheres to the requirements contained in Appendix 1 of GNR 326, as noted in Table 1-1.

TABLE 1-1: Content of a BA Report (2014 EIA Regulations, as amended)

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
Appendix 1, Section 3 (a)	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.	Section 2 & Appendix 1
Appendix 1, Section 3 (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	Section 3 & Appendix 2
Appendix 1, Section 3 (c)	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.	Section 3
Appendix 1, Section 3 (d)	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.	Section 4
Appendix 1, Section 3 (e)	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.	Section 5
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Appendix 1, Section 3 (h)	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;	Section 7 Section 8 Section 8 Section 9 Section 12 Section 11 Section 12

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	<ul style="list-style-type: none"> (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; (xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity. 	<p>Section 12</p> <p>Section 13</p> <p>Section 12</p> <p>Section 14</p>
Appendix 1, Section 3 (i)	<p>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-</p> <ul style="list-style-type: none"> (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
Appendix 1, Section 3 (j)	<p>An assessment of each identified potentially significant impact and risk, including-</p> <ul style="list-style-type: none"> (i) Cumulative impacts; (ii) The nature, significance and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be avoided, managed or mitigated. 	Section 13
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 10
Appendix 1, Section 3 (l)	<p>An environmental impact statement which contains-</p> <ul style="list-style-type: none"> (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred 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. 	Section 14 & Section 15
Appendix 1, Section 3 (m)	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.	Section 16
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 16
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	-
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 15
Appendix 1, Section 3 (q)	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.	Section 16
Appendix 1, Section 3 (r)	<p>An undertaking under oath or affirmation by the EAP in relation to-</p> <ul style="list-style-type: none"> (i) The correctness of the information provided in the report; (ii) The inclusion of 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 (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties. 	Section 18
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	-
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	-
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	-

TABLE OF CONTENTS

1	INTRODUCTION	1
2	DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)	1
3	LOCATION OF THE ACTIVITY	1
3.1	ALIGNMENT	1
3.2	WATERCOURSES	4
4	ACTIVITY DESCRIPTION	6
4.1	APPLICABLE LISTED ACTIVITIES	6
4.1.1	<i>EDTEA Pre-application Meeting</i>	7
4.2	NATIONAL WATER ACT (ACT NO 36 OF 1998)	9
4.3	DESCRIPTION OF THE ACTIVITY.....	9
4.3.1	<i>Project Overview</i>	9
4.3.2	<i>Development upgrade</i>	10
4.3.3	<i>Project objectives</i>	12
4.3.4	<i>Construction project specifics</i>	12
4.3.5	<i>Construction methodology</i>	15
4.3.6	<i>Training facilities and capacity building scope of work</i>	25
5	APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES	26
6	DEVELOPMENT MOTIVATION	27
6.1	NEED	27
6.2	DESIRABILITY	27
6.3	PLANNING INITIATIVES	28
6.3.1	<i>KZN Provincial Growth and Development Plan</i>	28
7	MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVE	29
7.1	PREFERRED SITE ALTERNATIVE.....	29
7.2	PREFERRED LAYOUT ALTERNATIVE	29
7.3	PREFERRED TECHNOLOGY ALTERNATIVE	32
7.4	NO-GO ALTERNATIVE.....	32
8	PUBLIC PARTICIPATION	33
8.1	NEWSPAPER ADVERTISEMENT	33
8.2	SITE NOTICE BOARDS	33
8.3	WRITTEN NOTIFICATION TO AUTHORITIES AND NEIGHBOURS	38
8.3.1	<i>Interested and Affected Parties (IAPs)</i>	38
8.3.2	<i>Notification Letter</i>	38
8.4	PUBLIC MEETING	38
8.5	COMMENTS RECEIVED	38
8.6	CIRCULATION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT	41
9	DESCRIPTION OF THE BASELINE ENVIRONMENT	42
9.1	TOPOGRAPHY	42
9.2	VEGETATION	42
9.3	FAUNA	42
9.4	GEOLOGY	45
9.5	HYDROLOGY	45
9.6	CLIMATE.....	46
9.7	CULTURAL, HISTORICAL AND ARCHAEOLOGICAL RESOURCES	46
9.8	CURRENT LAND USE	46
9.9	SOCIO-ECONOMIC.....	48
10	SPECIALIST STUDIES	49
10.1	BIODIVERSITY AND WATERCOURSE IDENTIFICATION AND DELINEATION ASSESSMENT.....	49
10.1.1	<i>Biodiversity</i>	49
10.1.2	<i>Watercourses</i>	51
10.1.3	<i>Conclusion and recommendations</i>	53

10.2	HERITAGE IMPACT ASSESSMENT	54
10.2.1	<i>Cemetery 1</i>	54
10.2.2	<i>Cemetery 2</i>	54
10.2.3	<i>Southwold Ruins</i>	55
10.2.4	<i>Conclusion and recommendations</i>	55
10.3	PALAEONTOLOGICAL IMPACT ASSESSMENT.....	55
10.3.1	<i>Conclusion and recommendations</i>	58
11	IMPACT ASSESSMENT AND MITIGATION MEASURES	59
11.1	IMPACT ASSESSMENT METHODOLOGY.....	59
11.2	MITIGATION	63
12	IMPACTS IDENTIFIED	64
13	IMPACT ASSESSMENT.....	71
13.1	SIGNIFICANCE.....	72
14	ENVIRONMENTAL IMPACT STATEMENT	72
15	RECOMMENDATIONS OF THE EAP	74
16	CONSTRUCTION TIMEFRAMES	76
17	SUBMISSION AND CONSIDERATION OF DOCUMENTATION BY THE COMPETENT AUTHORITY 76	
18	UNDERTAKING.....	76
19	REFERENCES.....	77

FIGURES

FIGURE 3-1:	LOCALITY MAP	2
FIGURE 3-2:	PROPOSED RETICULATION ALIGNMENT, WEMBEZI	4
FIGURE 4-1:	BASIC ASSESSMENT PROCESS ORGANOGRAM	8
FIGURE 4-2:	LAYOUT OF RISING MAIN BULK PIPELINES	11
FIGURE 4-3:	SECTORISING OF THE RETICULATION NETWORK, WEMBEZI.	14
FIGURE 4-4:	LOCALITY MAP OF WATERCOURSE CROSSINGS IDENTIFIED ON THE BULK PIPELINE ALIGNMENT	17
FIGURE 4-5:	TYPICAL CROSS SECTION FOR WATERCOURSE CROSSING NO. 1 (WETLAND: 29°01'26.68"S; 29°50'49.27"E)	18
FIGURE 4-6:	TYPICAL CROSS SECTION FOR WATERCOURSE CROSSING NO. 2 (WETLAND: 29°02'32.21"S; 29°48'39.13"E)	18
FIGURE 4-7:	TYPICAL CROSS SECTION FOR WATERCOURSE CROSSING NO. 3 (DRAINAGE LINE: 29°01'57.82"S; 29°50'18.81"E)	19
FIGURE 4-8:	TYPICAL CROSS SECTION FOR WATERCOURSE CROSSING NO. 4 (DRAINAGE LINE: 29°03'16.05"S; 29°47'38.98"E)	19
FIGURE 4-9:	TYPICAL CROSS SECTION FOR WATERCOURSE CROSSING NO. 5 (DRAINAGE LINE: 29°03'34.10"S; 29°47'15.69"E)	20
FIGURE 4-10:	TYPICAL CROSS SECTION FOR WATERCOURSE CROSSING NO. 6 (DRAINAGE LINE: 29°03'34.09"S; 29°47'12.00"E)	20
FIGURE 4-11:	LOCALITY MAP OF WATERCOURSE CROSSINGS IDENTIFIED ON THE RETICULATION ALIGNMENT.....	23
FIGURE 4-12:	TYPICAL EXCAVATED WATERCOURSE CROSSING FOR RETICULATION UPGRADE.....	24
FIGURE 4-13:	TYPICAL WATERCOURSE CROSSING OVER EXPOSED ROCK FOR RETICULATION UPGRADE.	24
FIGURE 8-1:	SITE NOTICE (24.06.2016).....	34
FIGURE 8-2:	SITE NOTICE (23.06.2017).....	35
FIGURE 8-3:	LOCATION OF SITE NOTICES ON SITE	36
FIGURE 9-1:	GRADIENT OF THE Ø750MM RISING MAIN BULK WATER PIPELINE	42
FIGURE 9-2:	MINSET MAP	44
FIGURE 9-3:	GEOLOGY OF THE GENERAL AREA.....	45
FIGURE 9-4:	AVERAGE CLIMATIC CONDITIONS, WEMBEZI	46

FIGURE 9-5: URBAN AREAS AS PER THE URBAN EDGE DATABASE (2008)	47
FIGURE 10-1: PALAEOLOGICAL SENSITIVE AREAS AS IDENTIFIED BY SAHRA [SOURCE: SAHRIS, 2017]	56
FIGURE 10-2: PALAEOLOGICAL SENSITIVITY OF GEOLOGICAL FORMATIONS IN THE STUDY AREA [SOURCE: GROENEWALD, 2017]	57
FIGURE 15-1: NO GO AREAS AS RECOMMENDED BY SPECIALISTS	75

TABLES

TABLE 1-1: CONTENT OF A BA REPORT (2014 EIA REGULATIONS, AS AMENDED)	ii
TABLE 2-1: DETAILS OF THE EAP	1
TABLE 3-1: PIPELINE CORRIDOR CO-ORDINATES	3
TABLE 3-2: WATERCOURSE CROSSING COORDINATES ON THE RISING MAIN BULK PIPELINE ALIGNMENT	4
TABLE 3-3: WATERCOURSE CROSSING COORDINATES LOCATED WITHIN THE RETICULATION NETWORK, WEMBEZI	5
TABLE 4-1: WATERCOURSE CROSSING COORDINATES ALONG THE BULK PIPELINE ALIGNMENT	16
TABLE 4-2: WATERCOURSE CROSSING COORDINATES ALONG THE RETICULATION PIPELINE ALIGNMENT	22
TABLE 5-1: APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES	26
TABLE 8-1: IAP COMMENT RECEIVED	39
TABLE 9-1: MINSET DATA	43
TABLE 9-2: SOCIO-ECONOMIC INFORMATION	48
TABLE 10-1: DETAILS OF SPECIALIST	49
TABLE 10-2: DETAILS OF SPECIALIST	54
TABLE 10-3: IDENTIFIED HERITAGE FEATURES	54
TABLE 10-4: DETAILS OF SPECIALIST	55
TABLE 11-1: INTERPRETATION OF THE SIGNIFICANCE SCORING OF A NEGATIVE IMPACT / EFFECT	59
TABLE 11-2: RATING SCALE FOR THE ASSESSMENT OF THE SPATIAL EXTENT OF A PREDICTED EFFECT / IMPACT ..	60
TABLE 11-3: RATING SCALE FOR THE ASSESSMENT OF THE SEVERITY / MAGNITUDE OF A PREDICTED EFFECT / IMPACT	61
TABLE 11-4: RATING SCALE FOR THE ASSESSMENT OF THE TEMPORAL SCALE OF A PREDICTED EFFECT / IMPACT ..	61
TABLE 11-5: RATING SCALE FOR THE ASSESSMENT OF LOSS OF RESOURCES DUE TO A PREDICTED EFFECT / IMPACT	62
TABLE 11-6: RATING SCALE FOR THE ASSESSMENT OF REVERSIBILITY OF A PREDICTED EFFECT / IMPACT	62
TABLE 11-7: RATING SCALE FOR THE ASSESSMENT OF THE PROBABILITY OF A PREDICTED EFFECT / IMPACT	63
TABLE 12-1: CONSTRUCTION PHASE IMPACTS IDENTIFIED AND ASSOCIATED MITIGATION MEASURES	66
TABLE 13-1: ASSESSMENT OF IMPACTS	71

PLATES

PLATE 4-1: EXISTING Ø355MM STEEL RISING MAIN PIPELINE ACROSS DRAINAGE LINE BELOW THE N3, ON EXISTING PLINTHS.	21
PLATE 4-2: EXISTING Ø355MM STEEL RISING MAIN ALIGNED THROUGH THE EXISTING CULVERT WHICH RUNS BENEATH THE N3.	21
PLATE 7-1: GEORGE CROSS WATER TREATMENT WORKS.	30
PLATE 7-2: EXISTING Ø355MM STEEL PIPELINE AT N3 CROSSING	30
PLATE 7-3: EXISTING Ø355MM STEEL PIPELINE AT N3 CULVERT	30
PLATE 7-4: PROPOSED BULK PIPELINE TO RUN THROUGH EXISTING SERVITUDE ON AGRICULTURAL LAND	30
PLATE 7-5: EXISTING 10ML WEMBEZI RESERVOIR. NEW 10ML RESERVOIR TO BE CONSTRUCTED ADJACENT TO THE EXISTING RESERVOIR	31
PLATE 7-6: RETICULATION TO BE ALIGNED ALONGSIDE EXISTING ROADS IN WEMBEZI.	31
PLATE 7-7: RETICULATION TO BE ALIGNED ALONGSIDE EXISTING ROADS IN WEMBEZI.	31
PLATE 7-8: LEAKING INFRASTRUCTURE EVIDENT THROUGHOUT WEMBEZI.	31

PLATE 7-9: LEAKING INFRASTRUCTURE EVIDENT THROUGHOUT WEMBEZI.....	31
PLATE 7-10: OVERFLOWING SEWERAGE MANHOLE, WEMBEZI AS A RESULT OF EXCESSIVE POTABLE WATER LOSS	31
PLATE 8-1: NOTICE AT BUS STOP (24.06.2017)	37
PLATE 8-2: SITE NOTICE PLACED ON A FENCE OF A LOCAL SHOP (24.06.2017)	37
PLATE 8-3: SITE NOTICE PLACED ON CHURCH FENCE (24.06.16)	37
PLATE 8-4: SITE NOTICE PLACED ON AN ELECTRICITY POLE (24.06.16)	37
PLATE 8-5: SITE NOTICE PLACED ON WAGON DRIFT DAM SIGN BOARD (24.06.16)	37
PLATE 8-6: SITE NOTICE PLACED ON THE P29 LAYBY (23.06.2017)	37
PLATE 8-7: SITE NOTICE PLACED ON SIGN BOARD TO MOOR PARK (23.06.2017)	37
PLATE 8-8: SITE NOTICE PLACED AT TAXI RANK, WEMBEZI (23.06.2017)	37
PLATE 8-9: SITE NOTICE PLACED AN ELECTRICITY POLE (23.06.17).....	38
PLATE 8-10: SITE NOTICE PLACES AT THE ENTRANCE TO THE GEORGE CROSS TREATMENT WORKS (23.06.17)	38

APPENDICES

APPENDIX 1: CVs OF THE EAP	78
APPENDIX 2: 21 DIGIT SG CODES AND PROPERTY DETAILS.....	79
APPENDIX 3: ENVIRONMENTAL AUTHORISATION APPLICATION	80
APPENDIX 4: EDTEA PRE-APPLICATION MEETING MINUTES	81
APPENDIX 5: ENVIRONMENTAL MANAGEMENT PROGRAMME	82
APPENDIX 6: SPECIALIST REPORTS.....	83
APPENDIX 7: DESIGN DRAWINGS.....	84
APPENDIX 8: PUBLIC PARTICIPATION DOCUMENTATION.....	85

Proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade, Inkosi Langalibalele Local Municipality, uThukela District Municipality, KwaZulu-Natal

1 INTRODUCTION

Terratest (Pty) Ltd has been appointed by the uThukela District Municipality to undertake the necessary environmental services required for the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme, Inkosi Langalibalele Local Municipality, KwaZulu-Natal. The proposed upgrade includes the installation of a new 8.8km High-density Polyethylene (HDPE) 750mm diameter (\emptyset), rising main bulk pipeline from the existing pump station at George Cross Water Treatment Works, to a new 10 Mega-litre (MI) bulk storage reservoir, Wembezi. The proposed rising main bulk water pipeline will be aligned to run alongside an existing \emptyset 355mm rising main which currently serves an existing 10MI Wembezi Reservoir, Wembezi, within an existing servitude.

The project also includes for the upgrade of the existing water reticulation scheme in Wembezi, which will amount to the replacement of approximately 160 993m of reticulation pipeline, ranging from \emptyset 75mm unplasticized polyvinyl chloride (uPVC) to \emptyset 500mm HDPE. All reticulation will be constructed within the same footprint as the previously installed network.

The proposed upgrade is required as Wembezi experiences severe water losses from the existing, dated infrastructure and supply is therefore unreliable. The neighbouring area of Ntabamhlophe feeds off the Wembezi infrastructure, and as this is failing, the area of Ntabamhlophe also receives an unreliable supply of water, if any at all. The proposed development therefore forms part of a larger project, which aims to upgrade water infrastructure and potable water supply in both the areas of Wembezi and in the neighbouring area of Ntabamhlophe. An additional aim of the upgrade is to stop the unnecessary and extreme water losses currently experienced and is thus also considered to be a water conservation initiative.

As per GNR 326 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) a Basic Assessment (BA) Process must be undertaken in such a manner that the environmental outcomes, impacts and residual risks of the proposed Listed Activities being applied for are noted in the BA Report and assessed accordingly by the Environmental Assessment Practitioner (EAP). In this regard, the requirements of the BA Process are noted in the EIA Regulations (2014, as amended)), Listing Notice 1, Appendix 1 of GNR 326 and are consequently adhered to in this report (please refer to Table 1-1 of the Executive Summary). For reference purposes, it is important to note that the Listed Activities in terms of GNR 326 of the EIA Regulations, (2014, as amended) applicable to this proposed project pertain only to the "development" / construction of infrastructure associated with the proposed rising main bulk pipeline and associated reticulation. In this regard, this BA Report focuses only on construction phase impacts and mitigation measures.

Ultimately, 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.

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Terratest (Pty) Ltd has been appointed by the uThukela District Municipality to undertake the environmental services required for the construction works associated with the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme, Inkosi Langalibalele Local Municipality, KwaZulu-Natal. Details of the qualified EAPs involved in undertaking the BA Process are noted in Table 2-1 and the Curriculum Vitae (CV) of the relevant EAPs attached as Appendix 1.

TABLE 2-1: Details of the EAP

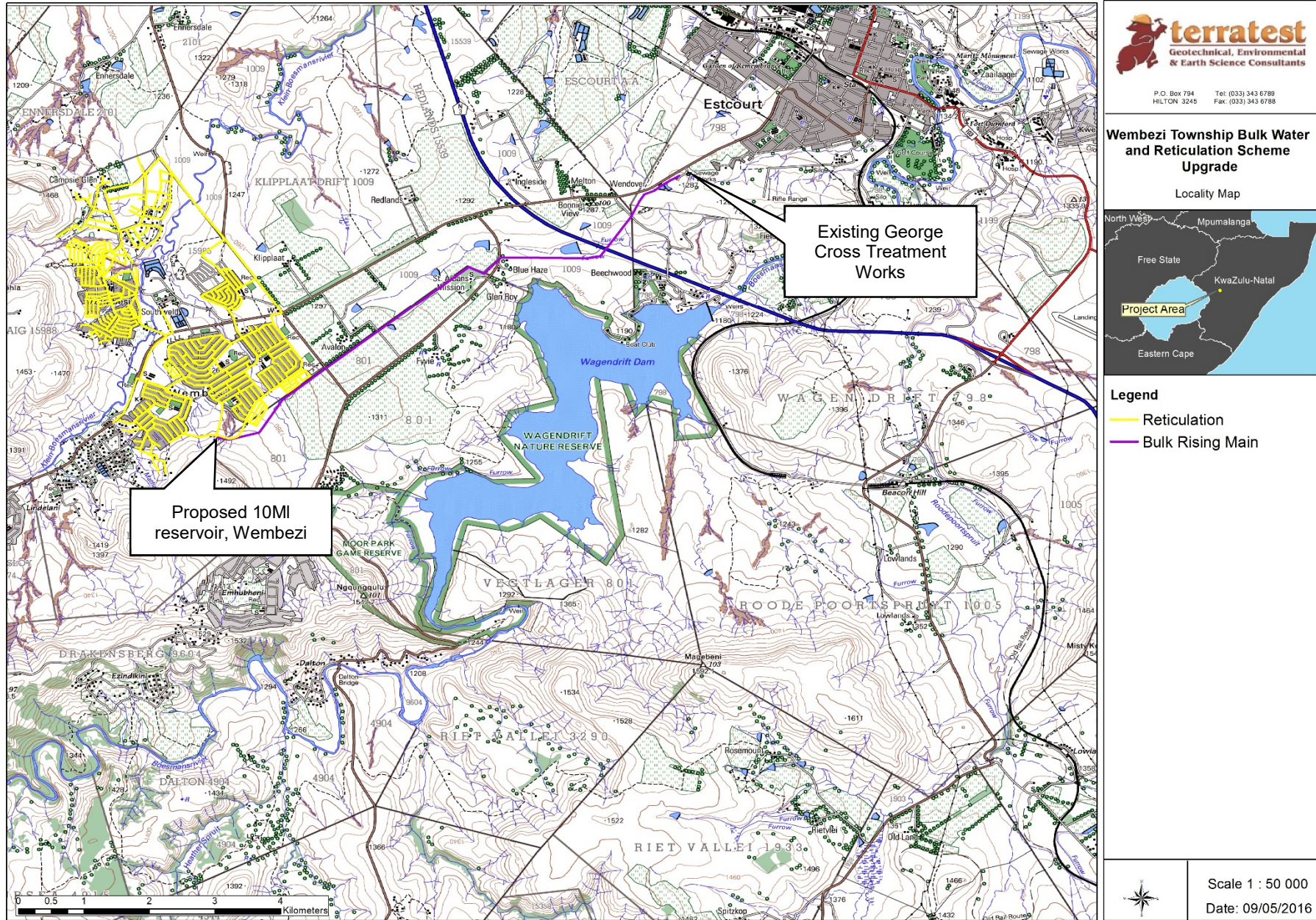
COMPANY: TERRATEST (PTY) LTD			
EAP	Qualifications & professional affiliations	Experience	Contact details
Mr M. van Rooyen Executive Associate	BSc, BSc Hons, MPhil. (Environmental Management), Pr. Sci. Nat, IAIAA	14 years	Tel: (033) 343 6789 Email: vanrooyenm@terratest.co.za
Ms L. Dralle Environmental Scientist	BSc. Hons Environmental Management, IAIAA	11 years	Tel: (033) 343 6789 Email: drallel@terratest.co.za
Ms B. Ndaba Environmental Consultant	Advanced diploma Nature Conservation, IAIAA	2 years	Tel: (033) 343 6789 Email: ndabab@terratest.co.za

3 LOCATION OF THE ACTIVITY

3.1 ALIGNMENT

The proposed activity is located within Wards 8, 9, 15 and 17 of the Inkosi Langalibalele Local Municipality, located immediately west of the town of Estcourt (see Figure 3-1: Locality Map).

The proposed rising main bulk water pipeline will be aligned to run alongside an existing Ø355mm steel rising main which currently serves an existing 10MI Wembezi Reservoir, within an existing servitude. The existing servitude is 2 to 3m wide. The proposed rising main bulk line will be approximately 8.8km long. All reticulation to be upgraded will either run alongside existing roads, or will be placed in the same trenches utilised to install the previous reticulation infrastructure in Wembezi (i.e. previous footprint of disturbance).



terratest
Geotechnical, Environmental & Earth Science Consultants

P.O. Box 794 HILTON 3246 Tel: (033) 343 6789 Fax: (033) 343 6788

Wembezi Township Bulk Water and Reticulation Scheme Upgrade
Locality Map



- Legend**
- Reticulation
 - Bulk Rising Main

Scale 1 : 50 000
Date: 09/05/2016

FIGURE 3-1: Locality Map

The 21-digit Surveyor General (SG) code for each cadastral land parcel, as well as property details through which the rising main bulk water pipeline servitude and associated reticulation are aligned to run, are attached as Appendix 2.

Co-ordinates of the rising main bulk water pipeline servitude, plotted at 500m intervals, are provided in Table 3-1.

TABLE 3-1: Pipeline corridor co-ordinates

FEATURE	KILOMETRE POINT	LATITUDE (S)	LONGITUDE (E)
Starting point (George Cross Reservoir):	0.0 km	29° 01' 32.152" S	29° 50' 40.059" E
	0.5km	29° 01' 45.361" S	29° 50' 30.111" E
	1km	29° 01' 58.096" S	29° 50' 18.649" E
	1.5km	29° 02' 04.046" S	29° 50' 04.575" E
	2.0km	29° 02' 03.893" S	29° 49' 46.100" E
	2.5km	29° 02' 06.743" S	29° 49' 30.896" E
	3km	29° 02' 10.523" S	29° 49' 15.503" E
	3.5km	29° 02' 16.881" S	29° 49' 00.626" E
	4km	29° 02' 27.077" S	29° 48' 46.246" E
	4.5km	29° 02' 37.270" S	29° 48' 31.863" E
	5km	29° 02' 47.263" S	29° 48' 17.333" E
	5.5km	29° 02' 57.569" S	29° 48' 03.078" E
	6km	29° 03' 07.857" S	29° 47' 49.617" E
	6.5km	29° 03' 18.252" S	29° 47' 35.426" E
	7km	29° 03' 30.528" S	29° 47' 24.818" E
	7.5km	29° 03' 33.256" S	29° 47' 07.839" E
End point (new 10MI reservoir):	8.00km	29° 03' 33.293" S	29° 47' 05.010" E

The reticulation network will require the replacement of approximately 160 993m of reticulation pipeline, ranging from Ø75mm uPVC to Ø500mm HDPE. Plotting 500m intervals is impractical for the reticulation upgrade due to multiple pipelines intersecting each other. As such, 500m co-ordinates have not been provided. A Layout Plan of the proposed reticulation upgrade is provided in Figure 3-2.

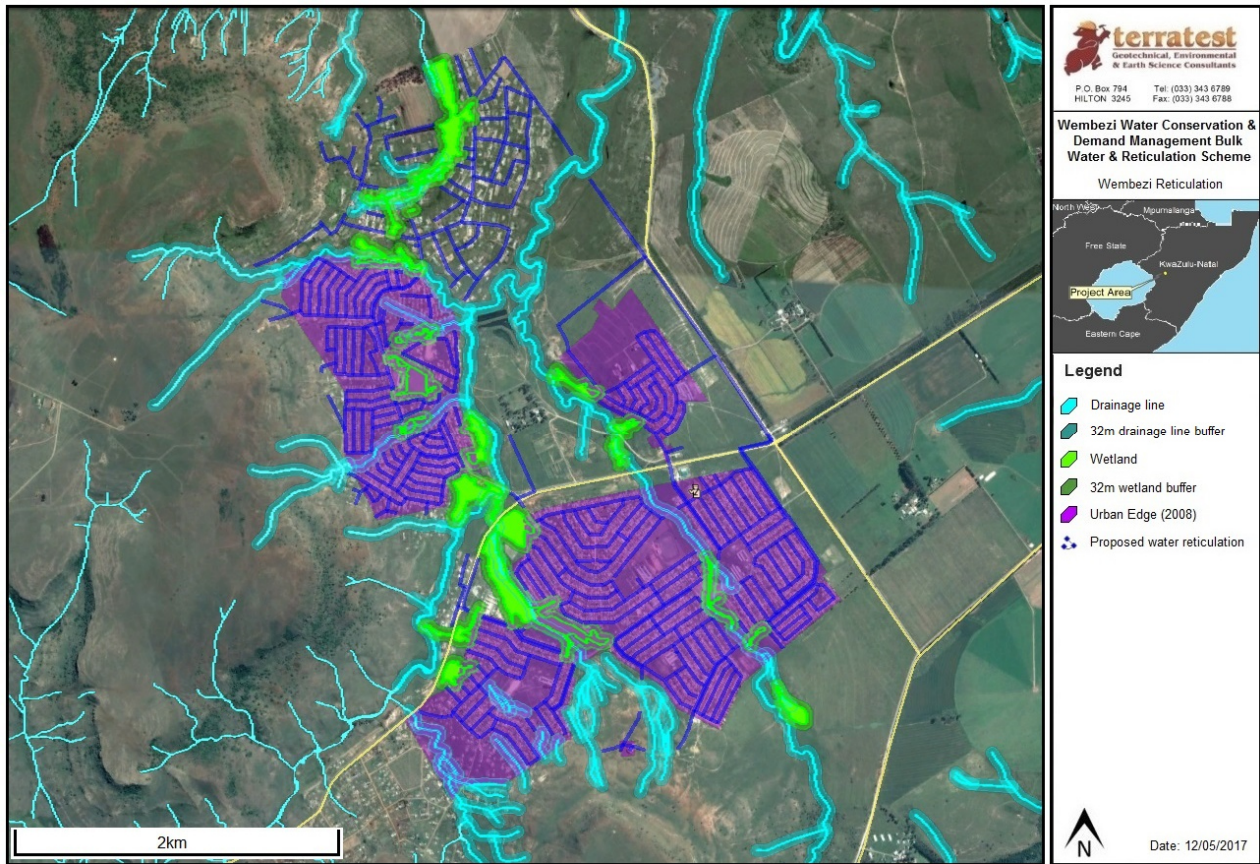


FIGURE 3-2: Proposed reticulation alignment, Wembezi

3.2 WATERCOURSES

Construction of the rising main bulk pipeline and the associated reticulation will require the crossing of several watercourses¹, inclusive of drainage lines and wetlands. A watercourse specialist has identified all drainage lines and wetlands located along the proposed alignment, the co-ordinates of which are provided in Tables 3-2 and 3-3.

TABLE 3-2: Watercourse crossing coordinates on the rising main bulk pipeline alignment

Number	CROSSING TYPE		POSITION	
	Wetland	Drainage line	Latitude (S)	Longitude (E)
1	x		29° 01'26.68"	29° 50'49.27"
2	x		29° 02'32.21"	29° 48'39.13"
3		x	29° 01'57.82"	29° 50'18.81"
4		x	29° 03'16.05"	29° 47'38.98"
5		x	29° 03'34.10"	29° 47'15.69"
6		x	29° 03'34.09"	29° 47'12.00"

¹ As per GNR 326 of the EIA Regulations (2014, as amended) a watercourse is defined as “(a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998)”.

Table 3-3: Watercourse crossing coordinates located within the reticulation network, Wembezi

CROSSING TYPE			POSITION	
Number	Wetland	Drainage line	Latitude (S)	Longitude (E)
1		x	29° 03'33.60"	29°46'59.03"
2		x	29° 03'31.85"	29°46'50.66"
3	x		29° 03'14.04"	29°46'53.09"
4	x		29° 03'05.94"	29°46'32.13"
5		x	29° 03'20.95"	29°47'10.37"
6		x	29° 03'33.44"	29°47'15.79"
7		x	29° 03'33.40"	29°47'12.30"
8		x	29° 03'11.65"	29°47'33.17"
9		x	29° 02'57.30"	29°47'27.10"
10		x	29° 02'45.99"	29°47'16.35"
11	x		29° 03'6.76"	29°46'46.23"
12	x		29° 02'48.18"	29°46'37.26"
13	x		29° 02'58.11"	29°47'25.62"
14	x		29° 03'10.07"	29°46'26.25"
15	x		29° 03'11.44"	29°46'31.11"
16		x	29° 02'41.54"	29°46'38.86"
17		x	29° 02'48.38"	29°46'19.88"
18		x	29° 02'37.86"	29°46'01.77"
19		x	29° 02'23.19"	29°46'27.58"
20		x	29° 02'12.43"	29°46'12.37"
21		x	29° 02'5.63"	29°46'16.38"
22		x	29° 02'4.16"	29°46'12.08"
23		x	29° 02'2.79"	29°46'19.49"
24		x	29° 02'2.38"	29°46'22.81"
25		x	29° 01'57.11"	29°46'20.79"
26		x	29° 01'43.91"	29°46'16.29"
27		x	29° 01'38.64"	29°46'23.09"
28		x	29° 01'38.12"	29°46'57.34"
29		x	29° 01'37.47"	29°46'14.13"
30	x		29° 02'40.19"	29°46'35.62"
31	x		29° 02'29.24"	29°46'16.30"
32	x		29° 02'21.80"	29°46'21.29"
33	x		29° 02'14.57"	29°46'13.32"
34	x		29° 01'43.17"	29°46'13.69"
35	x		29° 01'42.45"	29°46'15.63"
36	x		29° 01'38.44"	29°46'24.81"
37	x		29° 01'33.11"	29°46'27.35"
38	x		29° 01'27.90"	29°46'27.39"
39	x		29° 02'27.70"	29°47'08.93"

4 ACTIVITY DESCRIPTION

4.1 APPLICABLE LISTED ACTIVITIES

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 (GNR 327 and GNR 324) or a full Scoping and EIA (GNR 325) is required.

The following Listed Activities in Government Notice (GNR 327 (Listing Notice 1) and GNR 324 (Listing Notice 3), requiring a Basic Assessment (BA) Process are applicable to the proposed upgrade:

- **GNR 327, Item 9:** “The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or stormwater (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 stormwater drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.”
 - *The proposed project entails the development of an 8 000m (i.e. 8km) long rising main bulk water pipeline with an internal diameter of 0.75m (i.e. 750mm). The alignment of the rising main bulk water pipeline does not fall within an urban area and does not run inside a road or railway line reserve. Further, portions of the reticulation upgrade do not fall within urban areas and will have an internal diameter of more than 0.36m. This Listed Activity is therefore triggered.*
- **GNR 327, Item 12:** “The development of (xii) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs a) within a watercourse b) in front of the development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of the watercourse, excluding (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves.”
 - *The rising main bulk line is aligned to run through wetlands, which will result in more than 100m² of infrastructure being developed in a watercourse. The alignment of the rising main bulk water pipeline does not fall within an urban area and does not run inside a road or railway line reserve. This Listed Activity is therefore triggered.*
- **GNR 327, Item 19:** “The infilling or depositing of any material of more than 10 cubic metres into, or dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 10 cubic metres from a watercourse.”
 - *The construction of the rising main bulk line and reticulation upgrade will necessitate construction through watercourses, which will result in the excavation and deposition of more than 10m³ into and out of watercourses. This Listed Activity is therefore triggered.*
- **GNR 324, Item 2:** “The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres in d) KwaZulu-Natal xii) Outside urban areas aa) in areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve”.
 - *The site identified for the construction of a 10Ml reservoir falls outside of an urban area and within 5km of the Wagendrift and Moor Park protected areas. This Listed Activity is therefore triggered.*

- **GNR 324, Item 14:** “The development of (ii) infrastructure or structures with a physical footprint of 10m² or more where such development occurs (a) within a watercourse (c) if no development setback has been adopted, within 32 meters of a watercourse, measured from the edge of a watercourse (d) in KwaZulu-Natal (x) outside urban areas (aa) areas within 10km from national park or world heritage sites or 5km from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.”
 - *The rising main bulk line will necessitate construction within watercourses that will exceed 10m², outside urban areas and within 5km of the Wagendrift Nature Reserve. Further, portions of the reticulation fall outside of the urban area as defined by the Competent Authority which will require construction within a watercourse. This Listed Activity is therefore triggered.*

Based on the above proposed activities, a BA Process is required. The associated Environmental Authorisation (EA) Application form is attached to this Report as Appendix 3 and organogram of the BA Process is provided in Figure 4-1 for reference purposes.

4.1.1 EDTEA Pre-application Meeting

A Pre-Application Meeting was held with Ms A. Khulu and Ms N. Makhanya of the EDTEA: uThukela District on 08 June 2017. The minutes thereof are attached as Appendix 4. The purpose of the Pre-Application Meeting was to introduce the project to the EDTEA and present and confirm the relevant Listed Activities and Specialist Studies pertinent to the proposed upgrade.

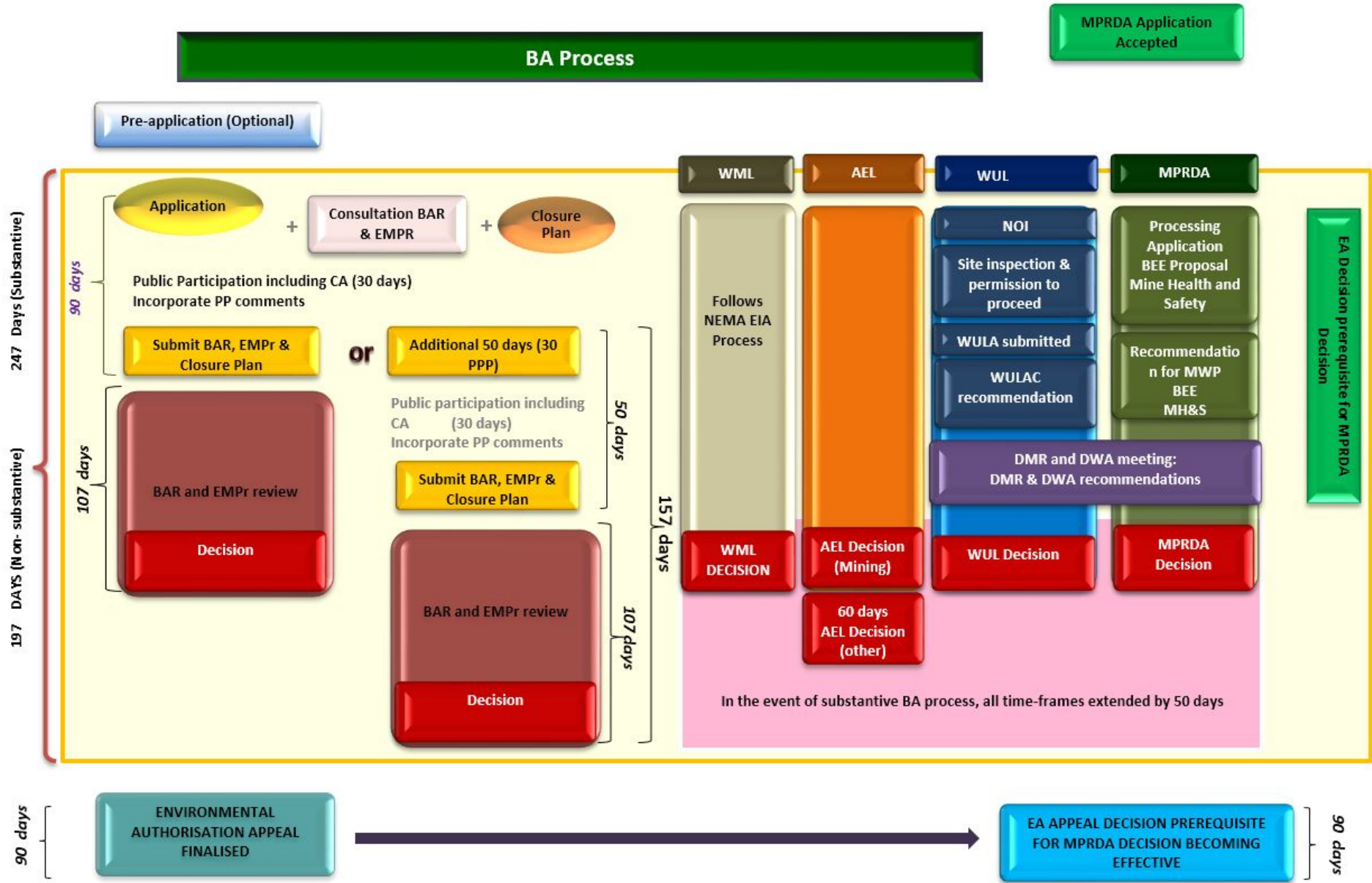


FIGURE 4-1: Basic Assessment Process Organogram

4.2 NATIONAL WATER ACT (ACT NO 36 OF 1998)

As per the National Water Act (Act No. 36 of 1998), should an activity trigger a Water Use, as defined in Section 21 of the Act, a Water Use Licence or a General Authorisation registration will be required prior to the activity being undertaken. The Competent Authority in this regard is the Department of Water and Sanitation. Water Uses, in terms of Section 21 of the Act include:

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

Terratest (Pty) Ltd has been appointed to undertake the necessary processes required to register the applicable water uses for the project. In this regard, a Pre-Application Meeting was held on 27 July 2016 with the Department of Water and Sanitation to ascertain their requirements and to confirm the Water Uses to be applied for. In terms of the rising main bulk pipeline, the Department of Water and Sanitation confirmed that a General Authorisation Registration would be required in terms of Section 39(1) of the National Water Act (Act 36 of 1998), Notice 509 of 2016 as the following water uses would be applicable:

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

In terms of the associated reticulation infrastructure in Wembezi, the Department of Water and Sanitation advised that a Water Use Licence or General Authorisation registration would not be required as the project involves the replacement and hence upgrading of existing infrastructure within an existing footprint of disturbance.

4.3 DESCRIPTION OF THE ACTIVITY

4.3.1 Project Overview

The project is a Water Conservation and Demand Management Scheme Upgrade for the area of Wembezi, located in the Inkosi Langalibalele Local Municipality. In this regard, the old existing infrastructure, including an existing bulk Ø315mm asbestos cement (AC) rising main pipeline and associated reticulation, is proposed to be upgraded and replaced with new infrastructure. This is required to stop the current and excessive water losses experienced in the area. It will also improve service delivery in terms of potable water provision.

The uThukela District Municipality is the Water Services Authority (WSA) for the upgrade. The Department of Water Affairs and Sanitation has unconditionally approved the upgrade and funding is via a Water Services Infrastructure Grant (WSIG).

In terms of construction works, the proposed rising main bulk pipeline will serve Wembezi and the associated reticulation network, as well as the adjacent community of Ntabamhlope. Due to the excessive loss of water from the existing Wembezi distribution network, the Ntabamhlope Community is unable to receive a constant supply of water and most areas do not receive water at all. The proposed scheme will alleviate the water loss and will ensure a constant supply to both the Wembezi and Ntabamhlope communities. Further, a new bulk and water reticulation scheme is currently being constructed in Ntabamhlope. The project started in 2007 and is due to be completed in 2019. This newly installed infrastructure will not be able to operate efficiently should the current Wembezi infrastructure remain. It is important to note that the George Cross Water Treatment Works is the only supplier of water to the Wembezi and Ntabamhlope communities.

Excessive water losses are also experienced through the existing reticulation network which services the Wembezi community. This is as a result of dated infrastructure and vandalism. The excessive leakages have placed substantial pressure on the existing sewerage network, to the extent that it cannot cope with the high water throughput and now also requires upgrading and replacement in most areas.

In total, approximately 9MI of potable water is lost to the existing system per day.

4.3.2 Development upgrade

Water is currently and will continue to be abstracted from Wagendrift Dam where it is pumped to the George Cross Water Treatment Works for treatment. From the George Cross Water Treatment Works, potable water is pumped via two existing bulk pipelines, namely:

- A Ø355mm steel rising main pipeline; and
- A Ø315mm AC rising main pipeline.

Both rising main pipelines run to an existing 10MI bulk storage reservoir located in Wembezi. The Ø355mm steel rising main pipeline runs through an existing servitude which is aligned mainly through agricultural land. The Ø315mm AC rising main pipeline runs through a servitude which runs alongside the P29.

From the existing 10MI Wembezi bulk storage reservoir, potable water is gravity fed to Wembezi, as well as to Ntabamhlope, where it is stored in the existing Bosch Reservoir.

The existing Ø315mm AC rising main pipeline from George Cross Water Treatment Works to the existing Wembezi Reservoir is old, cracked and leaks extensively. It is therefore proposed to decommission the Ø315mm AC rising main pipeline and construct the proposed Ø750mm HDPE rising main bulk pipeline. The proposed new Ø750mm HDPE rising main bulk pipeline will be aligned to run in the same pipeline servitude utilised for the existing Ø355mm steel rising main pipeline. The existing Ø355mm steel rising main pipeline will continue to operate and feed the existing 10MI Wembezi Reservoir, while the proposed Ø750mm HDPE rising main bulk pipeline will feed a new, dedicated 10MI reservoir, to be constructed adjacent to the existing reservoir, Wembezi.

A Layout Map of the pipelines, existing and proposed, is provided in Figure 4-2.

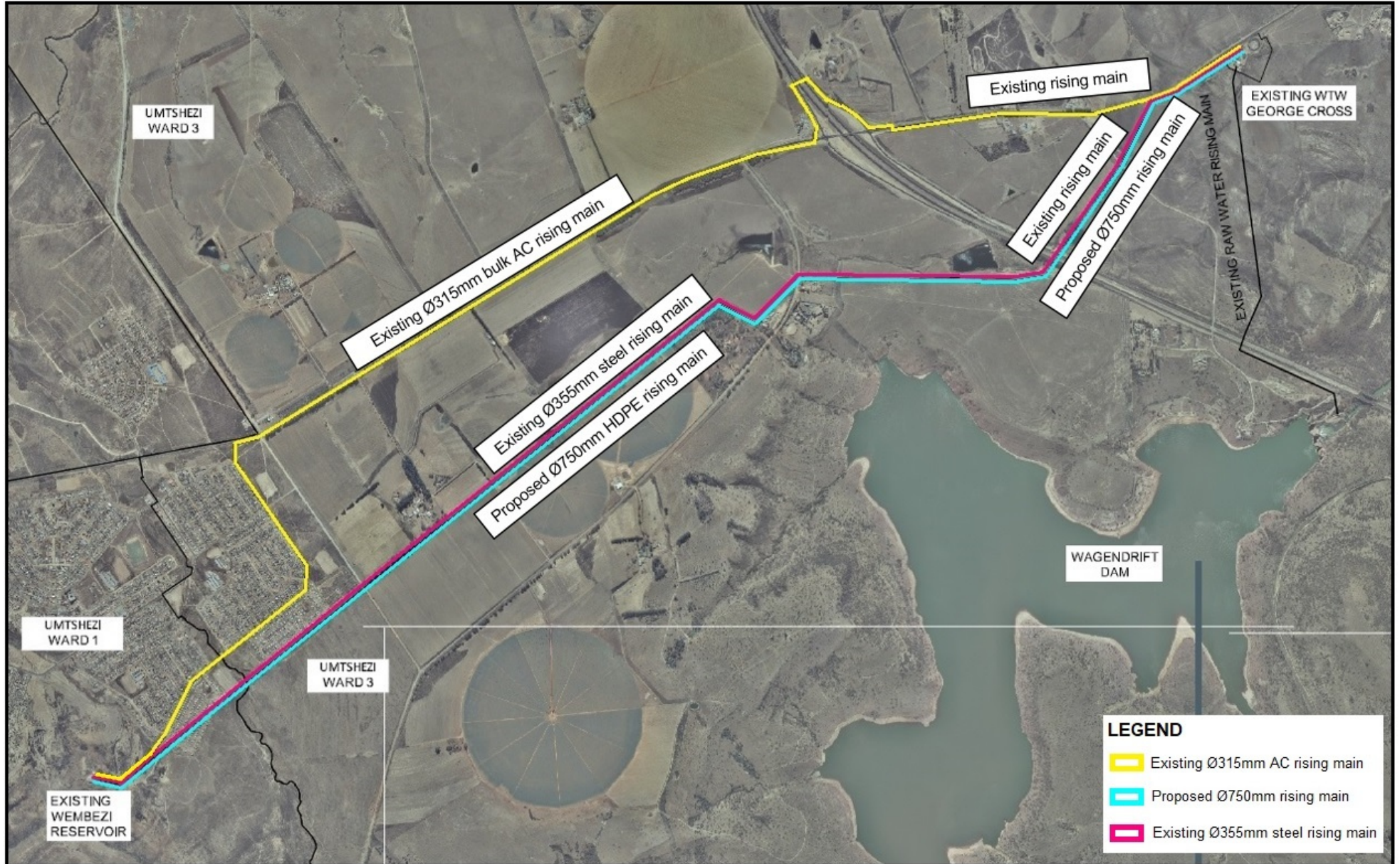


FIGURE 4-2: Layout of rising main bulk pipelines

The existing water reticulation scheme in Wembezi runs mainly alongside roads and was installed approximately 20-30 years ago and includes household connections. Due to vandalism and dated infrastructure, the reticulation scheme experiences large water losses. The majority of households also experience excessive water losses as a result of leaking plumbing connections such as pipes, taps, toilet systems, showers, geysers, etc.

The existing reticulation is proposed to be upgraded with 160 993m of reticulation pipelines ranging from Ø75mm uPVC to Ø500mm HDPE. The reticulation will be installed alongside existing roads and in trenches previously utilised for the installation of the current network (i.e. within an existing footprint of disturbance). Pipes will be constructed to tie into the existing infrastructure as construction progresses in order to prevent unnecessary disruptions to water supply.

4.3.3 Project objectives

The proposed Water Conservation and Demand Management Scheme Upgrade is proposed in order to meet the following objectives:

- Reduce the estimated daily water loss of 9 MI through the construction of the new Ø750mm HDPE rising main bulk and upgrading of the existing Wembezi water reticulation network;
- Relieve the pressure on the existing Wembezi sewerage network through the upgrading of the Wembezi water reticulation network;
- Ensure a reliable supply of potable water to the community of Wembezi;
- Ensure a reliable supply of potable water to the adjacent community of Ntabamhlope;
- Reduce the current demand of the George Cross Water Treatment Works by 4.48 MI/d in terms of treating water and the supply thereof to the communities of Wembezi and Ntabamhlope;
- Create sustainable development by ensuring maintenance of infrastructure post construction through the development of maintenance plans and identification of responsible parties (see Section 4.3.4);
- Educate the receiving community with regards to water conservation through:
 - Promoting water use efficiency; and
 - Relaying the importance of protecting water resources and the associated supply system;
- Create employment opportunities during the construction phase; and
- Develop skills and encourage knowledge transfer through job creation during the construction phase.

4.3.4 Construction project specifics

The existing Ø315mm bulk AC rising main is to be decommissioned and a new Ø750mm HDPE rising main bulk pipeline is to be constructed from the existing pump station at George Cross Water Treatment Works, to a new proposed Wembezi 10MI bulk reinforced concrete reservoir. Construction of the new Ø750mm HDPE rising main bulk pipeline will be constructed within the same, existing, 3m wide servitude which the existing Ø355mm rising main pipeline runs.

The key components of the rising main bulk scheme upgrade include:

- Approximately 8 000m of Ø750mm HDPE;
- Scour Valves;
- Air Valves;
- Isolating Valves;
- Pipeline ancillaries such as pipe marker posts, thrust blocks, chambers etc.;
- Utilisation of an existing culvert under the N3 and/or pipe-jacking beneath the N3;
- Bulk ultrasonic water meters; and

- Construction of a new 10 MI of a reinforced concrete reservoir.

The reticulation includes for the upgrading and replacement of 160 993m of pipeline, ranging from Ø75mm uPVC to Ø500mm HDPE, alongside roads or within existing trenches previously used during the initial construction of the reticulation approximately 20-30 years ago. The proposed reticulation will feed Wembezi only. Water supply will be gravity fed from the proposed new 10 MI bulk reinforced concrete reservoir at an elevation of 1 318m. The key components of the water reticulation scheme include:

- 160 993 m of reticulation pipelines ranging from Ø75mm uPVC to Ø500mm HDPE;
- Air valves;
- Scour valves;
- Isolating valves;
- Fire hydrants;
- Pipeline ancillaries such as marker posts, thrust blocks, chambers etc.;
- Replacement of yard connections;
- Replace or repair household toilet systems, leaking taps, leaking geysers and household plumbing; and
- Water meters on each house connection.

Once operational, the following Water Demand Management Interventions will be implemented to ensure the sustainability of the project:

1) Sectorising:

Sectorising is the process whereby large water distribution systems are sectioned off in order to create a smaller more manageable system. The proposed Wembezi Reticulation system is to be sectioned into four zones, namely Zone A to D as shown in Figure 4-2. By creating different zones within the Wembezi Water Reticulation Scheme this will help prevent water loss in the system as the operators will be able to manage and detect leaks within each zone.

Sectorising also assists when repairing or maintaining the water network. The operators will be able to isolate the section of the network which is experiencing water loss, while the rest of the network still receives a continuous supply of water. By splitting the water distribution network into zones it will not prevent water loss in the system from occurring, however, it will enable water loss in each zone to be monitored.

By continuously monitoring the flow in each zone the water loss in the network can be detected and responded to quicker.

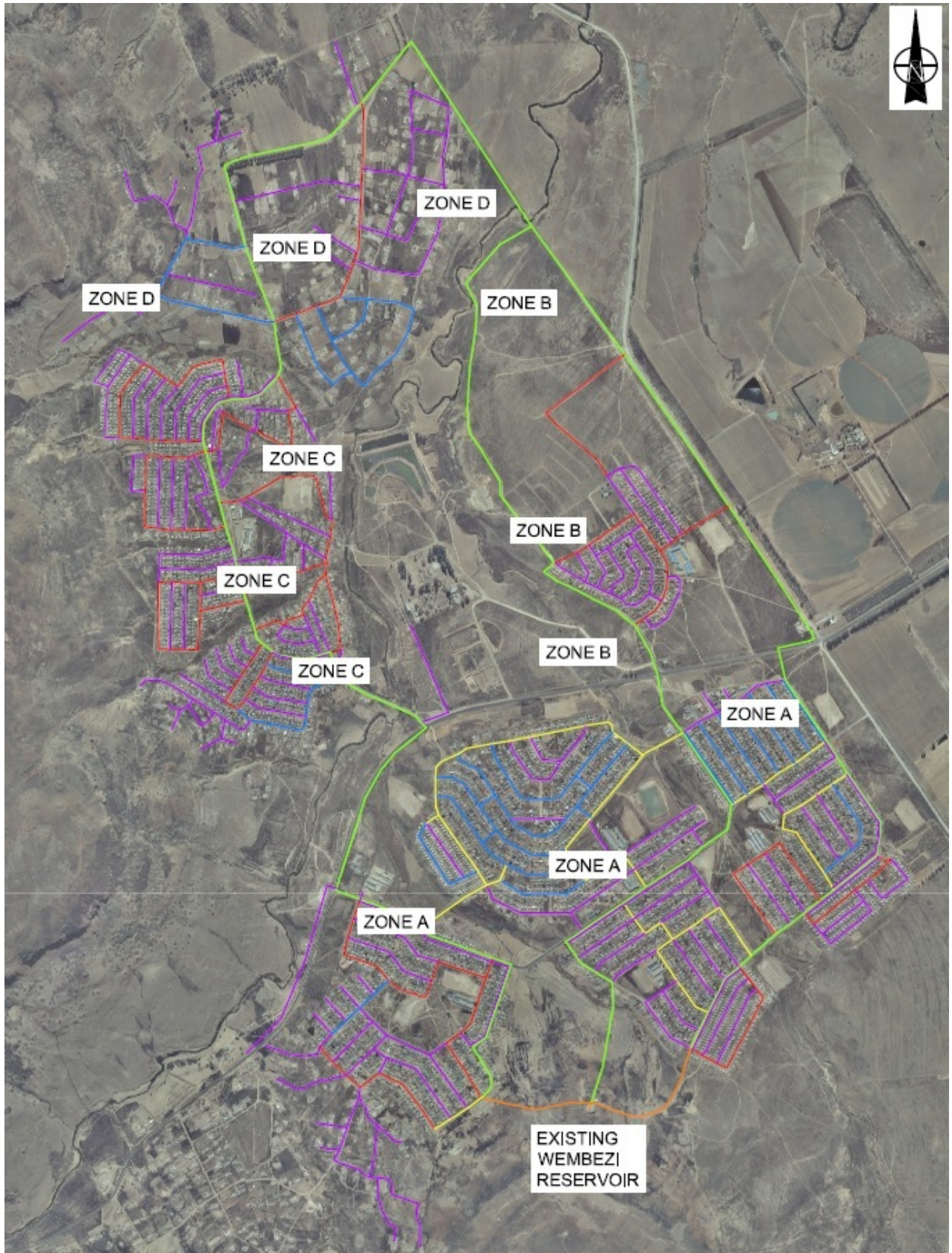


FIGURE 4-3: Sectoring of the reticulation network, Wembezi.

2) Logging and analysis of minimum night flows:

By installing ultrasonic meters within the water distribution network, flows and pressures can be monitored within each zone 24 hours a day. This will assist in detecting water loss in each zone.

3) Bulk management meters:

Bulk management meters will be installed on the new Ø750mm HDPE rising main bulk pipeline from George Cross Water Treatment Works to the proposed 10MI Wembezi bulk storage reservoir. This will assist in monitoring the amount of water being supplied from the water treatment works, as well as to detect if there are any leaks in the bulk rising main. It is critical to detect any leaks on the bulk rising main from the water treatment works to the proposed Wembezi bulk storage reservoir as it is the only supply of water for the Wembezi and Ntabamhlope Townships.

4) Domestic metering:

Domestic meters are to be installed at each household connection. This will enable the Municipality to monitor the water usage at each household. By monitoring the water usage at each household, water leaks in the household plumbing can also be detected by measuring the consumer's average water consumption. A consumer billing system can also be incorporated which also assist in saving water as consumers tend to use water more efficiently if they must pay for it.

5) Pipe replacement and repair:

Pipe replacement is a very costly exercise to the Municipality but there comes a point in the life of a pipeline that it becomes impractical to keep repairing the pipe. By repairing the old infrastructure it may reduce the water loss in the existing network for a short period, but eventually sections of the old pipe that were not previously repaired will also start to leak. For the long term, the most feasible option is to replace the entire network to eliminate the water loss in the network.

6) Pressure Management:

One of the most important aspects in the Water Conservation and Demand Management Scheme Upgrade is pressure management. Water reticulation systems generally operate at a high pressure due to flow requirements, topography of the area and off-peak surges. The volume of water loss due to leaking pipes is generally greater during off-peaks times when the pressures in the system are high due to the low demand. By reducing the pressure in the network during off-peak times it will reduce the volume of water loss from the leaking pipes. The proposed pressure management system will be based on a time-based modulation where the pressures in many parts of the network will be reduced during off-peak hours when the pressures in the network are higher. This will assist in reducing the water loss if any leaks occur in the water reticulation network.

7) Community awareness and education:

One of the most important factors in reducing the water loss in a system is community awareness and education. Often a well-designed water network fails because the community it serves are not included in the overall process. Proper consultation and education with the community is essential to ensure the community is involved in the upgrading of the scheme.

4.3.5 Construction methodology

4.3.5.1 General

Bulk

The existing Ø315mm bulk AC rising main will be decommissioned. It will not be excavated and will remain *in situ*.

The proposed new Ø750mm HDPE rising main bulk pipeline will be laid in the existing 2 to 3m wide pipeline servitude, adjacent to the existing Ø355mm steel bulk raising main. All construction activities will be carried out in accordance to the Environmental Management Programme (EMPr), attached as Appendix 5, as well as the relevant technical and safety requirements.

The working corridor (maximum of 8m) will be fenced to mitigate the risk of livestock accidents and to prevent public ingress. Demarcating the working corridor will also prevent the construction footprint from increasing in size. The working corridor will be stripped of topsoil to a minimum depth of 200mm and stockpiled as per the EMPr requirements. The working corridor will cater for the stockpiling of topsoil and subsoil, stringing of pipes, stockpiling of bedding materials and vehicle access along the pipeline route.

The new Ø750mm HDPE rising main bulk pipeline will be laid in the opened trench on bedding material and welded *in situ* by coded welders to minimise the development of internal stresses. In order to mitigate potential leaks, all welds will be proved by proven non-destructive techniques.

Reservoir

The new bulk reinforced concrete 10MI reservoir will be constructed adjacent to the existing 10MI Wembezi Reservoir. The new proposed reservoir will receive the Ø750mm HDPE rising main bulk pipeline.

Reticulation

Construction of the Wembezi reticulation will be conducted in a 5m wide (maximum) working corridor alongside existing roads (i.e. original reticulation footprint) or within existing trenches previously used during the initial construction of the reticulation. The working corridor will cater for the stockpiling of topsoil (if applicable) and subsoil, stringing of pipes and stockpiling of bedding materials.

In areas prone to erosion, the backfill will be stabilised with lime or other approved stabilizer to mitigate the risk of erosion. Backfill will be reinstated in accordance with the EMPr (Appendix 5) and will be maintained for the duration of the defects liability period.

4.3.5.2 Watercourses

Bulk line

The bulk pipeline will cross six watercourses as identified and delineated by the watercourse specialist (see Appendix 6: Specialist Reports).

Table 4-1 provides the co-ordinates of the watercourse crossings areas. Figure 4-4 provides the location of the identified watercourse crossing sites, while Figures 4-5 – 4-10 provide typical cross section detail per crossing. Further detail is provided in Appendix 7: Design drawings.

TABLE 4-1: Watercourse crossing coordinates along the bulk pipeline alignment

CROSSING TYPE			POSITION	
Number	Wetland	Drainage line	Latitude (S)	Longitude (E)
1	x		29°01'26.68"	29°50'49.27"
2	x		29°02'32.21"	29°48'39.13"
3		x	29°01'57.82"	29°50'18.81"
4		x	29°03'16.05"	29°47'38.98"
5		x	29°03'34.10"	29°47'15.69"
6		x	29°03'34.09"	29°47'12.00"

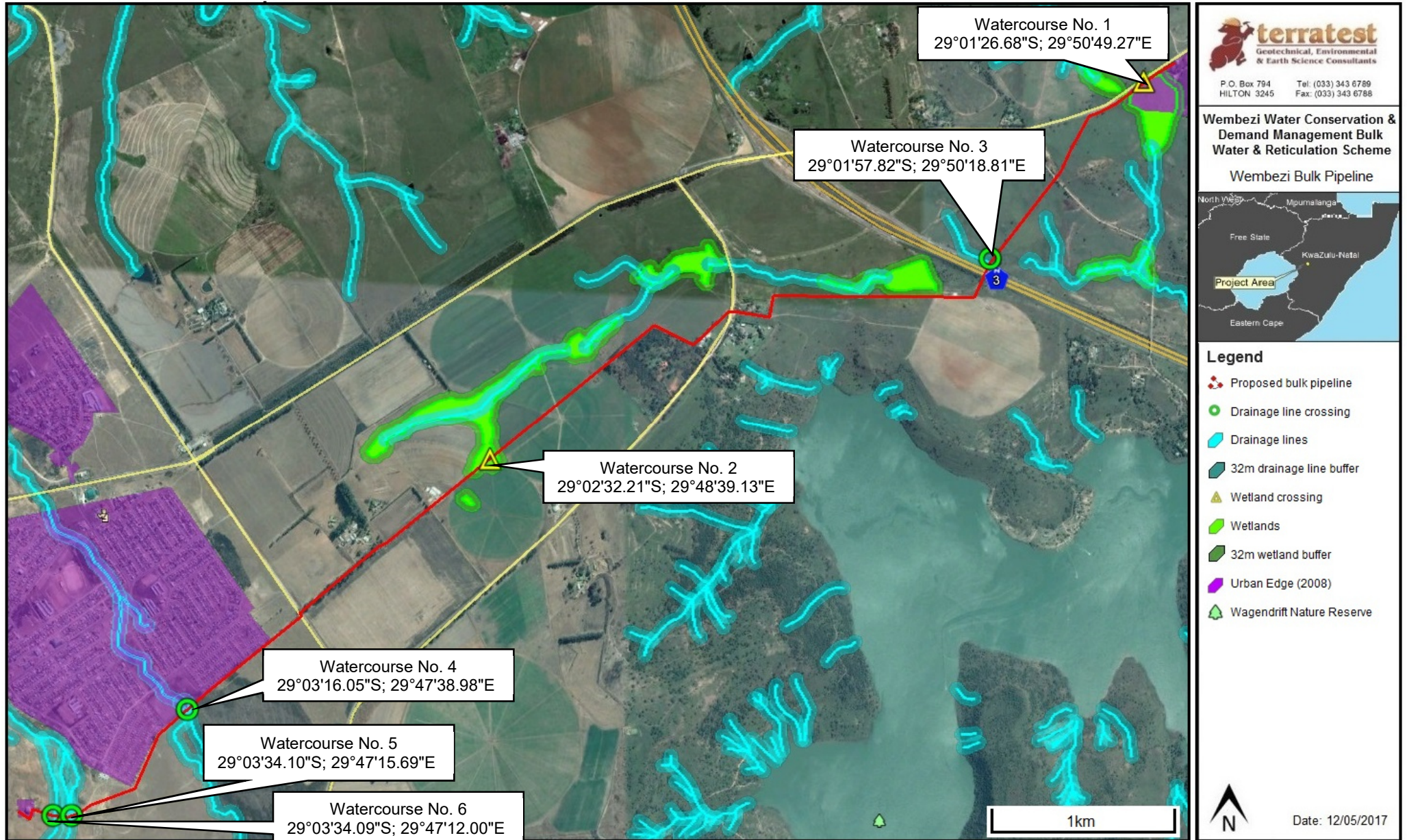


FIGURE 4-4: Locality Map of watercourse crossings identified on the bulk pipeline alignment

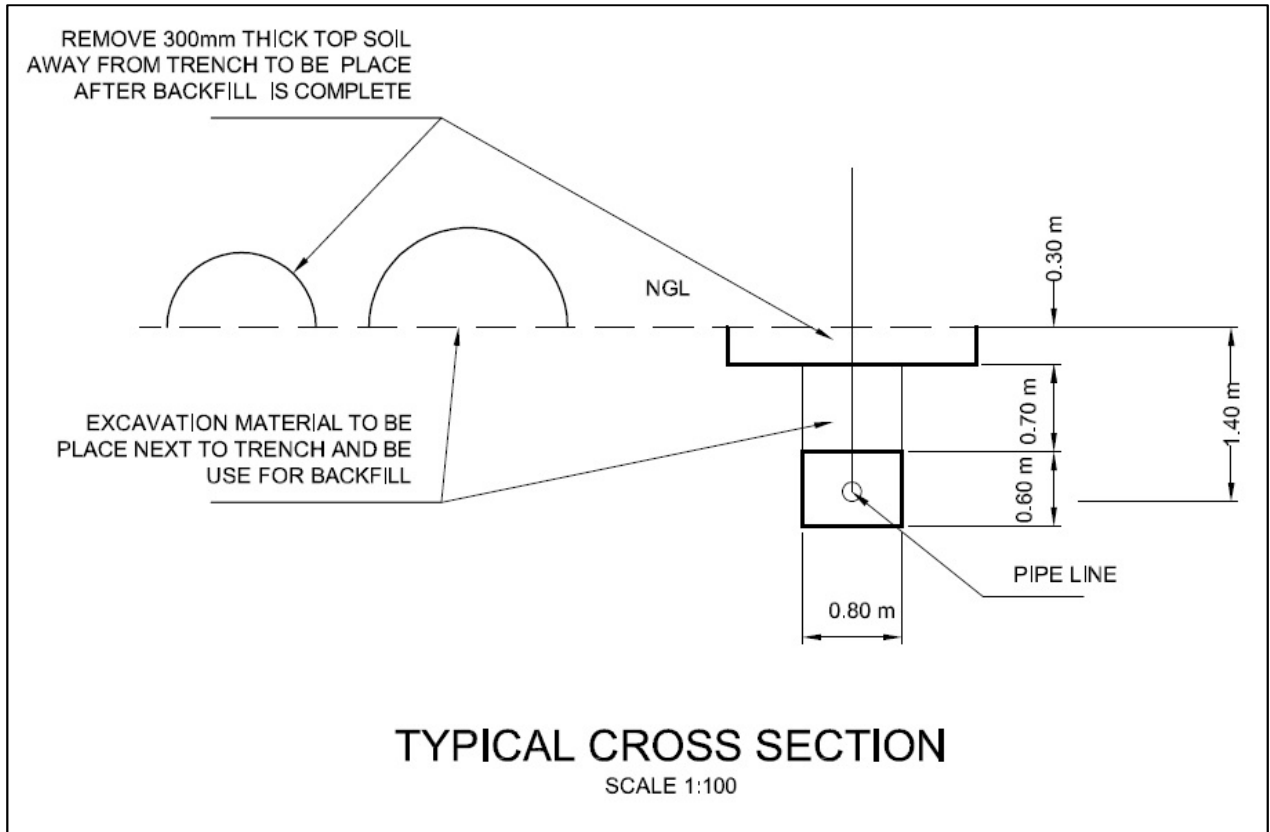


FIGURE 4-5: Typical cross section for watercourse crossing No. 1 (Wetland: 29°01'26.68"S; 29°50'49.27"E)

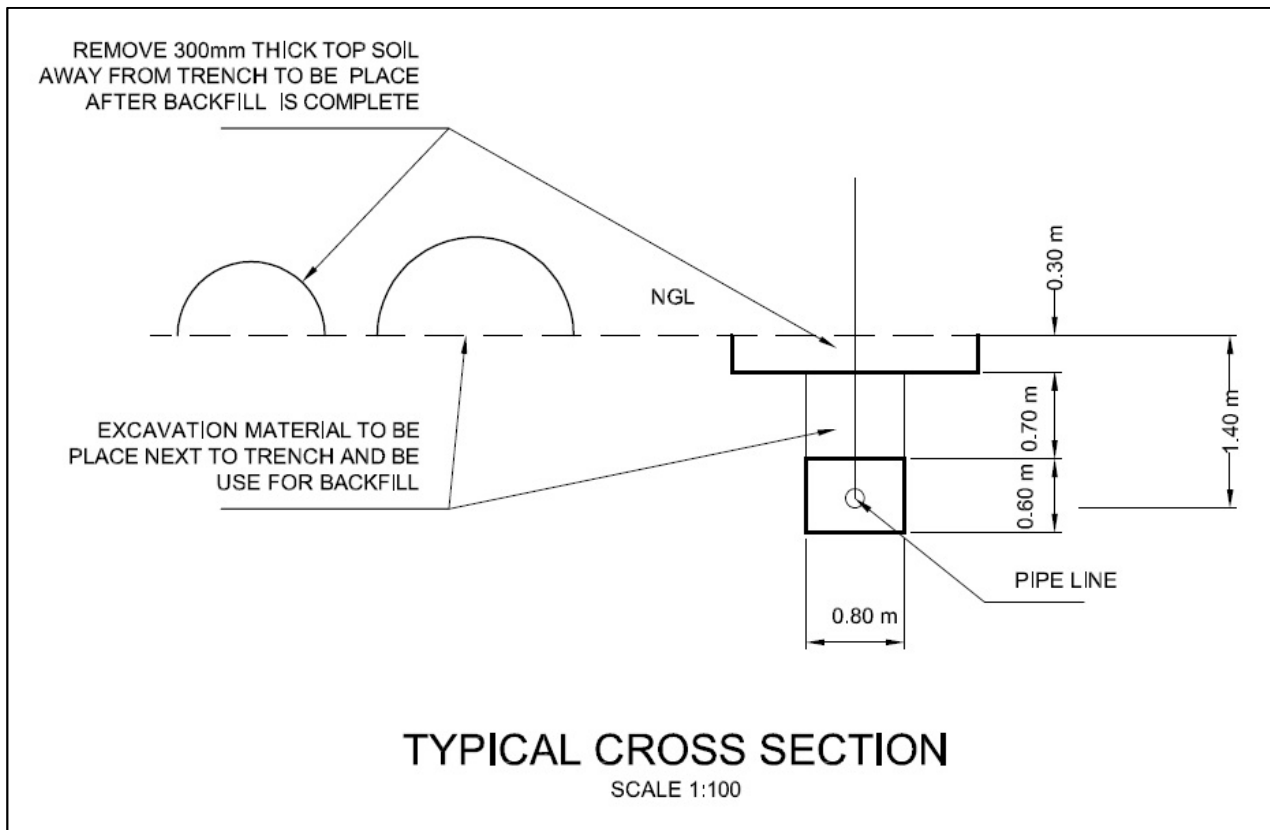


FIGURE 4-6: Typical cross section for watercourse crossing No. 2 (Wetland: 29°02'32.21"S; 29°48'39.13"E)

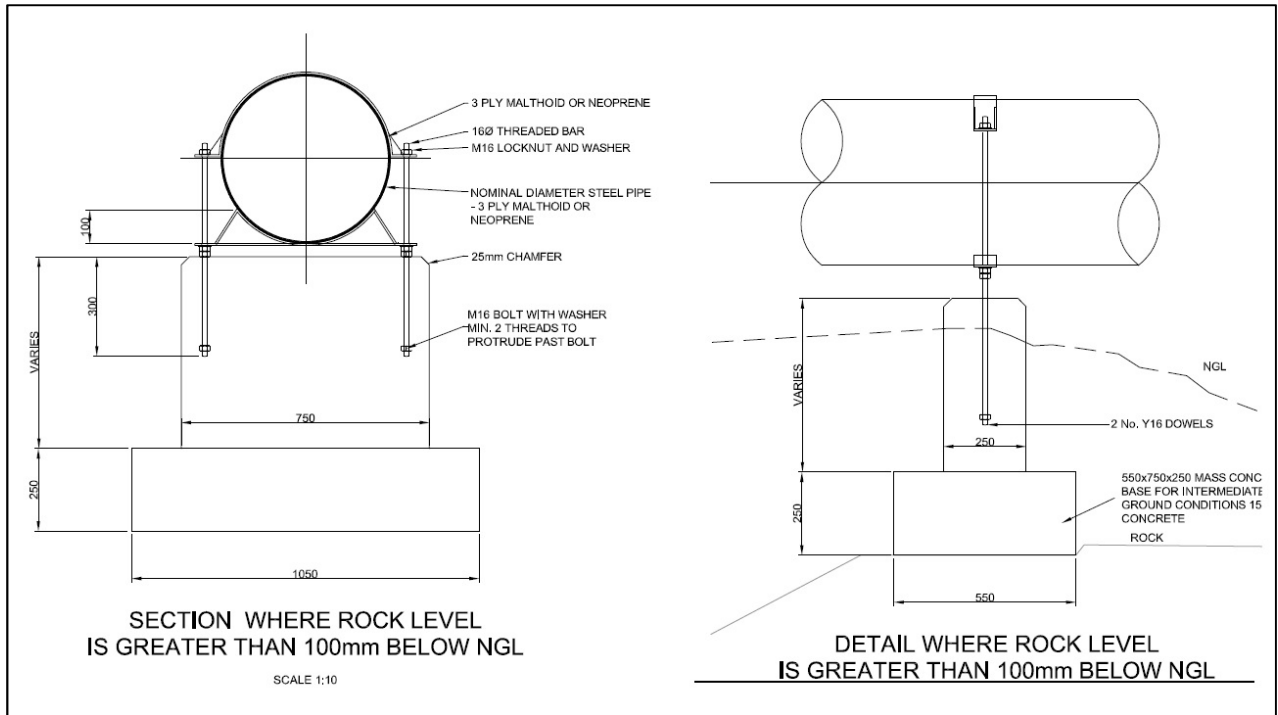


FIGURE 4-7: Typical cross section for watercourse crossing No. 3 (Drainage line: 29°01'57.82"S; 29°50'18.81"E)

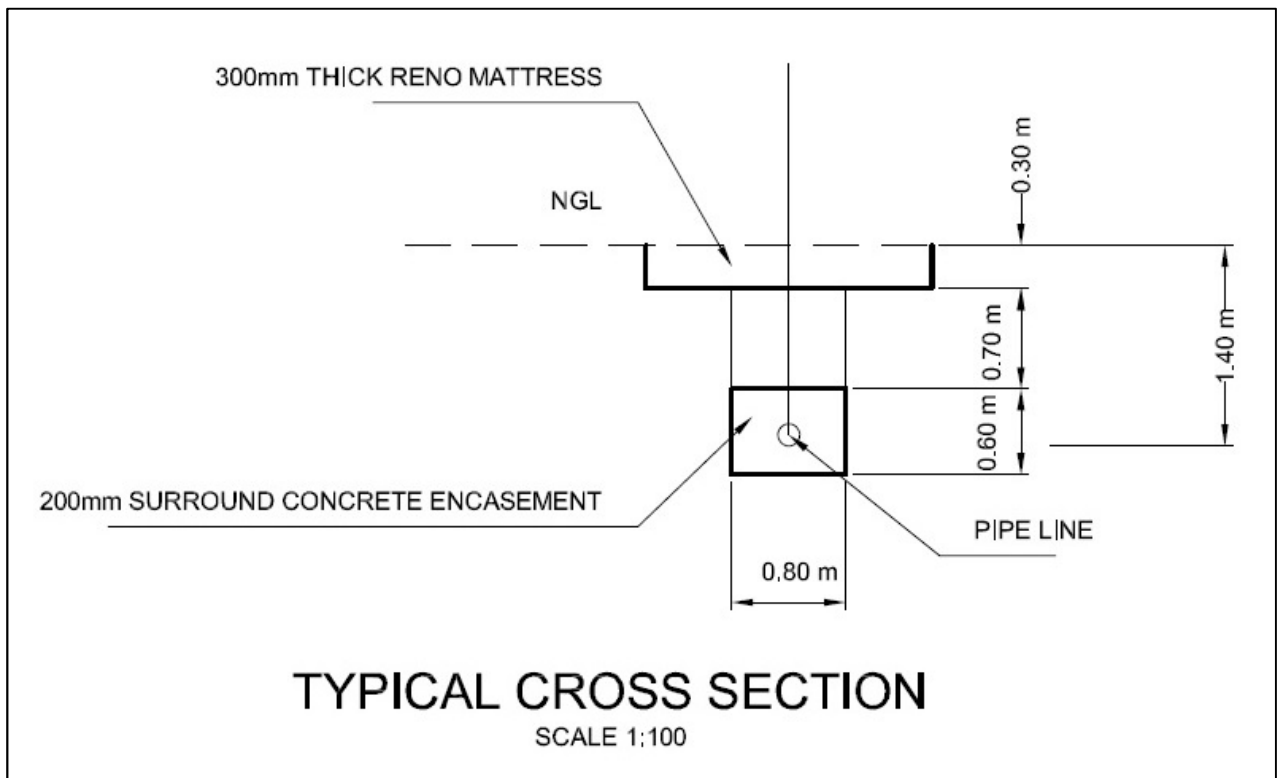


FIGURE 4-8: Typical cross section for watercourse crossing No. 4 (Drainage line: 29°03'16.05"S; 29°47'38.98"E)

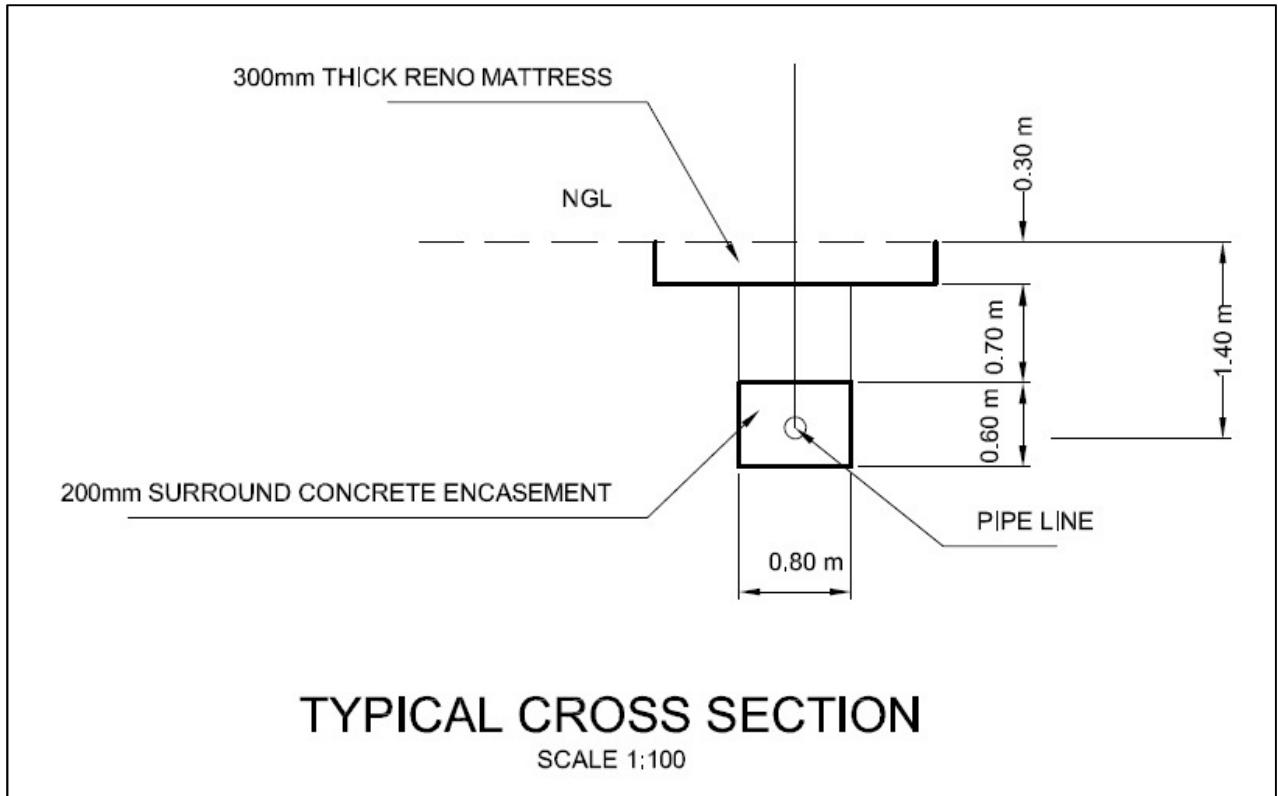


FIGURE 4-9: Typical cross section for watercourse crossing No. 5 (Drainage line: 29°03'34.10"S; 29°47'15.69"E)

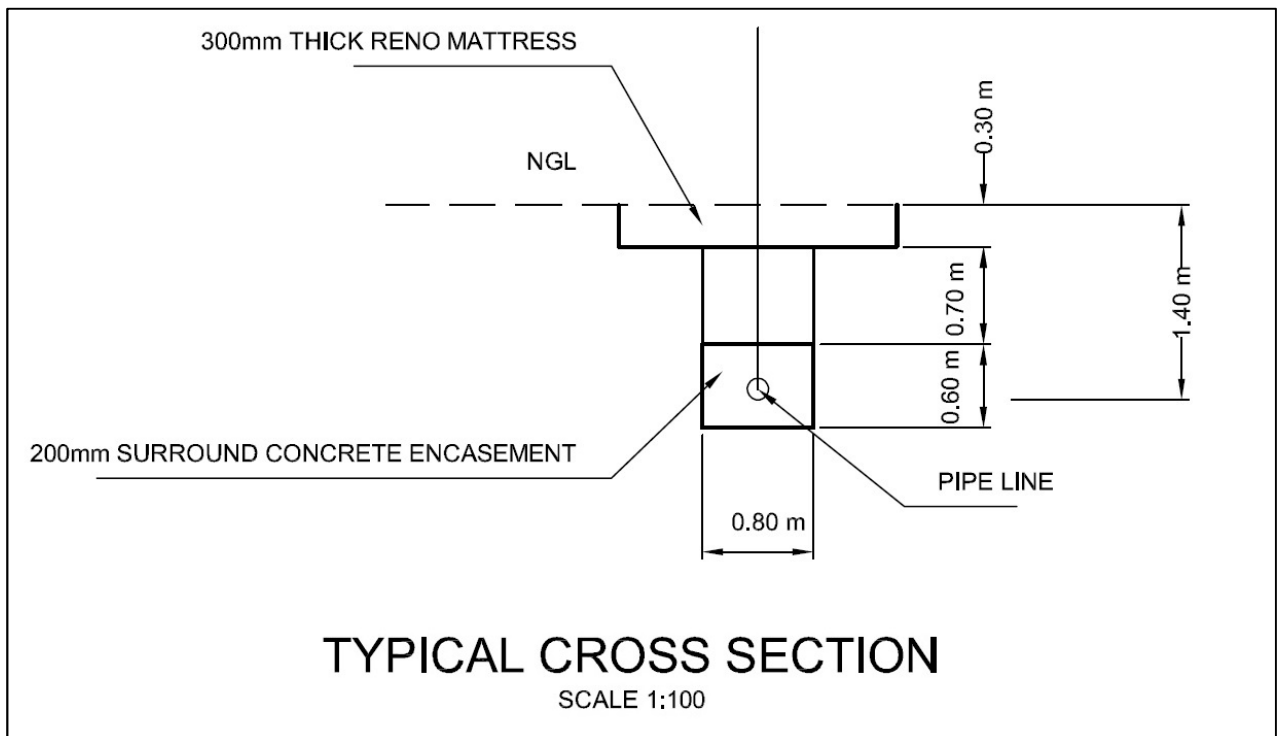


FIGURE 4-10: Typical cross section for watercourse crossing No. 6 (Drainage line: 29°03'34.09"S; 29°47'12.00"E)

Watercourse crossings No. 1 and 2 are wetland crossings. As per Figures 4-5 and 4-6 the top 300mm of soil (i.e. topsoil) is to be removed and stockpiled adjacent to the trench and within the working construction corridor (5m wide strip). Thereafter, the remaining subsoil is to be excavated and placed in a separate stockpile, to be used as backfill post-laying of the pipeline. All backfill will be returned to the trench in the reverse order to which it was removed to re-establish the original soil profile as best possible.

The trench will be 1.4m deep and 1.2m wide to create a limited amount of disturbance.

Watercourse crossing No. 3 is a drainage line crossing and will be aligned beneath the N3 in an existing culvert, adjacent to the existing steel Ø355mm steel rising main pipeline. New plinths will be installed adjacent to the existing plinths. The pipeline will then be tacked to the existing steel pipeline structure and run through the existing culvert, beneath the N3. Plates 4-1 and 4-2 illustrate the existing steel Ø355mm steel rising main pipeline which the new Ø750mm HDPE rising main bulk pipeline will run adjacent to.



PLATE 4-1: Existing Ø355mm steel rising main pipeline across drainage line below the N3, on existing plinths.



PLATE 4-2: Existing Ø355mm steel rising main aligned through the existing culvert which runs beneath the N3.

Watercourse crossing No's 4, 5 and 6 are all drainage line crossings and will have the same methodology applied in terms of construction. As per Figures 4-8, 4-9 and 4-10 all excavations will allow for a 1.4m deep trench with a width of 0.8m. The pipeline will be encased in concrete (200mm) for protection. As per the wetland crossing methodology, all topsoil will be stripped and stockpiled for reuse in rehabilitation. All excavated soil will be stockpiled separately and used as backfill if found to be suitable. A 300mm thick reno mattress will be placed above the pipeline once backfilling is complete and bank slopes will be graded to the lowest possible angle to prevent scour and erosion.

Reticulation

The proposed reticulation upgrade will cross 39 watercourses as identified and delineated by the watercourse specialist (see Appendix 6: Specialist Reports).

Table 4-2 provides the co-ordinates of the watercourse crossing points. Figure 4-11 provides the location of the identified watercourse crossing sites, while Figures 4-12 – 4-13 provide typical cross section detail. Further detail is provided in Appendix 7: Design drawings.

TABLE 4-2: Watercourse crossing coordinates along the reticulation pipeline alignment

CROSSING TYPE			POSITION	
Number	Wetland	Drainage line	Latitude (S)	Longitude (E)
1		x	29° 03'33.60"	29°46'59.03"
2		x	29° 03'31.85"	29°46'50.66"
3	x		29° 03'14.04"	29°46'53.09"
4	x		29° 03'05.94"	29°46'32.13"
5		x	29° 03'20.95"	29°47'10.37"
6		x	29° 03'33.44"	29°47'15.79"
7		x	29° 03'33.40"	29°47'12.30"
8		x	29° 03'11.65"	29°47'33.17"
9		x	29° 02'57.30"	29°47'27.10"
10		x	29° 02'45.99"	29°47'16.35"
11	x		29° 03'6.76"	29°46'46.23"
12	x		29° 02'48.18"	29°46'37.26"
13	x		29° 02'58.11"	29°47'25.62"
14	x		29° 03'10.07"	29°46'26.25"
15	x		29° 03'11.44"	29°46'31.11"
16		x	29° 02'41.54"	29°46'38.86"
17		x	29° 02'48.38"	29°46'19.88"
18		x	29° 02'37.86"	29°46'01.77"
19		x	29° 02'23.19"	29°46'27.58"
20		x	29° 02'12.43"	29°46'12.37"
21		x	29° 02'5.63"	29°46'16.38"
22		x	29° 02'4.16"	29°46'12.08"
23		x	29° 02'2.79"	29°46'19.49"
24		x	29° 02'2.38"	29°46'22.81"
25		x	29° 01'57.11"	29°46'20.79"
26		x	29° 01'43.91"	29°46'16.29"
27		x	29° 01'38.64"	29°46'23.09"
28		x	29° 01'38.12"	29°46'57.34"
29		x	29° 01'37.47"	29°46'14.13"
30	x		29° 02'40.19"	29°46'35.62"
31	x		29° 02'29.24"	29°46'16.30"
32	x		29° 02'21.80"	29°46'21.29"
33	x		29° 02'14.57"	29°46'13.32"
34	x		29° 01'43.17"	29°46'13.69"
35	x		29° 01'42.45"	29°46'15.63"
36	x		29° 01'38.44"	29°46'24.81"
37	x		29° 01'33.11"	29°46'27.35"
38	x		29° 01'27.90"	29°46'27.39"
39	x		29° 02'27.70"	29°47'08.93"

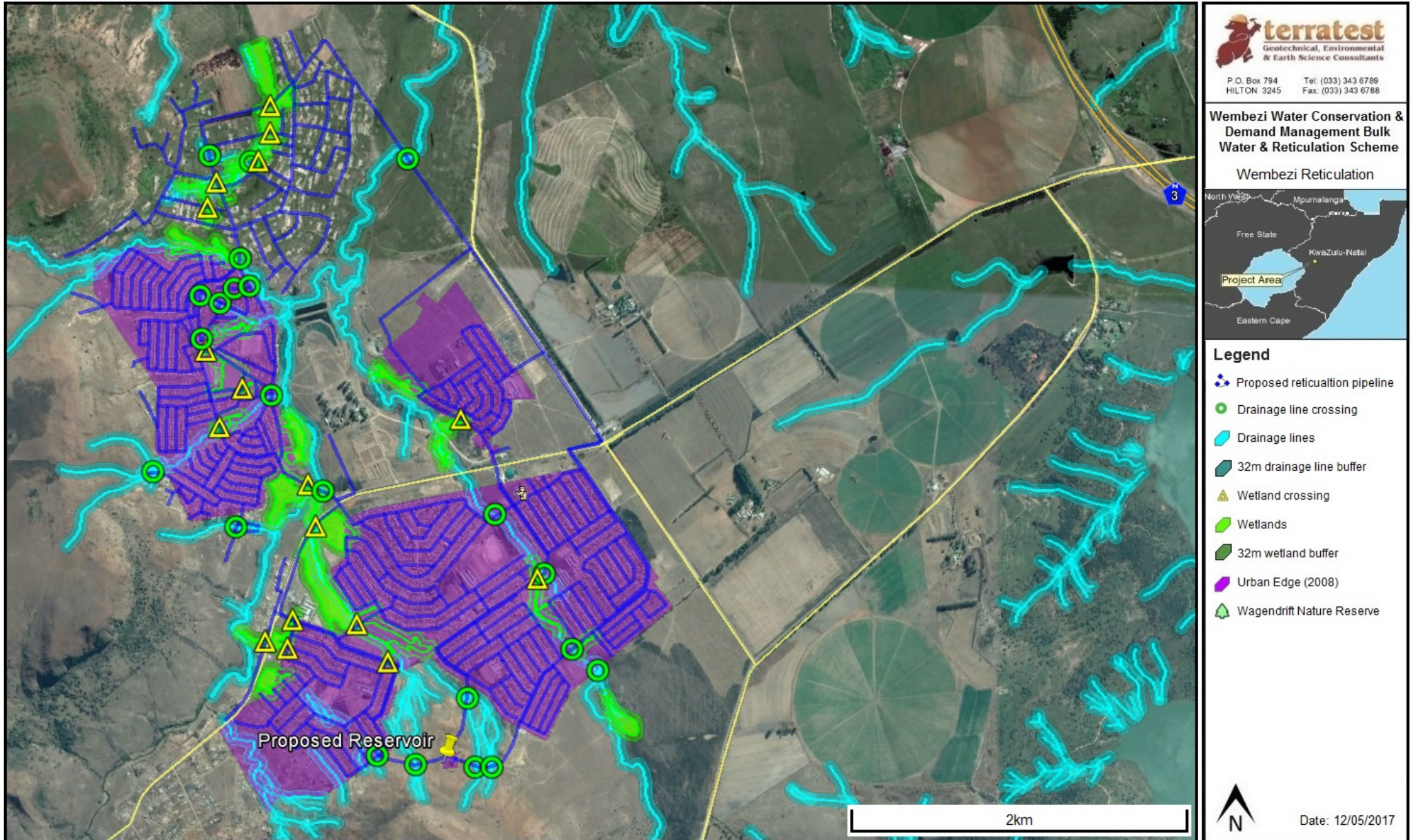


FIGURE 4-11: Locality Map of watercourse crossings identified on the reticulation alignment

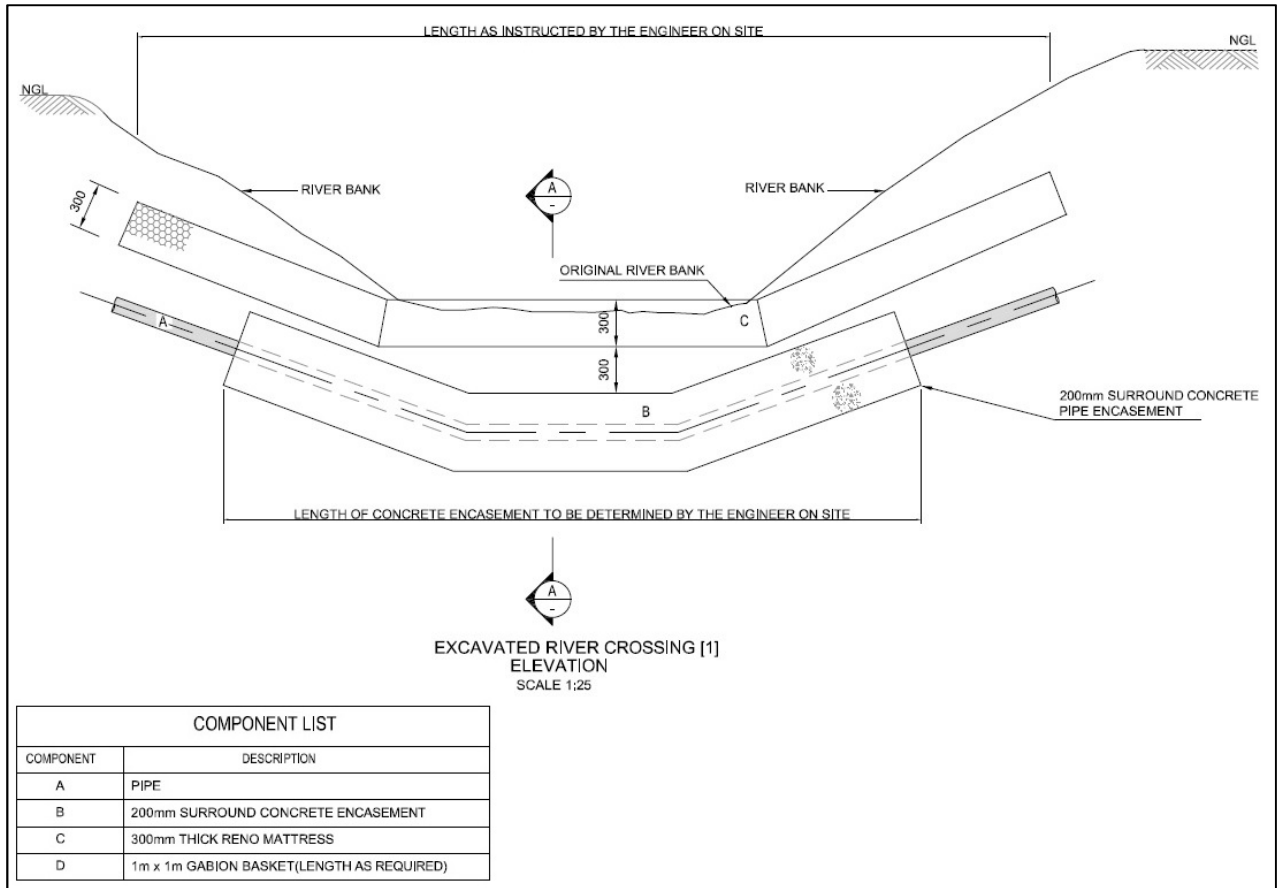


FIGURE 4-12: Typical excavated watercourse crossing for reticulation upgrade.

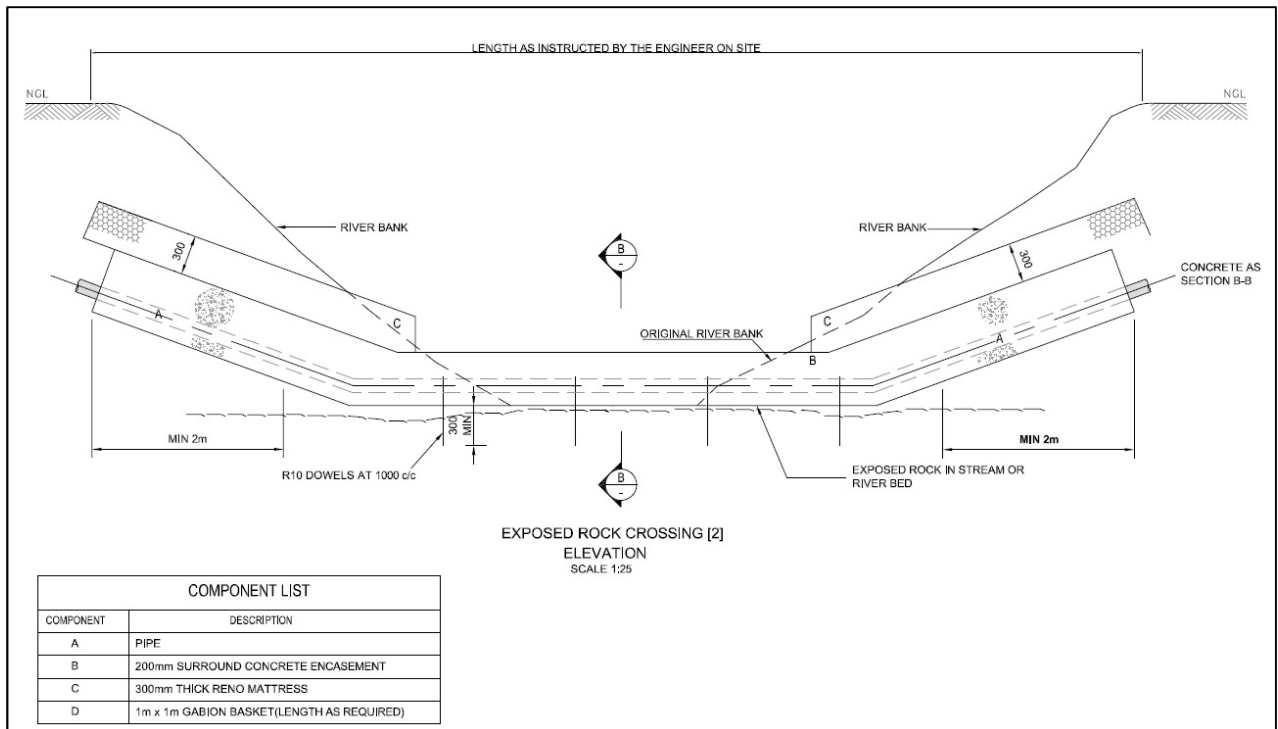


FIGURE 4-13: Typical watercourse crossing over exposed rock for reticulation upgrade.

The crossing of all watercourses in the proposed reticulation upgrade will undertake one of two methodologies as indicated in Figures 4-12 and 4-13, depending on founding conditions and will replace the existing infrastructure on site. Should watercourses allow for excavation, the pipeline will be laid beneath the river profile, encased in a 200mm thick concrete casing. A 300m layer of excavated material will be laid over the pipe, followed by a 300m reno mattress to match to the pre-existing river profile. Thereafter, bank slopes will be graded to the lowest possible angle to prevent scour and erosion.

Should watercourse crossings require to be undertaken on bedrock, the bedrock will be chipped, washed and broomed prior to casting a 200mm concrete encasement and setting dowels into the bedrock. Thereafter, bank slopes will be graded to the lowest possible angle and 300m reno mattresses will be installed to prevent scour and erosion.

As the reticulation includes for the upgrading of the existing infrastructure, the existing pipelines will be removed and the new reticulation pipelines will be installed at each watercourse crossing i.e. a degree of disturbance already exists from historical construction activities.

4.3.6 Training facilities and capacity building scope of work

Training will be undertaken during the construction of the scheme. In accordance with the Expanded Public Works Programme (EPWP) requirements, construction activities will be undertaken using manual labour where possible. This will enable temporary job creation and will boost the economy during the construction period.

Training will target people from within the community to build skills in pipe laying, plumbing, general masonry and small concrete works. It is anticipated that 150 persons from the local community will be employed for a period of 36 months during construction.

5 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

Table 5-1 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).

TABLE 5-1: Applicable legislation, policies and/or guidelines

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	ADMINISTERING AUTHORITY:	DATE:
National Environmental Management Act (Act 107 of 1998) – for its potential to cause degradation of the environment (Section 28).	Department of Environmental Affairs	1998
Environmental Conservation Act (Act 73) – for potential environmental degradation.	Department of Environmental Affairs	1989
National Water Act (Act 36 of 1998) – for potential to cause pollution of water resources defined under the Act (Section 19 and 21).	Department of Water Affairs and Forestry	1998
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 Department of Agriculture	1983
Subdivision of Agricultural Land Act, Act 70 of 1970 – for the subdivision of agricultural land.	National Department of Agriculture	1970
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity.	Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife	2004
The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance.	Department of Arts and Culture (Amafa KwaZulu-Natal)	1999
Integrated Environmental Management Guideline; Guideline on Need and Desirability (2017).	Department of Environmental Affairs, Pretoria, South Africa	2017
Guideline 4: Public Participation in support of the EIA Regulations (2005).	Department of Environmental Affairs and Tourism	2006
Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.	Department of Environmental Affairs, Pretoria, South Africa	2017
Guideline 7: Detailed Guide to Implementation of the Environmental Impact Assessment Regulations (2006).	Department of Environmental Affairs and Tourism	2007
Environmental Conservation Act, 1989. Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials.	Department of Environmental Affairs and Tourism	2008
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993): Asbestos Regulations, 2001.	Department of Labour	2002
Inkosi Langalibalele Municipal By-Laws.	Local Municipality	Updated accordingly

6 DEVELOPMENT MOTIVATION

6.1 NEED

The Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme aims to upgrade infrastructure and supply potable water to the areas of Wembezi and Ntabamhlophe. The current infrastructure is old and prone to excessive leakages to the volume of 9MI per day. Replacing the existing reticulation and constructing the new Ø750mm HDPE rising main bulk pipeline will conserve water which is currently treated at the George Cross Treatment works at a cost and further, will provide a reliable supply. It will also reduce the current demand of the George Cross Water Treatment Works by 4.48 MI/d.

The 2016 Census data notes that the population growth rate for the Inkosi Langalibalele Local Municipality is 2.10%². According to the Development of a Reconciliation Strategy for uThukela District Municipality (June 2011), the high growth rate in this area is due to future growth in the agriculture and tourism industry in and around the Estcourt area. This will result in new housing developments and therefore increase the demand for basic services such as water and sanitation. Supporting motivation for this is the development of a future housing project (3 000 households) and shopping centre (10 000m²) to be constructed in the area, which the Ø750mm HDPE rising main bulk pipeline is also earmarked to supply.

The upgraded system will result in a reliable supply of water, a basic human need, to both communities of Wembezi and Ntabamhlophe.

6.2 DESIRABILITY

The current loss of treated, potable water as pumped from the George Cross Treatment Works as a result of the old and damaged water infrastructure (both bulks and reticulation), is 9 MI per day. That is 9 000m³ of potable water lost to the system every day. A portion of the lost water is flowing into the Wembezi sewerage system which has resulted in excessive damage to the sewerage infrastructure and as a result, the sewerage system is overflowing and raw sewage is flowing through the town and into surrounding watercourses. It is therefore desirable to stop the 9MI water loss per day in order to conserve water, prevent excessive damage to the existing sewerage network and ultimately to prevent a health threat to the residents of Wembezi.

In addition to the above, several employment opportunities will be provided to the local community during the construction phase, as well education pertinent to water conservation and management. This will result in skills development and knowledge transfer within the Wembezi community. It may also encourage a sense of water conservation within the community.

Lastly, South Africa is a water poor country. It is desirable, if not imperative, to conserve our water resources especially as we are currently in a state of drought. The continued daily loss of 9MI of potable water through damaged and dated infrastructure is unacceptable given the limited amount of water available in the country currently.

² Municipalities of South Africa (2012-2017). Inkosi Langalibalele Local Municipality (KZN237). WWW Document. URL: <https://www.localgovernment.co.za/locals/view/237/Inkosi-Langalibalele-Local-Municipality#demographic>. Date accessed: 13 July 2017.

6.3 PLANNING INITIATIVES

6.3.1 KZN Provincial Growth and Development Plan

The Provincial Growth and Development Plan (2013) was designed to be aligned to and in synergy with the National Development Plan and is a primary overarching strategic framework for development in KwaZulu-Natal. It drives growth and development in the Province until the year 2030 and aims at addressing issues and challenges of poverty, inequality and unemployment. One of the goals, Goal 4, addresses infrastructure issues with the outcome focusing on improved water resource management.

The proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme is therefore in accordance with the KZN Provincial Growth and Development Plan.

7 MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVE

The proposed development triggers Listing Notice 1 (GNR 327), Activities 9, 12 and 19 and Listing Notice 3 (GNR 324), Activities 2 and 14 of the EIA Regulations, (2014, as amended).

As per GNR 326, Appendix 1(2)(b), alternatives for the proposed development are to be identified and considered. Chapter 1 of the EIA Regulations (2014, as amended) provides an interpretation of the word “alternatives”, which is to mean “*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 the activity is proposed to be undertaken;*
 - b) *Type of activity to be undertaken;*
 - c) *Design or layout of the activity;*
 - d) *Technology to be in the activity; or*
 - e) *Operational aspects of the activity;*
- And includes the option of not implementing the activity.”*

Based on the above, the following alternatives are presented for the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade.

7.1 PREFERRED SITE ALTERNATIVE

The preferred site alternative is located between the George Cross Water Treatment Works, as the supplier of treated potable water, and the receiving community of Wembezi. The Wembezi community is the area which has been identified as having excessive water losses and therefore it is proposed to upgrade and rectify the *status quo* by implementing the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme. As the George Cross Water Treatment Works is the only supplier of water to the Wembezi and Ntabamhlope communities, the site between the George Cross Water Treatment Works and the proposed 10MI reservoir, this is the only site alternative which can meet the need and desirability of the Application.

7.2 PREFERRED LAYOUT ALTERNATIVE

The George Cross Water Treatment Works is the closest, operational water treatment works in the area that can, and currently does supply water to the communities of Wembezi and Ntabamhlope. As treated potable water is already allocated at this treatment works for the aforementioned communities it is reasonable to assume that it is the best site alternative from which the potable water is to be pumped from.

The **preferred layout (layout alternative 1)** of the proposed Ø750mm rising main bulk water pipeline is aligned to run alongside the existing Ø355mm steel bulk rising main pipeline, within an existing 3m wide servitude. As the servitude already exists, this is the preferred layout alternative as an area of disturbance has already been created through the construction of the existing Ø355mm steel pipeline. Further, the servitude is easily accessible and monitoring and maintenance can be conducted on both pipelines simultaneously as they will be located adjacent to each other.

Layout alternative 2 is to align the proposed Ø750mm rising main bulk water pipeline adjacent to the existing Ø315mm AC pipeline, within the road reserve of the P29. The existing Ø315mm AC pipeline is, however, proposed to be decommissioned. Decommissioning will not involve the removal of the pipeline due to potential associated health risks (i.e. asbestosis). Instead, the AC pipe will remain in its current location, *in situ*. Constructing the proposed Ø750mm rising main bulk water pipeline in the same servitude of the AC

pipe will result in a risk to construction workers as the AC pipe may be struck or damaged which could result in asbestos fibres becoming air-borne.

The preferred and therefore only layout alternative is layout alternative 1 i.e. aligning the Ø750mm rising main bulk water pipeline alongside the existing Ø355mm steel bulk rising main pipeline, within the existing 3m wide servitude.

The site layout for the proposed new 10MI bulk storage reservoir is adjacent to the existing 10MI bulk storage reservoir. This is preferable as the servitude for the existing Ø355mm steel bulk rising main pipeline (and the proposed alignment of the Ø750mm rising main bulk water pipeline) is already aligned to tie into the reservoirs at this location. Further, the site is located at a suitable elevation to gravity feed the Wembezi reticulation system (i.e. 1 318m). Maintenance will also only need to be undertaken at one location only. There is therefore only one site layout alternative available for the proposed new 10MI bulk storage reservoir.

In terms of the proposed reticulation upgrade, all reticulation will be installed alongside existing roads located within Wembezi or within the existing trenches of the previously installed reticulation. Therefore, an area of disturbance already exists and will be utilised for the installation of the proposed new reticulation network. There is therefore no other layout alternative for the proposed reticulation network.

The preferred layout alternative considers items of heritage significance and falls within previously disturbed areas. Plates 7-1 – 7-10 provide an overview of the layout.



Plate 7-1: George Cross Water Treatment Works



Plate 7-2: Existing Ø355mm steel pipeline at N3 crossing



Plate 7-3: Existing Ø355mm steel pipeline at N3 culvert



Plate 7-4: Proposed bulk pipeline to run through existing servitude on agricultural land



Plate 7-5: Existing 10MI Wembezi reservoir. New 10MI reservoir to be constructed adjacent to the existing reservoir



Plate 7-6: Reticulation to be aligned alongside existing roads in Wembezi.



Plate 7-7: Reticulation to be aligned alongside existing roads in Wembezi.



Plate 7-8: Leaking infrastructure evident throughout Wembezi



Plate 7-9: Leaking infrastructure evident throughout Wembezi



Plate 7-10: Overflowing sewerage manhole, Wembezi as a result of excessive potable water loss

7.3 PREFERRED TECHNOLOGY ALTERNATIVE

The preferred technology is to utilise a HDPE pipeline for the rising main bulk pipeline, as opposed to steel or asbestos. The cost of an HDPE pipeline is less than that of a steel pipeline and HDPE pipelines offer a better hydrodynamic design to that of steel pipelines. The use of an asbestos pipeline was not considered as it is no longer permissible by law as per GNR 341: Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials.

The preferred technology alternative is therefore to use a HDPE rising main bulk pipeline in the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade as it is the only feasible alternative which meets the need and desirability of the application.

7.4 NO-GO ALTERNATIVE

The No-go alternative is to not to implement the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade, Inkosi Langalibalele Local Municipality, uThukela District Municipality, KwaZulu-Natal. As a result, the existing infrastructure would remain unchanged. This would result in continued, excessive water leakages, which would probably increase in volume due to additional failures and breakages in infrastructure over time. The Wembezi sewerage system would likely collapse as additional water enters the system, resulting in continued raw sewage overflow through the town. This will likely result in numerous health implications.

Ultimately, failing the implementation of the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade will result in the communities of Wembezi and Ntabamhlophe not receiving a sustainable water supply. Further, no potential employment opportunities will be created and no water conservation strategies / educational programmes will be implemented or communicated to the community.

8 PUBLIC PARTICIPATION

To fulfil the necessary public participation required as part of the BA Process, the following methods of stakeholder engagement were and are in the process of being conducted by the EAP, as outlined below.

8.1 NEWSPAPER ADVERTISEMENT

Newspaper advertisements were published at the outset of the project to inform the general public of the BA Process. An advertisement was published in isiZulu on 30 June 2016 in the Ilanga newspaper and in English on 01 July 2016 in The Witness newspaper. Copies of the advertisements are included in Appendix 8 of this report.

8.2 SITE NOTICE BOARDS

Five (5) site notice boards were placed on site and around the area on 24 June 2016 and five (5) on 23 June 2017. The 2016 notice boards made reference to the 2014 EIA Regulations i.e. GNR 982, GNR 983 and GNR 985, while the 2017 notice boards included for the amended 2014 EIA Regulations i.e. GNR 326, GNR 327 and GNR 324.

The notice boards were written in English and isiZulu. Figures 8-1 and 8-2 provide a copy of the relevant site notices, while Figure 8-3 provides an illustration of the location of the site notices on site. Evidence is detailed in Plates 8-1 - 8-10. Flyers in isiZulu were also distributed to passers-by whilst the site visit was being conducted on the 24 June 2016 (refer Appendix 8).

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 should any member of the public require additional information, or wish to register as an IAP in the Application.

NOTICE OF ENVIRONMENTAL BASIC ASSESSMENT PROCESS FOR THE PROPOSED WEMBEZI TOWNSHIP BULK WATER AND RETICULATION SCHEME UPGRADE, UTHUKELA DISTRICT MUNICIPALITY, UMTSHEZI LOCAL MUNICIPALITY, KWAZULU-NATAL

Notice is hereby given in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), Environmental Impact Assessment (EIA) Regulations 2014 of the intent to carry out a Basic Environmental Impact Assessment. The application will be made to the Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

Number and date of the relevant notice	Activity	Description of each listed activity as per project description
GNR 983 (Listing Notice 1)	9	"The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or stormwater i) with an internal diameter of 0.36 metres or more; or ii) with a peak throughput of 120 litres per second or more"
GNR 983 (Listing Notice 1)	12	"The development of (xii) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs: a) Within a watercourse b) In front of the development setback; or c) If no development setback exists, within 32 metres of a water course, measured from the edge of the water course."
GNR 983 (Listing Notice 1)	19	"The infilling or depositing of any material of more than 5 cubic metres into, or dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from i) a watercourse."

PROPOSED ACTIVITY: The project is divided into two sections, the Bulk water and the Water reticulation.


Under the Bulk water, the project involves the decommissioning of an existing AC rising main and the installation of a new 355 mm HDPE rising main, the construction of: 8 000m of Ø 400mm HDPE, Pipe Jacking under N3 Highway, An additional 10 MI storage reservoir and all associated infrastructure.

Under the Water reticulation, the project involves: 160 993 m of pipelines ranging from Ø75 uPVC to Ø500 HDPE all associated infrastructure.

Co-ordinates of the site are as follows: 29°02'50" S; 30°44'50" E.

PROPONENT: uThukela District Municipality.

To register as an Interested and Affected Party (IAP) or provide comment on the project, please contact Mrs Tarin Strydom of Terratest (Pty) Ltd as per the details below:

	Applicant: The project proponent is The KwaDukuza Local Municipality. Environmental Consultant: Terratest (Pty) Ltd, Contact Person: Mrs. Tarin Strydom, Tel: (033) 343 6789, Fax: (033) 343 6788, Email: strydom@terratest.co.za Postal Address: PO Box 794, Hilton, 3245
--	---

ISAZISO NGENQUBO EYISISEKELO YOCWANINGO LWEMVELO NGOKUHLONGOZWA KOKUTHUKUKISA KWAMANZI KANYE NOKUHELE LOKUWANDLULISELA ELOKUSHINI LASE WEMBEZI, KUMASIPALA WOMKHANDLU UTHUKELA, KUMASIPALA WASEMTSHEZI.

Isaziso sikhishwe ngokoMthetho kaZwelonke wezokuPhathwa kweMvelo (uMthetho 108 ka 1998) (NEMA), Ucwangingo leMvelo (EIA) ingubo-mgomo 2014, ngenhliso yokwenza ucwangingo oluyisisekelo lwemvelo. Isicelo sizofakwa kuMnyango wezokuThuthukiswa koMnotho, ezokuVakasha kanye nezeMvelo (EDTEA).

Inombolo kanye nosuku leSaziso	Umsebenzi	Incazelo yomsebenzi odinga ukugunyazwa
GNR 983 (Listing Notice 1)	9	"ukuthuthukiswa kwengqalazinda engaphezulu kwamamitha ayinkulungwane (1000) ulubeke yokuthuthwa kwamazi ahanzekile noma amanzi ezikhukhula i) anokubanzi ngaphakathi okungamamitha angu-0.36 noma angaphezulu; okanye ii) esikwazi ukundlulisa amalitha ayikhulu namashumi anabili (120) ngomzuzu noma ngaphezulu
GNR 983 (Listing Notice 1)	12	"ukuthuthukiswa kwe: (xii) Nqalazinda noma izakhiwo ezilinganiselwe ku-100 square metres noma ngaphezulu lapho ukuthuthukiswa kutholakala: a) ngaphakathi emfuleni b) ngaphambili kwendawo ethuthukiswayo; noma c) uma kungekho ukuthuthukiswa okukhona, ngaphakathi kwamamitha angamashumi amathathu namibili (32) emfuleni kubalwa kusukela onqenqemeni lomfula."
GNR 983 (Listing Notice 1)	19	"Ukugcalisa noma ukufakwa kwezinto ezingaphezulu kuka 5 cubic metres phakathi noma ukumba, ukususa noma ukususa kwentlabathi, ishlabathi, amagobokondo, igobolondo namatsho noma amadwala angaphezulu kuka 5 cubic metres kusuka i) emfuleni."


UMSEBENZI OHLONGOZWAYO: Umsebenzi uhlukaniswe izigaba ezimbili, ukugcinwa kwamanzi amaningi alungele ukusetshenziswa kanye nohlelo lokuthuthwa kwawo ngamapayipi. Ngaphansi kohlelo lokugcinwa kwamanzi, umsebenzi uzobandakanya ukudlulisa kwe AC rising main kanye nokufakwa kwe 355mm HDPE rising main entsha, ukwakhiwa kwe: 8000 ye 400mm HDPE, I pipe jacking ngaphansi komgwaqo uthelawayeka (N3), kanye ne 10 MI wethangi lokugcina amanzi kanye nezinsiza ezihlobeni nalomsebenzi.

Ngaphansi kohlelo lokuthuthwa kwamanzi, lomsebenzi uzobandakanya: 1: 160 993 m wamapayipi asukela ku Ø75 uPVC kuya ku-Ø500 HDPE kanye nezinsiza ezihlobene nalomsebenzi.

Izixhumanisi zendawo zimi kanje: 29°02'50" S; 30°44'50" E.

UMCELI: uThukela District Municipality.

Ukubhalisa njengonentshisekelo kanye nothintekayo (IAP) okanye ukuveza umbono ngalomsebenzi ohlongozwayo, sicela uxhumane no Mrs Tarin Strydom wakwa Terratest (Pty) Ltd kulemingwane enikeziwe ngezansi:

	Applicant: The project proponent is The KwaDukuza Local Municipality. Environmental Consultant: Terratest (Pty) Ltd, Contact Person: Mrs. Tarin Strydom, Tel: (033) 343 6789, Fax: (033) 343 6788, Email: strydom@terratest.co.za Postal Address: PO Box 794, Hilton, 3245
--	---

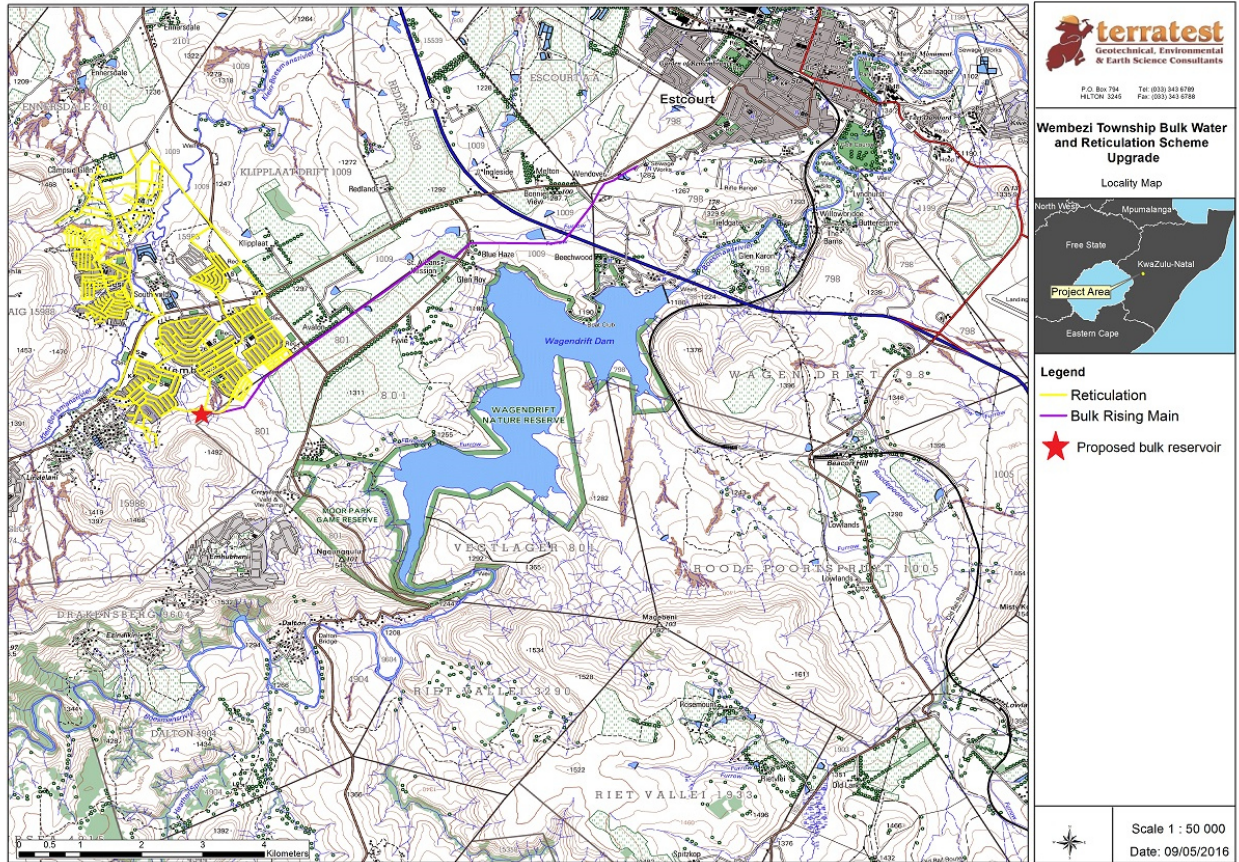


FIGURE 8-1: Site notice (24.06.2016)

<p>NOTICE OF AN ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION (BASIC ASSESSMENT) FOR THE PROPOSED WEMBEZI TOWNSHIP BULK WATER SCHEME UPGRADE, UMTSHEZI LOCAL MUNICIPALITY, UTHUKELA DISTRICT MUNICIPALITY, KWAZULU-NATAL Terratest (Pty) Ltd Reference No.: 41646</p>	<p>ISAZISO NGESICELO SOKUHLOLA UMTHELELA KWEZEMVELO (UKUHLOLA OKUYISISEKELO) SOKUTHUTHUKISA UHLELO LWAMANZI LWASELOKISHINI LASEWEMBEZI, KUMASIPALA WASEMTSHEZI, KUMASIPALA WESIFUNDA SASOTHUKELA, KWAZULU-NATAL Terratest (Pty) Ltd Inombolo Yereferensi.: 41646</p>
<p>Notice is hereby given in terms of the National Environmental Management Act, (NEMA, Act 107 of 1998), published in Government Notice No. R326 (2014) as amended, of the intent to carry out a Basic Assessment Process for the abovementioned development. Activities listed under NEMA GNR. 327 and 324, will be applied for with the Department of Economic Development, Tourism and Environmental Affairs (EDTEA).</p> <p>LOCATION: Start co-ordinates of the bulk pipeline: 29°01'23.85"S; 29°50'55.96"E. End co-ordinates of the bulk pipeline: 29°03'33.70"S; 29°47'08.12"E.</p> <p>SCOPE OF WORKS: The existing bulk AC rising main is to be decommissioned and a new 750 mm HDPE rising main is to be constructed from the existing Pump Station at George Cross Water Treatment Works, to a proposed Wembezi 10MI bulk storage reservoir. The bulk pipeline is to run alongside an existing pipe in an existing pipeline servitude.</p> <p>The key components of the scheme are:</p> <ul style="list-style-type: none"> • 8 000m of Ø 750mm HDPE; • Scour Valves; • Air Valves; • Isolating Valves; • Pipeline ancillaries such as pipe marker posts, thrust blocks, chambers etc.; • Pipe Jacking under N3 Highway or alternatively utilising an existing culvert on the N3; • Bulk ultrasonic water meters; and • Construction of a 10 MI of a reinforced concrete reservoir. <p>Serval watercourse crossings identified within the Wembezi Township will also require assessment and Environmental Authorisation prior to any construction activities being conducted. The overall proposal forms part of a larger project, which aims to upgrade infrastructure and supply water to the Wembezi and Ntabamhlophe Townships.</p> <p>PROPONENT: UThukela District Municipality</p> <p>CONTACT: Bongumusa Ndaba Terratest (Pty) Ltd PO Box 794, Hilton, 3245 Tel: 033 343 6789 Fax: 033 343 6701 E-mail: ndabab@terratest.co.za</p> <p>In order to ensure that you are identified as an interested and/ or affected party in the project, please submit your name, email address, and other contact information and interest in the matter, in writing, to the contact person given above.</p>	<p>Isaziso sikhishwa ngokoMthetho Wezokuphathwa Kwezemvelo Kazwelonke, (NEMA, uMthetho 107 ka-1998), eshicilelwe kwiSaziso sikaHulumeni No R326 (2014), obuyekeziwe, ngenhloso yokwenza iNqubo yokuHlola Eyisisekelo yentuthuko ekhonjwe ngenhla. Kuzofakwa isicelo semisebenzi eshicilelwe ngaphansi kwe-NEMA GNR. 327 kanye no 324, kuMnyango Wezokuthuthukiswa Komnotho, Ezokuvakasha kanye Nezemvelo (EDTEA).</p> <p>INDAWO: Indawo lapha kuqala khona ipayipi: 29°01'23.85" S; 29°50'55.96" E. Indawo lapho ligcina khona: 29°03'33.70" S; 29°47'08.12" E.</p> <p>UMSEBENZI OHLONGOZWAYO: Ipayipi elikhulu elikhona lizokhishwa bese kwakhiwa ipayipi elisha elingu-750 mm HDPE kusukela e-Pump Station ekhona e-George Cross Water Treatments Works, kuya e-Wembezi 10MI Bulk storage reservoir ehlongozwayo. Ipayipi elikhulu lizohamba eduze kwaleli elikhona lapho okuvele kuhamba khona ipayipi.</p> <p>Izingxenye eziyinhloko zaloluhelelo ziyi:</p> <ul style="list-style-type: none"> • U- 8 000m we Ø 750mm HDPE; • Scour Valves; • I-Air Valves; • Isolating Valves; • Pipeline ancillaries such as pipe marker posts, thrust blocks, chambers etc.; • Ukubhona ngaphansi kwathelawayeka (N3) noma ukusebenzisa i-culvert ekuthelawayeka ukweqisa ipayipi; • Bulk ultrasonic water meters; kanye • Nokwakhiwa kwethangi elingu-10MI lokugcina amanzi ngokhonkolo. <p>Izindawo eziningana zokunqamula emfuleni ezitholaka ngaphakathi elokishini lase-Wembezi zizodinga ukuhlolwa nokuGunyazwa Kwemvelo ngaphami kokwenziwa kwemisebenzi yokwakha. Isiphakamise siyngxenye yeprojekthi enkulu, ehlose ukuthuthukisa ingqalazinda kanye nokuhlazeka ngamanzi ilokishi laseWembezi naseNtabamhlophe.</p> <p>UMSEKELI: UThukela District Municipality</p> <p>IMININGWANO: Bongumusa Ndaba Terratest (Pty) Ltd PO Box 794, Hilton, 3245 Phone: 033 343 6789 Fax: 033 343 6701 E-mail: ndabab@terratest.co.za</p> <p>Ukuze uqiniseke ukuthi ubalwe njengonentshisekelo okanye othintekayo sicela uthumele igama, ikheli le-imeyili kanye neminye iminingwano nentshisekelo yakho ngaloludaba, ngokubhalela, kwiminingwano ebaluliwe ngenhla.</p>

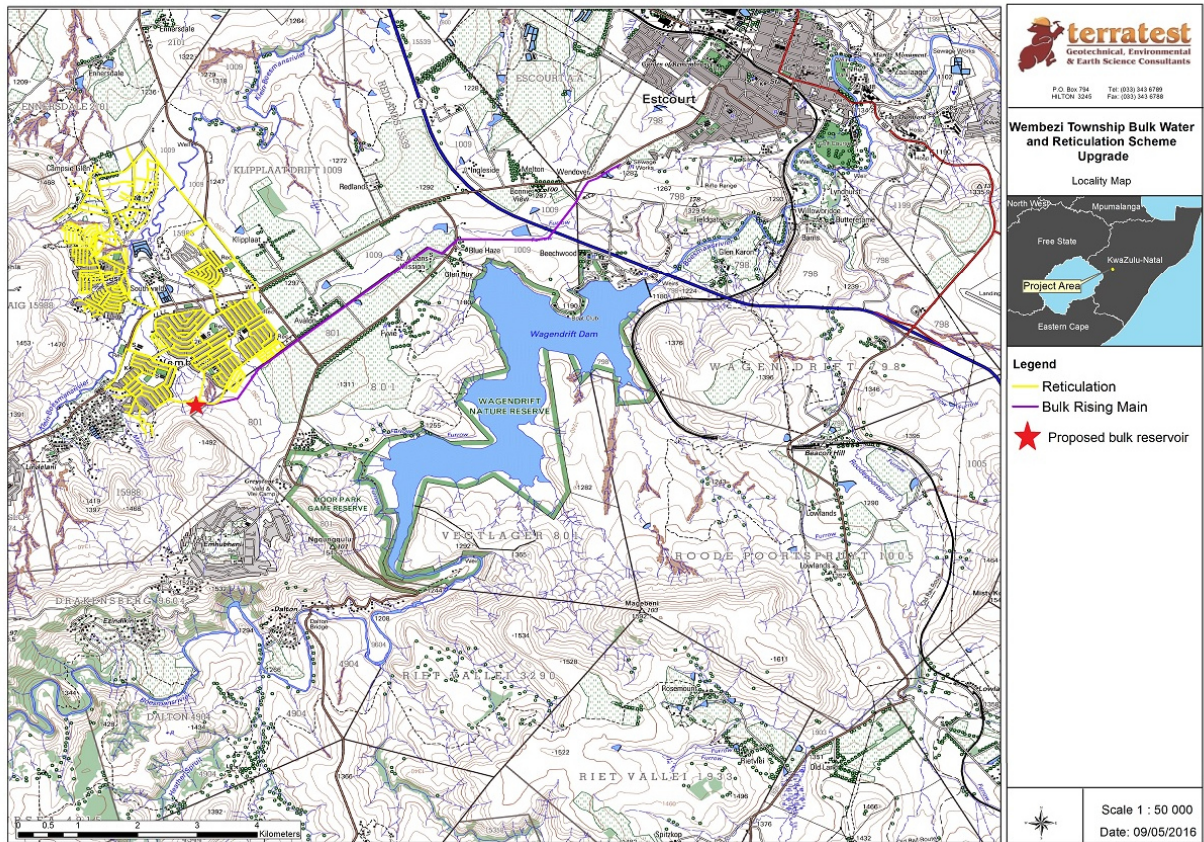


FIGURE 8-2: Site notice (23.06.2017)

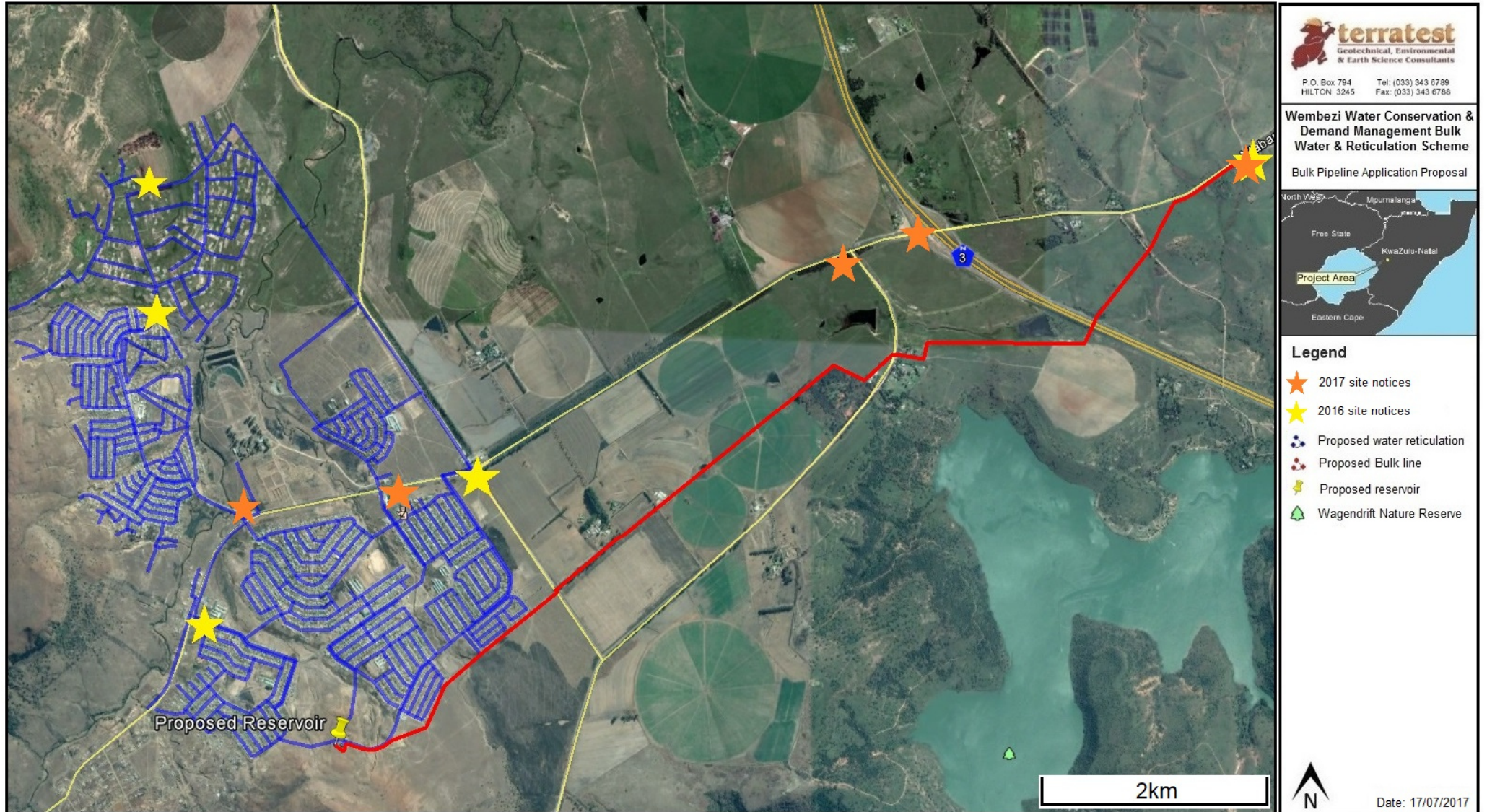


FIGURE 8-3: Location of site notices on site



PLATE 8-1: Notice at bus stop (24.06.2017)



PLATE 8-2: Site notice placed on a fence of a local shop (24.06.2017)



PLATE 8-3: Site notice placed on church fence (24.06.16)



PLATE 8-4: Site notice placed on an electricity pole (24.06.16)



PLATE 8-5: Site notice placed on Wagon Drift Dam sign board (24.06.16)



PLATE 8-6: Site notice placed on the P29 layby (23.06.2017)



PLATE 8-7: Site notice placed on sign board to Moor Park (23.06.2017)



PLATE 8-8: Site notice placed at taxi rank, Wembezi (23.06.2017)



PLATE 8-9: Site notice placed on electricity pole (23.06.17)



PLATE 8-10: Site notice placed at the entrance to the George Cross Treatment Works (23.06.17)

8.3 WRITTEN NOTIFICATION TO AUTHORITIES AND NEIGHBOURS

8.3.1 Interested and Affected Parties (IAPs)

A register of IAPs was compiled as per Section 42 of the EIA Regulations, 2014 (as amended). This included all relevant authorities, Government Departments, the Local Municipality, the District Municipality, relevant conservation bodies and non-governmental organisations (NGO's), as well as neighbouring landowners and the surrounding community. This register was regularly updated to include those IAPs responding to the newspaper advertisements, site notice boards, flyers and Notification Letters. A copy of the IAP Register is included as Appendix 8 of this report.

8.3.2 Notification Letter

A Notification Letter was compiled and circulated to all identified IAPs by email and post. The purpose of the Notification Letter was to provide preliminary information regarding the project and its location. Furthermore, the Notification Letter invited preliminary comments from IAPs and requested those notified to provide details of other potential IAPs which they may be aware of. A copy of the Notification Letter is included as Appendix 8 of this report.

Further, flyers written in isiZulu were distributed to members of the local community on 24 June 2016 informing them of the proposed development (see Appendix 8).

8.4 PUBLIC MEETING

A public meeting was not held due to limited interest in the proposed upgrade.

8.5 COMMENTS RECEIVED

Following the publication of newspaper advertisements, placement of on-site notice boards and distribution of notification letters, the following comments as per Table 8-1 have been received by IAPs. Please refer to Appendix 8 for original comment.

TABLE 8-1: IAP comment received

DATE	IAP	COMMENT	RESPONSE
02/08/2017 received via email	Ms N. Mabaso: SANRAL	We acknowledge receipt of your application for the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade. Please find attached guide line for pipelines and form to be completed and sent through to us. Kindly indicate on the locality map the nation route Kilometre makers.	Thank you for the email and guideline document. I have forwarded SANRAL's requirements onto the relevant engineers for their attention.
02/08/2017 received via email	Mr W. Blaker: Local farmer and resident	In regards to the Wembezi Township Bulk Water Scheme upgrade. I am a manager of the property to which the bulk of the pipe would go through. While mainly veld, the line does cut through our pasture platform. This is essential to our milk production. We would need to work closely together to plan around this project please.	Thank you for your email. Please would you be so kind as to indicate on the attached map the property to which you refer, as well as the pastures proposed to be affected. I can then present this information to the associated engineers. Further, are the pastures utilised continuously year round, or is there a period when the utilisation of this portion of land is not as important an asset for milk production? I'd like to determine if a construction schedule is required in this regard. If necessary, this would need to be determined with yourself and the engineers. In terms of the Basic Assessment Process which Terratest is currently undertaking, a Draft Basic Assessment Report is in the process of being drafted. This will contain all pertinent information relating to the proposed development activity, as well as the potential biophysical and social impacts identified in terms of construction. You will be notified of the availability of this report and be afforded an opportunity to comment on the content. Thereafter, a Final Basic Assessment Report will be drafted, which again will be circulated for comment, as well as being submitted to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs for a decision on whether the proposed project may be implemented or not. Please advise regarding the location of the pastures and I will revert back soonest.
07/08/2017 received via email	Ms T. Rodgers: JG Afrika (Pty) Ltd	Jan (Resident Engineer) met with Warren Blaker to discuss his concerns. We will still be able to construct the pipeline as long as we replace the grass and reconstruct the gravel road to its original condition which we will make provision to do so. He also mentioned that certain times of year he uses the pivot irrigation more so we will try compensate this by constructing on his farm when he irrigates less.	Noted. This information has been formally communicated to Mr Warren Blaker and his concerns have been addressed.
08/08/2017 received via post	Regional SANRAL Manager:	Any pipeline that crosses or runs parallel to the National Road or placed within SANRAL's building restriction area which is 60 metres from the Road Reserve Boundary needs SANRAL's approval.	Thank you for your comments. The relevant engineers have been informed of SANRAL's requirements and will liaise directly with SANRAL going forward.

		<p>Once your proposal is approved and finalised and falls within 60 metres parallel or crosses the National Road will be submitted to SANRAL's Eastern Region for approval.</p> <p>Formal application shall be made to this office on an encroachment form which can be made available at the time of application and must be completed by the service provided.</p>	
14/08/2017 received via post	Ms J. Reddy: Department of Transport	Your email dated 20 July 2017 refers. The Application was received on 10 August 2017. You are advised that the Application is in the process of being investigated and that you will be advised accordingly of this Department's comments. When communicating with this office, please supply that above mentioned file reference (T10/2/2/682/235).	Noted.
Received via post	Mr M. Moor: Resident	Please register me as an Interested and Affected Party.	Noted. You have been registered.

8.6 CIRCULATION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT

Copies of the Draft BA Report have been circulated to the following Key Stakeholders and IAPs for review and comment on 26 January 2018:

- Ezemvelo KZN Wildlife: Mr A. Blackmore;
- Department of Water and Sanitation: Ms L. Dladla;
- Department of Transport: Mrs J. Reddy;
- Inkosi Langalibalele Municipality: Mr S. Radebe
- uThukela District Municipality: Ms P. Lite;
- Amafa Heritage: SAHRIS;
- DAEA: Macro Planning Directorate: Mr Z. Dlamini;
- Department of Agriculture, Forestry and Fisheries: Mr R. Baca; and
- Department of Cooperative Governance and Traditional Affairs: Mr M. de Lange.

All registered IAPs were notified of the availability of the Draft BA Report and the deadline for comments, being on, or before 26 February 2018. A copy of the BA report has been placed in the Wembezi Public Library for public review on 26 January 2018. A complete copy of the report has also been uploaded onto the Terratest (Pty) Ltd website (www.terratest.co.za).

Further, it is to be noted that in terms of the EIA Regulations (2014), GNR 326 43(2) as amended, all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the EAP as per the request of the EAP. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

9 DESCRIPTION OF THE BASELINE ENVIRONMENT

9.1 TOPOGRAPHY

The gradient of the proposed Ø750mm rising main bulk water pipeline varies considerably as it starts from the George Cross Treatment Works and dips below the N3 to gradually climb uphill across agricultural land. Thereafter it dips again as it crosses a drainage line, to climb rapidly up to the proposed reservoir site. Please refer to Figure 9-1 for the elevation profile.

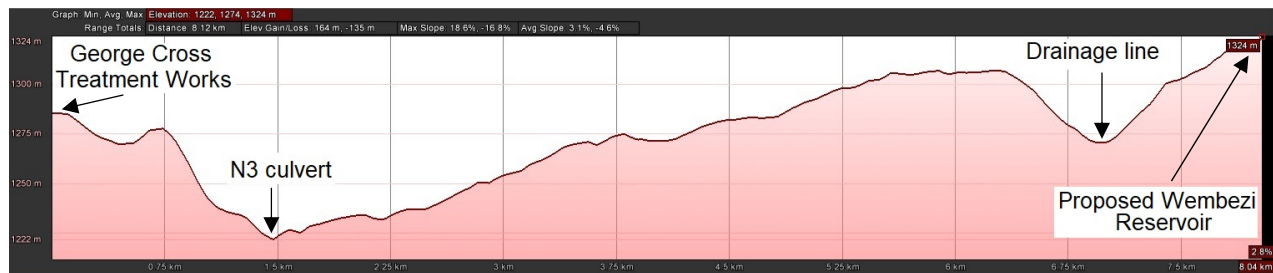


FIGURE 9-1: Gradient of the Ø750mm rising main bulk water pipeline

The reticulation will run alongside existing roads in the Wembezi area, which is located in a broad valley (north to south). The gradient gradually increases towards the west as the Drakensberg escarpment is encroached.

9.2 VEGETATION

The natural vegetation in the area is primarily KwaZulu-Natal Highland Thornveld. A small strip of Drakensberg Foothill Moist Grassland is evident in the west. Wetlands, with associated vegetation, are also present on site.

In terms of the Ø750mm rising main bulk water pipeline alignment, grasslands are evident for approximately 850m after leaving the George Cross Water Treatment Works. Thereafter the alignment passes through a small area which has been cultivated (i.e. agriculture) and continues for approximately 250m through additional grasslands before reaching the N3 highway. After passing beneath the N3 via an existing culvert, the vegetation is considered to be totally transformed along the alignment either as a result of commercial agricultural activities, or from overgrazing and over burning on communal tenure land (Appendix 6: Specialist Reports).

In Wembezi the natural vegetation is almost entirely eradicated as a result of urban development (Appendix 6: Specialist Reports).

9.3 FAUNA

Any development has the potential to negatively impact upon the local fauna, given the intrusion of an unnatural object in a natural environment, or artificial environment. The Ezemvelo KZN Wildlife Minset database has been consulted and the following species of conservation significance have been identified as potentially being present in the area, as per Table 9-1.

TABLE 9-1: Minset data

FORM	SPECIES	CONSERVATION STATUS
Avifauna	<i>Anthropoids paradiseus</i> (Blue crane)	Vulnerable (IUCN)
Millipede	<i>Doratogonus falcatus</i>	Least Concern
Millepede	<i>Centrobolus tricolor</i>	-
Millepedes	<i>Spinotarsus triangulosus</i>	-
Millipede	<i>Doratogonus meridionalis</i> (Southern black Millipede)	Vulnerable (IUCN)
Millepedes	<i>Doratogonus montanus</i> (Montane black Millepedes)	Least concern (IUCN)
Mollusc	<i>Cochlitoma simplex</i> (Thukela agate snail)	unknown
Mollusc	<i>Gullenta orientalis</i>	Unknown
Reptile	<i>Bradypodion thamnobates</i> (Natal Midlands dwarf Chameleon)	Vulnerable (IUCN)
Grasshopper	<i>Whitea alticeps</i>	unknown

The Ezemvelo KZN Wildlife MINSET Map (Figure 9-2) shows that the section of the Ø750mm rising main bulk water pipeline located to the east of the N3 falls within an area considered as an “Irreplaceable Critical Biodiversity Area”. In terms of the reticulation, two small sections on the western periphery of the reticulation network lie with in an area classified as an “Optimal Critical Biodiversity Area”. However, as the proposed Ø750mm rising main bulk line will run in an existing servitude and as the reticulation is to be upgraded in the same footprint utilized to install the reticulation previously, the impact to these areas is considered to be negligible as an area of disturbance already exists.

The Biodiversity Assessment (Appendix 6) also states that the fauna in the area is already greatly reduced from the natural state. This further substantiates that the upgrade will have a limited impact on the receiving fauna.

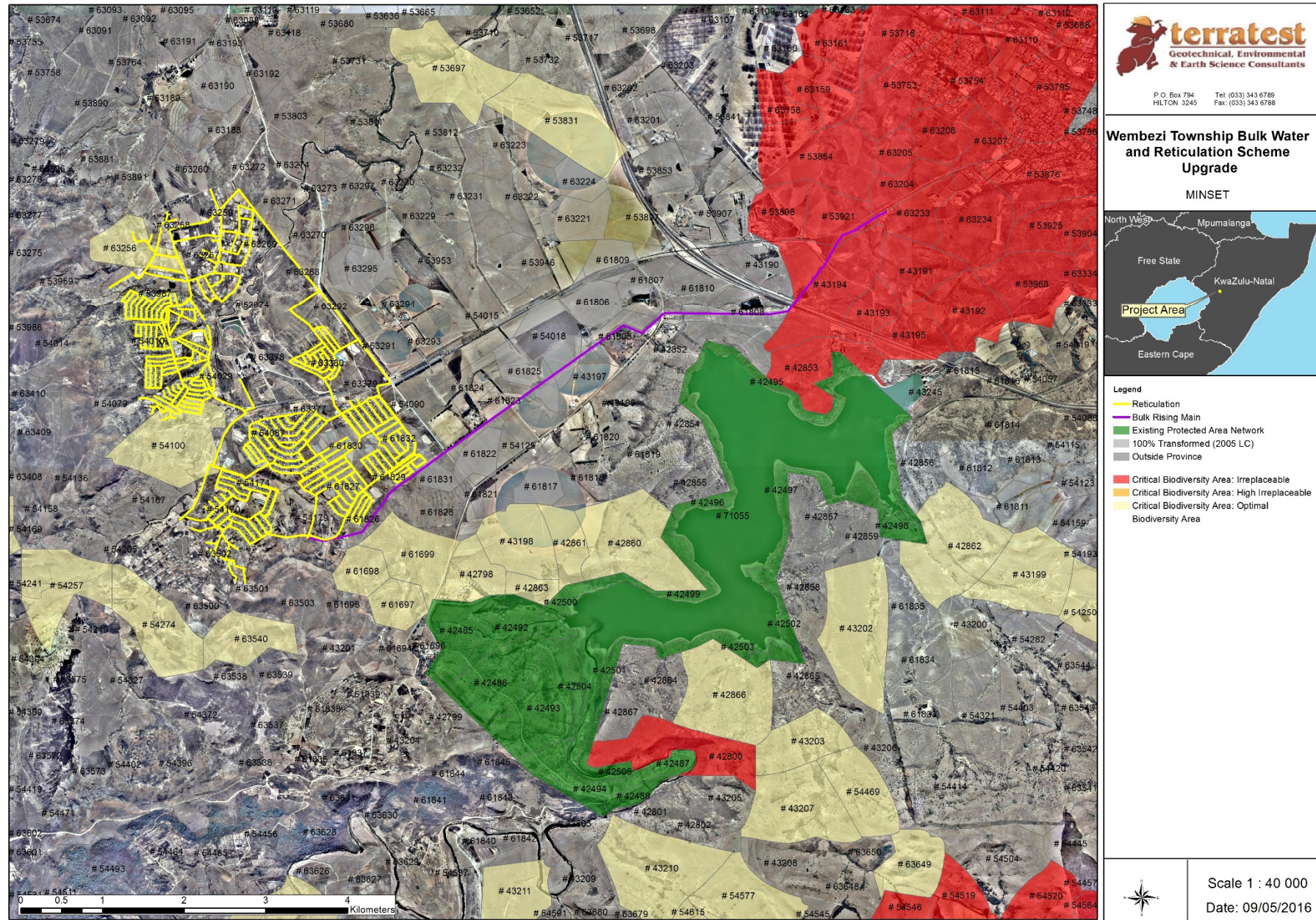


FIGURE 9-2: MINTSET Map

9.4 GEOLOGY

The study area is underlain by bedrock units of the Escourt Formation which forms part of the Beaufort Group, Karoo Supergroup. The Escourt Formation is represented by dark-blue grey shale with subordinate siltstone and sandstone. These sedimentary rock units have been intruded by Jurassic aged dolerite dykes and sills which are preserved in the southern and western portions of the study site. Figure 9-3 Provides an overview of the geology in the area.

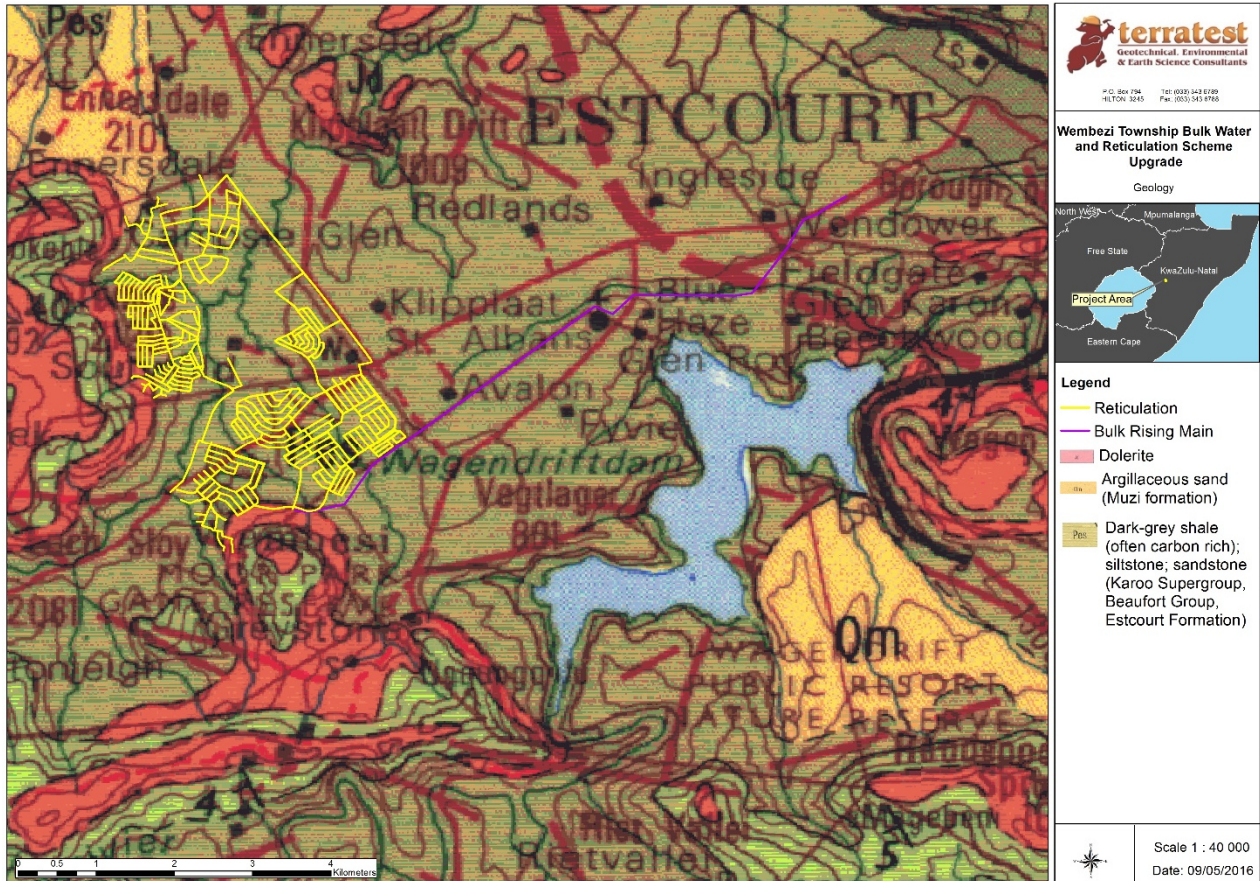


FIGURE 9-3: Geology of the general area

As the rising main bulk pipeline will be aligned to run in an existing servitude and the works in Wembezi will consist of the upgrading of the existing infrastructure, the soils expected to be encountered will consist of backfill material utilised to install the existing infrastructure previously. This will assist with manual excavation as original, undisturbed soils should not be encountered.

9.5 HYDROLOGY

The study area is situated in the Thukela Water Management Area (WMA), Area 7 and falls within the V14C, V70D, V70E and V70C Quaternary catchments. The major rivers in the area include the Bushmans, the Bloukrans and the Mooi, all of which drain into the Tugela River.

The project area crosses the Small Bushmans River and numerous tributaries thereof, which ultimately flow into the Bushmans River. Several erosion gullies, in the form of dongas are present on site and will require crossing. A specialist Watercourse Identification and Delineation Assessment has been undertaken which provides further information on the hydrology of the area (see Section 10.1 and Appendix 6).

9.6 CLIMATE

The area is characterised by a rainy summer season and experiences intermittent rain in winter. Much of the summer rain falls in thunderstorm events. The average annual precipitation is 589mm. The annual average high in terms of temperature is 26.4°C, while the annual average low is 14.7°C. Refer to Figure 9-4.

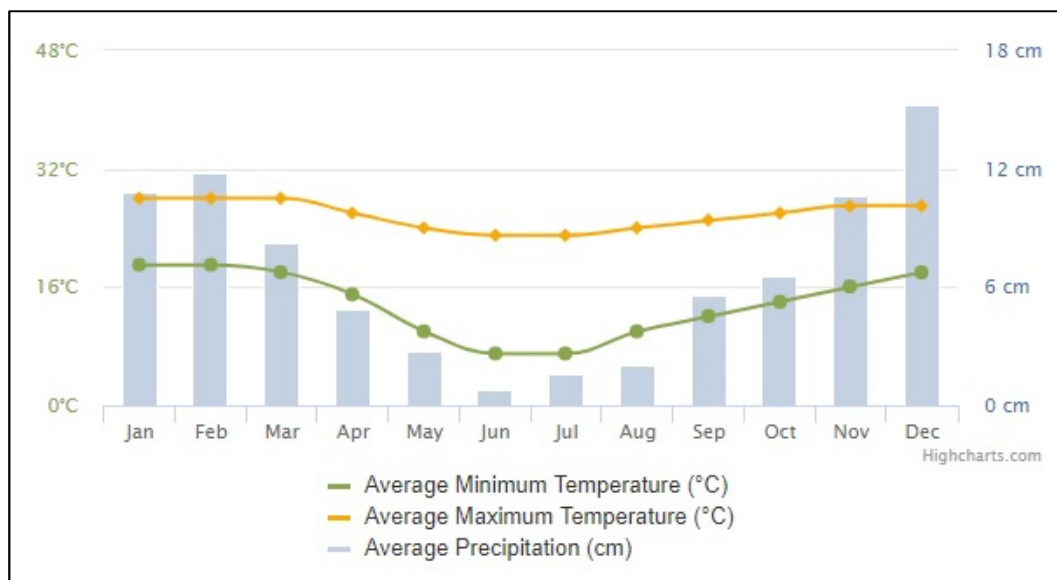


FIGURE 9-4: Average climatic conditions, Wembezi

9.7 CULTURAL, HISTORICAL AND ARCHAEOLOGICAL RESOURCES

A specialist Heritage Impact Assessment (HIA) was undertaken by UMLANDO: Archaeological Surveys & Heritage Management. No fatal flaws to development were identified. The HIA Report is discussed in Section 10.2 and attached as Appendix 6.

A specialist Palaeontological Impact Assessment was undertaken by Gideon Groenewald. No fatal flaws to development were identified. The Palaeontological Impact Assessment Report is discussed in Section 10.3 and attached as Appendix 6.

Amafa Heritage KwaZulu-Natali (Amafa), the authority responsible for KwaZulu-Natal's heritage, has been contacted regarding the proposed upgrade and the associated HIA Report submitted to them for comment via the South African Heritage Resources Information System (SAHRIS).

9.8 CURRENT LAND USE

The servitude through which the Ø750mm rising main bulk water pipeline will be constructed in is aligned through of a variety of land uses. Initially the servitude runs through grassland and then a small segment of agricultural land. It then runs through a small patch of grassland again. Thereafter it intersects the N3 SANRAL road reserve where it runs beneath the N3 via an existing culvert. After passing beneath the N3, the servitude runs through commercial agricultural land for approximately 4.5km. The servitude then runs into Wembezi where the servitude runs alongside the southern border of the town, through communal land, which is considered to be severely degraded as a result of overgrazing and veld burning. Along its length the servitude passes through two wetland areas.

The majority of the landuse in Wembezi is classified as urban as per the Urban Edge database (2008). This is due to extensive urban development / settlement in the area. Please refer to Figure 9-5.

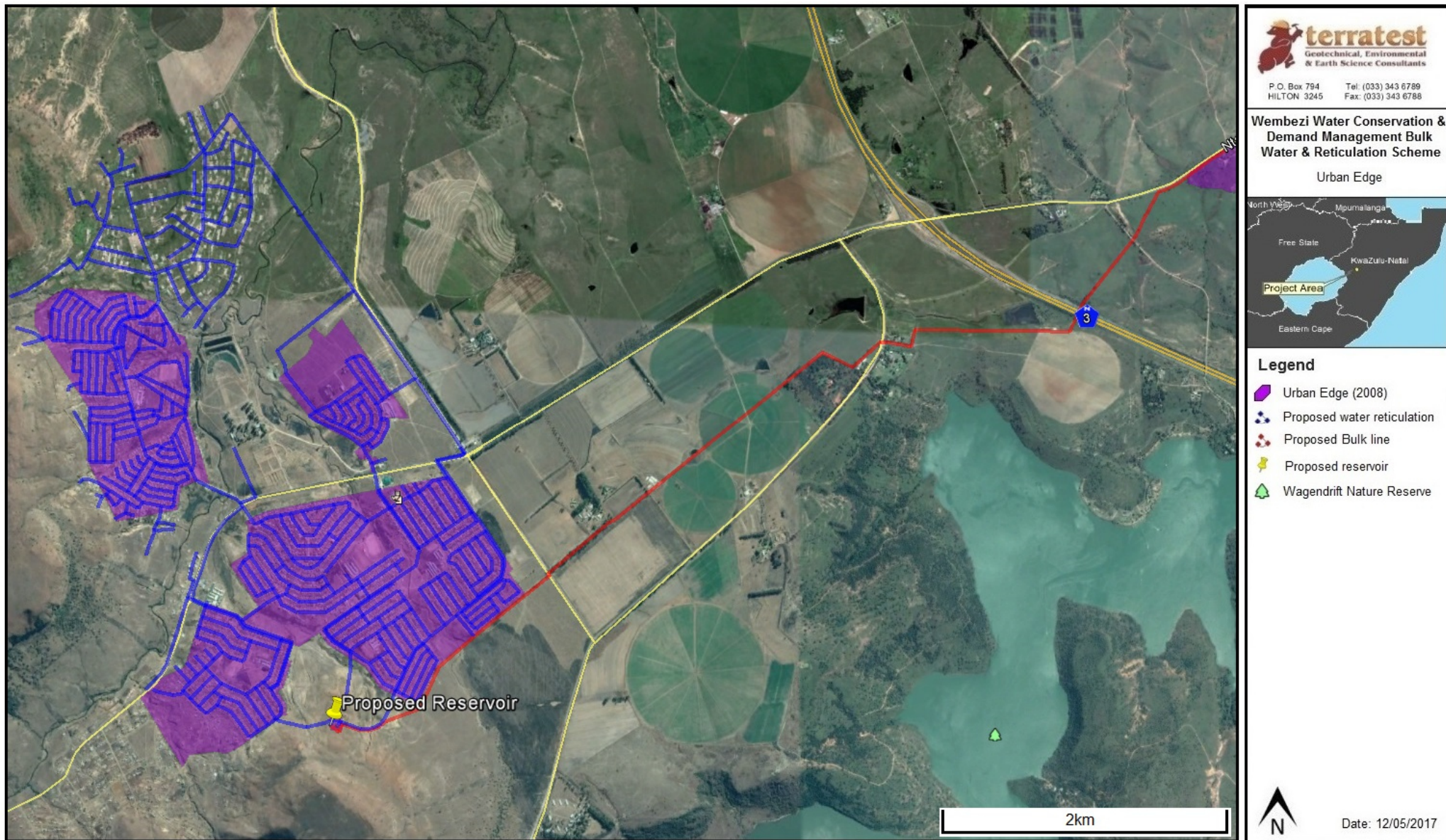


FIGURE 9-5: Urban areas as per the Urban Edge database (2008)

9.9 SOCIO-ECONOMIC

The Inkosi Langalibalele Local Municipality was established via the amalgamation of Imbabazane Local Municipality and uMtshezi Local Municipality on 03 August 2016. As such, financial, employment and service delivery information is not yet available for the new municipality (Municipalities of South Africa, 2017). Consolidated historical information for the Imbabazane Local Municipality and uMtshezi Local Municipality are however available, and are presented in Table 9-2.

TABLE 9-2: Socio-economic information

YEAR	2016	2011
Population	215 182	196 227
Age Structure		
Population under 15	36.4%	36.2%
Population 15 to 64	59.6%	59.4%
Population over 65	4.0%	4.4%
Dependency Ratio		
Per 100 (15-64)	67.8	68.3
Sex Ratio		
Males per 100 females	89.9	87.3
Population Growth		
Per annum	2.10%	n/a
Labour Market		
Unemployment rate (official)	n/a	n/a
Youth unemployment rate (official) 15-34	n/a	n/a
Education (aged 20 +)		
No schooling	10.8%	16.0%
Matric	33.7%	26.3%
Higher education	7.0%	5.1%
Household Dynamics		
Households	46 953	41 617
Average household size	4.6	4.5
Female headed households	53.1%	51.5%
Formal dwellings	75.3%	63.3%
Housing owned	89.4%	60.4%
Household Services		
Flush toilet connected to sewerage	18.8%	22.5%
Weekly refuse removal	22.0%	23.7%
Piped water inside dwelling	15.5%	21.9%
Electricity for lighting	85.2%	71.1%

Of particular relevance to the proposed upgrade is the percentage of Household Services which indicates a decline in terms of water-based services from 2011 - 2016.

10 SPECIALIST STUDIES

10.1 BIODIVERSITY AND WATERCOURSE IDENTIFICATION AND DELINEATION ASSESSMENT

Terratest (Pty) Ltd was appointed to undertake a Biodiversity and Watercourse Identification and Delineation Assessment of all wetlands and drainage lines located along the pipeline alignment, for both the Ø750mm rising main bulk water pipeline and the reticulation, as well as to conduct an impact assessment of the proposed upgrade on the surrounding environments. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Biodiversity and Watercourse Identification and Delineation Assessment Report is attached as Appendix 6. The relevant details of the specialist who conducted the assessment are noted in Table 10-1.

TABLE 10-1: Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report/s as attached in Appendix 6
Mr Jake Alletson	BSc Hons (Zoology)	Aquatic and terrestrial ecology, Environmental Impact Assessment, landscape scale, Conservation science and planning	Biodiversity and Wetland Assessment associated with the proposed routes of the Wembezi Potable Water Supply Scheme in Wembezi, KwaZulu-Natal

An impact assessment study of the proposed upgrade utilised the following databases:

- Ezemvelo KZN Wildlife Vegetation types;
- Ezemvelo KZN Wildlife and National Freshwater Ecosystem Priority Areas (NFEPA) wetland database;
- Conservation data viz the Ezemvelo KZN Wildlife Minset database;
- Ezemvelo KZN Wildlife Protected Areas database;
- Ezemvelo KZN Wildlife Wetlands database (2014);
- Threatened Ecosystems viz the SANBI database;
- Game Reserves, Nature Reserves and Wildlife Conservancies as per the Department of Environmental Affairs Interactive Spatial Information database (2014);
- The identification of areas of avifaunal (bird) importance; and
- Google Earth.

Following the desktop study, the specialist conducted a site survey. The results thereof are presented below (refer to Appendix 6: Specialist Reports).

10.1.1 Biodiversity

The natural vegetation in the area is primarily KwaZulu-Natal Highland Thornveld. A small strip of Drakensberg Foothill Moist Grassland is evident in the west and wetlands are present in places. However, in the built-up area of the town where the reticulation pipelines will be placed, the vegetation is almost entirely eradicated as a result of urban development.

The fauna in the area is already greatly reduced from the natural state. The only species of conservation concern which was found was Blue Crane (*Anthropoides paradiseus*) which is a red data species, listed as being regionally "Near Threatened" (Taylor *et al*, 2015). Two birds were seen near the long wetland to the west of the N3 and a farm worker said that they are seen there on a regular basis. It is, however, highly unlikely that the construction of the pipeline will impact on these birds.

A dedicated survey would reveal more species, but due to the nature of the development, which will leave the landscape virtually unchanged once construction is complete, a detailed assessment of the biodiversity is not considered to be necessary (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

10.1.1.1 Impacts

Loss of vegetation

The natural vegetation in the project area is already severely degraded. As such it is anticipated that the project will create few new impacts. Provided that pipeline trenches are rehabilitated and that the working area is revegetated, the greatest potential risk arises from the spread of alien weed species, with bramble being the greatest threat (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

Loss of fauna

The fauna in the area is already greatly reduced from the natural state. Since the completed pipelines will be non-intrusive in the landscape it is not anticipated that they will create any new impacts on the fauna. Attention must, however, be paid to the Blue Crane (*Anthropoides paradiseus*) since the birds could be scared away from the area during the construction phase (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

10.1.1.2 Recommendations

Loss of vegetation

- The soil excavated from the trenches must be retained and be returned in the reverse order to which it was removed so as to re-establish the original soil profiles as best possible;
- A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the trenches is well established and complete; and
- Indigenous grass species suitable for the rehabilitation of the trenches are as follows:

– Kweek grass	<i>Cynodon dactylon</i>	15%
– Love grass	<i>Eragrostis curvula</i>	65%
– Thatch grass	<i>Hyparrhenia hirta</i>	20%

[The above grasses are tolerant of grazing pressure from domestic livestock. Other species which are more attractive to grazers are not recommended as they will not be able to establish. The percentage figures are the proportion of each species by mass in the seed mixture].

The above measures are intended to quickly cover the soil along the working strip to prevent erosion. In time other species will colonise from the surrounding areas possibly resulting in a slight improvement in diversity. Measures to prevent the invasion of weed species, especially bramble, must be adhered to (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

Loss of fauna

- The fauna in the area will be best protected through maintenance of vegetation, drainage lines and wetlands. Therefore, all the recommendations put forward with regard to vegetation are relevant;
- The Blue Cranes (*Anthropoides paradiseus*) which are resident, for at least a large part of the time, in the vicinity of the large wetland in the farming area (i.e. along the rising main servitude), will require special mitigatory actions, viz:
 - Prior to the planned commencement of the construction work it must be determined whether the cranes are present or not. If they are in the area, then the construction of the Ø750mm rising

main bulk water pipeline in the area between the N3 highway and the road which borders Wembezi should be scheduled to be done outside of the normal breeding season (i.e. between April and August);

- No construction activities, stockpiles, stores, or personnel may go more than 30m north of the pipeline trench at any time of the year (during construction); and
- The wetland rehabilitation guidelines are to be very strictly adhered to (as presented in Section 10.1.2.2).

(Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

10.1.2 Watercourses

Wetlands

The Ø750mm rising main bulk water pipeline passes through two wetland systems.

The wetlands within the reticulation study area (i.e. Wembezi) are generally severely degraded as a result of anthropogenic factors. Most of the damage has been done incidentally as a result of livestock trampling and possibly as a result of over-frequent veld fires. Currently, the four existing wetland types identified are Channelled and Unchannelled Valley Bottoms, Hillslope Seeps and Toeslope Seeps.

Most of the wetlands identified originate from unnatural sources such as running taps or sewage leaks. For this reason, the systems were more biologically active than they would otherwise have been under the prevailing dry weather conditions. The vegetation within them had been heavily grazed by livestock, but it was apparent that most cover would consist of sedges and grasses. Stands of Reeds (*Phragmites australis*), Bulrushes (*Typha capensis*), Snakeweed (*Persicaria spp.*), and the large Sedge (*Cyperus fastigiatus*) were evident. Unexpectedly, a small stand of Job's Tears (*Coix lacryma*), which is not indigenous, was identified at one site. This is well outside the normal altitude range of the species and is an anomaly.

Connecting the various wetlands, or linking them to the larger Little Bushmans River, are a number of drainage lines of widths which vary from one metre to 30m. Originally many of these were probably wetland systems, but are now so severely eroded that no wetland elements remain and there is no realistic possibility of rehabilitation. Typically, the banks are high and are either very steep or are vertical. The substrate is loose argillaceous alluvium of up to gravel particle size, with occasional bedrock bands of either dolerite or shale/sandstone of the Estcourt Formation of the Beaufort Group, Karoo Supergroup (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

Drainage lines and the Little Bushmans River

The drainage in the project area consists of two systems. The larger is the Little Bushmans River catchment which includes the Wembezi area, while smaller is a stream which flows from the area around most of the Ø750mm rising main bulk water pipeline.

The watercourses are largely seasonal or ephemeral and only hold natural water after rainfall events. Under present conditions, however, some have prolonged flows as a result of water and/or sewage leaks, and of runoff from irrigation schemes in the agricultural area. In almost all cases, the ecological condition of these systems are poor and, in terms of their functionality, are considered to be largely modified if not critically modified. Those which are in better condition are concentrated in the agricultural area and are considered to be moderately modified.

The Little Bushmans River is the largest river flowing from the project area. It rises in the Ntabanhlope area and flows through Wembezi and the town of Estcourt, to the Bushmans River. The channel distance from the northern edge of Wembezi to the Bushmans River confluence is approximately 18km. Flows in the river

are perennial but vary seasonally. However, at the time of the study, it was apparent that a considerable portion of the flow was derived from leaking infrastructure within the Wembezi area since flows below the town were visibly greater than those upstream of the town (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

10.1.2.1 Impacts

Wetlands

The Ø750mm rising main bulk water pipeline passes by a wetland close to the treatment works at its origin and through two arms of a single wetland in the farming area. The wetland at the treatment works includes settling ponds which were linked to the works and so it is not considered to be a natural system. Since the pipeline follows the servitude past this system, impacts there will be minimal. The two wetland crossings do have potential to result in some impacts. One site is within an irrigated pasture, but the other has semi-natural vegetation. Fortunately, both sites are at the head of the local system arms and so the flow through them will be smaller than would be the case further downstream. Rehabilitation at these sites will be of great importance and will relate to maintenance of sub-surface water flows and to restoration of the existing vegetation type.

Within the Wembezi area there are 17 wetland crossings. All but three of these are at the points where roads pass through the systems so there are existing impacts at those points. It may be possible to use the road crossing structures to carry the pipelines, but otherwise attention must be given to sub-surface flows and vegetation (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

Drainage lines and the Little Bushmans River

Because of their poor ecological state, the identified drainage lines provide relatively little habitat for aquatic biodiversity. For this reason, most impacts will be related to channel and bank stability. Because of the highly erodible soils, the risk of impacts is considerable and the consequences would be additional sedimentation of the system and further secondary degradation of biodiversity.

The Little Bushmans River is similar to the other drainage lines in the area in terms of its channel morphology at the crossing site. It is, however, larger than the other drainage lines making the risk of bank erosion larger (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

Cumulative impacts

Once the construction phase is complete and the rehabilitation has been done, the project will leave no new cumulative impacts on the environment since it makes provision for an upgrade of existing facilities. The reduction in water leakage from the current infrastructure and wastage will, however, result in some wetlands being dried out and in flows in the Little Bushmans River being reduced (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

10.1.2.2 Recommendations

Wetlands

- The soil excavated from the trenches must be retained with the topsoil and the subsoil being stockpiled separately. They must then be returned to the trench in the reverse order to which they were removed so as to re-establish the original soil profiles as best possible;
- Compaction of the soils to match the porosity of the surrounds must be done;
- The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds. It is recommended that any wetland plants which are excavated should be set aside and be kept moist until they can be returned for use on the trench; and

- A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover over the trenches is well established and complete.

Because the pipelines will either be within an existing servitude or be confined to narrow corridors within the built up area of Wembezi, and because virtually all of the pipeline routes are within transformed areas, it was not possible to consider wetland buffers in the usual way. It is, however, recommended that the working servitudes be kept well within the planning servitude spaces (Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

Drainage lines and the Little Bushmans River

The construction of the reticulation in the vicinity of drainage lines and the Little Bushmans River must be done with due consideration of the stability of the banks. It is imperative that the banks be left in a stable condition at the end of the construction phase. The mitigatory measures are as follows:

- Bank slopes must be graded to the lowest possible angle and must be well below the slip angle of the material concerned;
- Banks must be planted with indigenous grasses and the following mix is suggested:

–	Kweek grass	<i>Cynodon dactylon</i>	15%
–	Love grass	<i>Eragrostis curvula</i>	65%
–	Thatch grass	<i>Hyparrhenia hirta</i>	20%

[The above grasses are tolerant of grazing pressure from domestic livestock. Other species which are more attractive to grazers are not recommended as they will not be able to establish. The percentage figures are the proportion of each species by mass in the seed mixture];

- Where necessary use must be made of gabions, rock packs, or other such hard stabilising structures. However, the use of retaining walls constructed of bricks, blocks, or concrete, is not recommended as such structures are often ineffective and can accelerate erosion processes in some cases; and
- No surplus soil or other such material may be disposed of in the channels.

(Appendix 6: Biodiversity and Watercourse Identification and Delineation Assessment Report).

10.1.3 Conclusion and recommendations

The study undertaken on the biophysical environment in the footprint of the proposed upgrade to the water supply and reticulation system in and near Wembezi has not found any impacts of significance. The reasons for this are as follows:

- The project area is already highly transformed as a result of both the agricultural activities along the proposed Ø750mm rising main bulk water pipeline route, and of the existing urban development in Wembezi where a new reservoir and the fine scale domestic reticulation will be situated. The transformation has resulted in either total loss or severe degradation of the vegetation, and in an associated reduction in the fauna; and
- The new water pipelines will largely be located within existing servitudes and so are in areas which have already been affected by the supply system.

Although the anticipated further impacts of the development are minimal, and no fatal flaws have been found, it is not implied that the construction of the pipelines may go ahead without appropriate caution. For this reason, a series of management recommendations have been put forward and are backed up by a monitoring programme (refer Appendix 5: EMPr).

Finally, it is suggested that the ECO is appointed prior to the start of construction activities, including site establishment, and that the ECO becomes thoroughly familiar with the project area.

10.2 HERITAGE IMPACT ASSESSMENT

UMLANDO: Archaeological Surveys and Heritage Management was appointed to undertake a Heritage Survey for both the proposed Ø750mm rising main bulk water pipeline and reticulation, as well as to conduct an impact assessment of the proposed development on the surrounding environments. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Heritage Survey Report is attached as Appendix 6. The relevant details of the specialist who undertook the work are noted in Table 10-2.

TABLE 10-2: Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report/s as attached in Appendix 6
Mr Gavin Anderson	M. Phil Archaeology/Social Psychology	Heritage Impact Assessment	Heritage survey of the proposed Wembezi Water reticulation project, Estcourt, KwaZulu-Natal

A field survey was conducted on 22 June 2017. Three heritage features were recorded during the survey, viz. two cemeteries and the ruins of a building. Table 10-3 lists the associated locations:

TABLE 10-3: Identified heritage features

NO.	SITE	SOUTH	EAST
1	Cemetery 1	29° 02'59.24"S	29°47'59.14"E
2	Cemetery 2	29° 01'56.52"S	29°47'10.50"E
3	Ruins (Southwold)	29° 02'23.79"S	29°46'40.59"E

The results of the Heritage Survey are presented below (refer to Appendix 6: Specialist Reports).

10.2.1 Cemetery 1

Overview: This cemetery occurs between the district road and the south-eastern part of Wembezi. It covers an area of approximately 200m x 200m. A line of oak trees separates the cemetery and the proposed water pipeline.

Significance: The cemetery is of high significance.

Mitigation: Technically, there should be at least a 20m buffer between a cemetery and a proposed upgrade. However, the line of oak trees forms a natural buffer between the pipeline and the cemetery. Mitigation is therefore not required (Appendix 6: Heritage Impact Assessment).

10.2.2 Cemetery 2

Overview: Cemetery 2 occurs along the eastern side of the reticulation. The one part of the pipeline is between the main road and the access road to the cemetery. The pipeline then turns southwest and runs adjacent to the cemetery. The southwest line is approximately 10m from the cemetery.

Significance: The cemetery is of high significance.

Mitigation: The existing line is too close to the cemetery. It needs to be at least 20m from the southwestern branch. A clear boundary fence should be erected between the cemetery and the edge of the development footprint. Mitigation is therefore the implementation of a 20m buffer (Appendix 6: Heritage Impact Assessment).

10.2.3 Southwold Ruins

Overview: The Farm Southwold occurs near the water treatment works. Very little of the farmhouse and related structures remain. These are mostly the form of the house floors. No middens were observed.

Significance: The ruins are of low significance.

Mitigation: The reticulation does not affect the ruins and thus no further mitigation is required (Appendix 6: Heritage Impact Assessment).

10.2.4 Conclusion and recommendations

No archaeological sites were noted in the servitude footprint. Two cemeteries were noted during the survey. The northern cemetery requires mitigation in the form of demarcation before construction begins. The other cemetery and Southwold Farm ruins require no further mitigation (Appendix 6: Heritage Impact Assessment).

10.3 PALAEOLOGICAL IMPACT ASSESSMENT

Gideon Groenewald was appointed to undertake a Phase 1 Palaeontological Assessment Survey for both the proposed Ø750mm rising main bulk water pipeline and reticulation, as well as to conduct an impact assessment of the proposed development on the surrounding environments. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Phase 1 Palaeontological Assessment Survey is attached as Appendix 6. The relevant details of the specialist who undertook the work are noted in Table 10-4.

TABLE 10-4: Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report/s as attached in Appendix 6
Mr Gideon Groenewald	PhD Geology	Biostratigraphy and Palaeontology	Phase 1 Palaeontological Assessment and "Chance find Protocol" for the proposed Wembezi Bulk Water Reticulation Project, Inkosi Langalibalele Local Municipality, Uthukela District Municipality, KwaZulu-Natal Province

A field survey was conducted from 03 July – 07 July 2017. The Phase 1 Palaeontological Assessment Survey was undertaken given the sensitivity rating allocated by the South African Heritage Resources Agency (SAHRA), as per Figure 10-1.

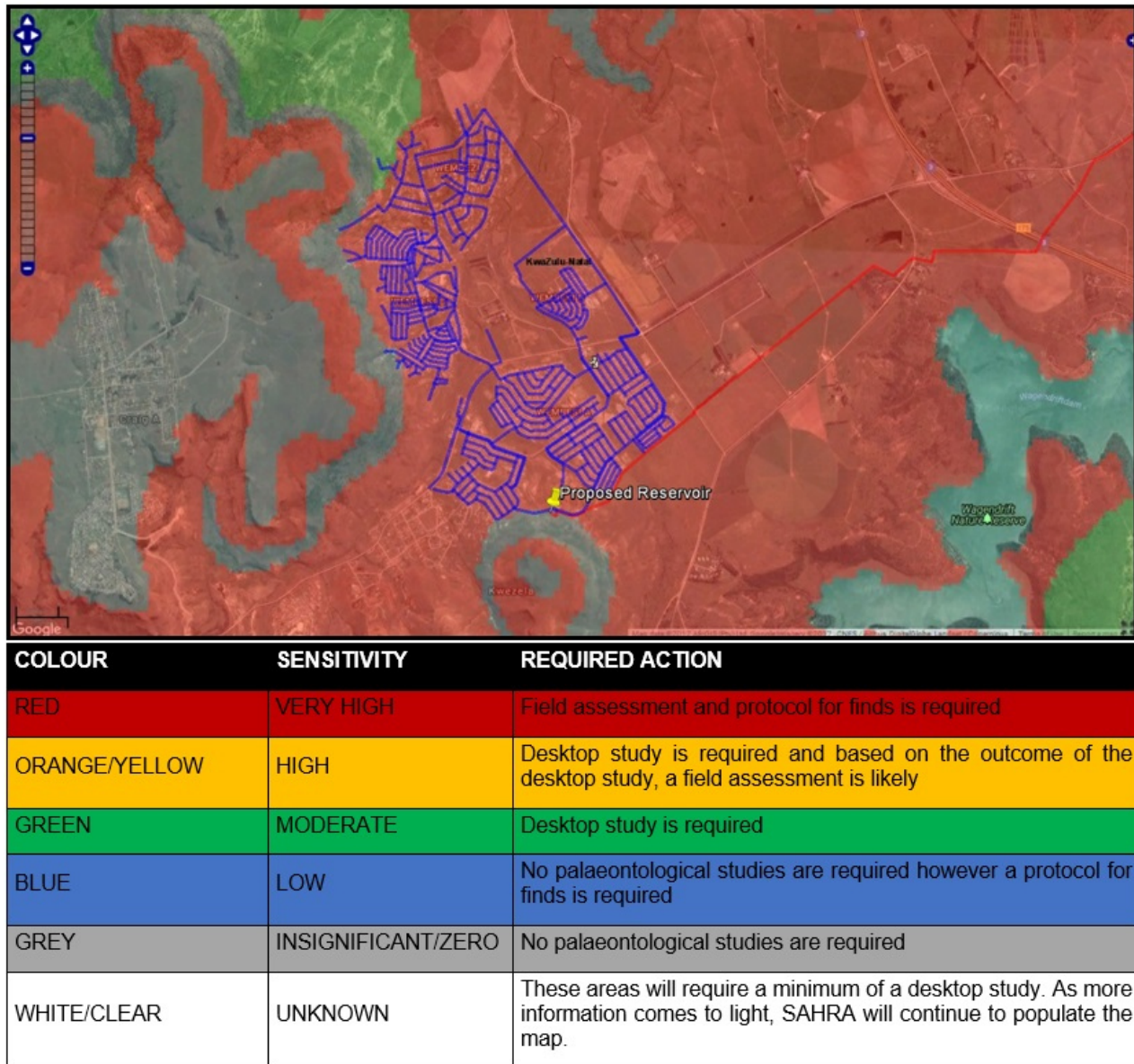


FIGURE 10-1: Palaeontological sensitive areas as identified by SAHRA [Source: SAHRIS, 2017]

Based on the field surveys undertaken, several palaeontological findings were identified, however, none of these findings occur within the project area. Figure 10-2 provides an indication of where the possibility of uncovering palaeontological artefacts is most likely during construction. As noted in the Phase 1 Palaeontological Assessment Report, Points 13910, 14810 and 14910 (as represented in Figure 10-2) are noted in the immediate project area and due consideration is to be implemented by the contractor when implementing works in these areas.

Based on these sensitives, a Chance Find Protocol has been developed, specific to the project, which is to be implemented throughout the construction phase. The Chance Find Protocol forms part of the Phase 1 Palaeontological Assessment Report (Appendix 6) and has been appended to the EMPr (Appendix 5).

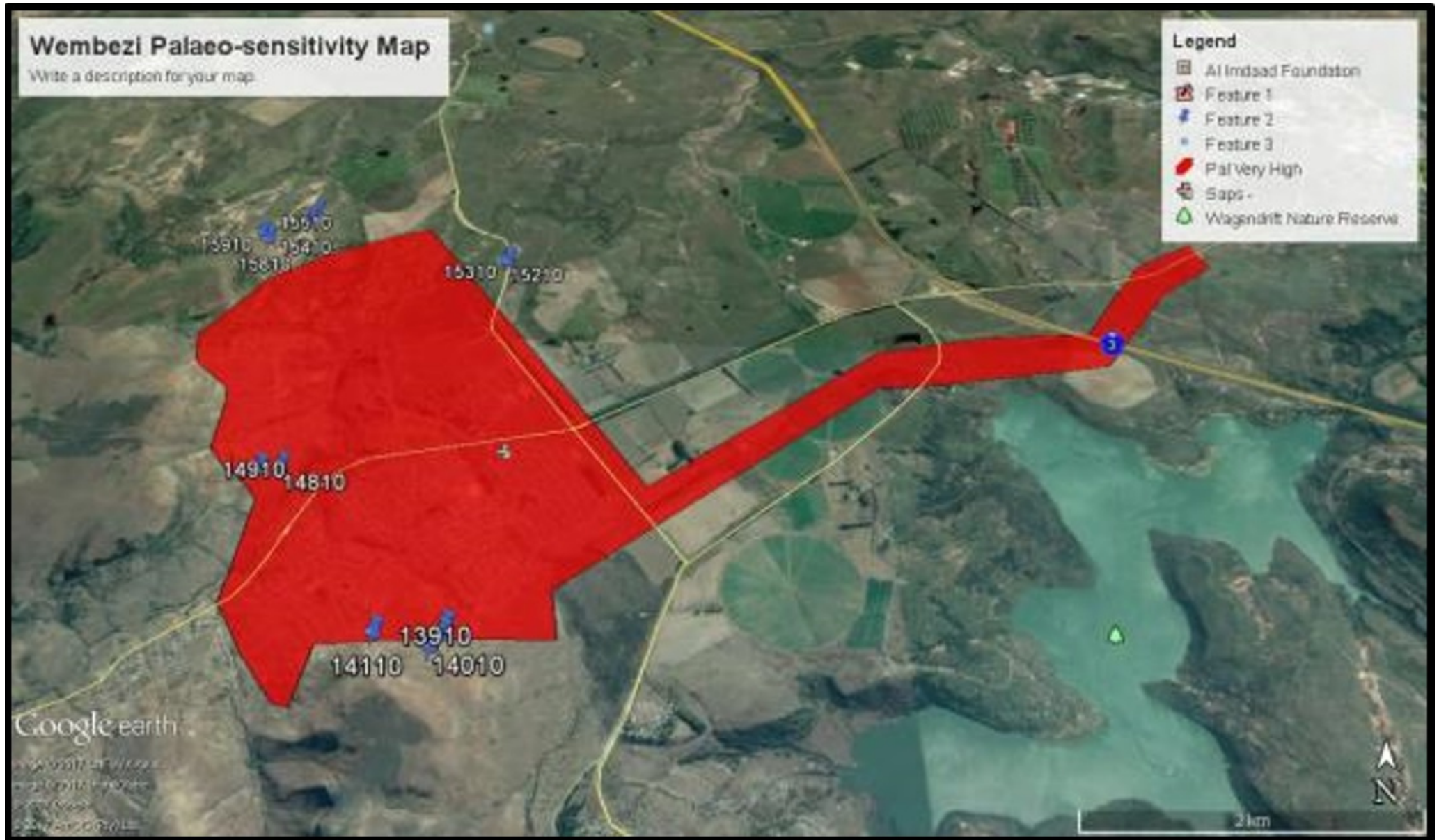


FIGURE 10-2: Palaeontological sensitivity of geological formations in the study area [Source: Groenewald, 2017]

10.3.1 Conclusion and recommendations

The possibility of finding significant fossils in the study area is considered to be very high. Should fossils be observed during construction, the appointed Heritage Impact Assessment consultant must be notified immediately and the fossils collected by a suitably qualified palaeontologist.

Recommendations noted in the Palaeontological Assessment Report (Appendix 6) include:

- The ECO must be notified of the fact that a Very High Palaeontological sensitivity is retained for all the sections of the development that are underlain by shale and sandstone of the Normandien and Masotcheni Formations and alluvium. Although highly weathered, fossils might be recorded during the initial phase of construction when excavations exceed 1.5m;
- A Professional Palaeontologist must be appointed to inspect the site during the on-going weeks of excavation for the infrastructure and a "Chance Find Protocol" document must be updated on a monthly basis. If fossils are recorded, a suitably qualified palaeontologist must be appointed to inspect all areas where excavation of deeper than 1,5m is made into sediments of Normandien and Masotcheni Formations and a protocol for the chance find of fossils must then be developed and discussed with the contractor on site; and
- Gabions must be constructed in dongas starting to develop in areas underlain by Normandien Formation shales and the Masotcehni Formation and alluvium. The neglect of urgent measures to cure the erosion of highly expansive and dispersive soils on this Formation (clearly visible in areas where huge (tens of meters in diameter) sinkholes are busy developing, will lead to extensive tunnelling and sudden development of huge dongas that will be extremely counter-productive in the long-term planning of the project.

Recommendations noted in Chance Find Protocol (Appendix 6) include:

- The ECO must be informed of the fact that a Very High Palaeontological Sensitivity was allocated to the entire development and due to the highly weathered nature of the material, significant fossils are expected after the start of excavations for foundations that exceed 1.5m;
- The allocated team members from the Wembezi Community can be introduced to any Palaeontological material that is likely to be found on site. A once-off information session with the Palaeontological Specialist must be arranged, to present a simple and understandable (preferably audio-visual presentation in an "interpreted voice") of the majority of the contractual workers on site (isiZulu) during the initial site visit that must form part of the EMPr for the project;
- This "Chance Find Protocol" must be included into the EMPr of the project and a reasonable budget must be allocated to ensure compliance with the legal responsibility of the developer in terms of the proper conservation of and storage of Palaeontological Heritage; and
- AMAFA and SAHRA must be informed of the content of this "Chance Find Protocol" and EMPr arrangements by the EAP or the developer, for final approval of the Environmental Authorisation documentation during the BA Process.

The above recommendations have been included in the EMPr (Appendix 5).

11 IMPACT ASSESSMENT AND MITIGATION MEASURES

11.1 IMPACT ASSESSMENT METHODOLOGY

The EIA Regulations (2014, as amended), prescribe requirements to be adhered to and objectives to be reached when undertaking Impact Assessments. These are noted in the following sections contained within the EIA Regulations (2014, as amended):

- Regulation 326, Appendix 1, Section 2 and Section 3 – Basic Assessment Impact Requirements; and
- Regulation 326, Appendix 2 and Appendix 3 – Environmental Impact Assessment Requirements.

In terms of these Regulations, the following should be considered when undertaking an Impact Assessment:

- A description and assessment of the significance of any environmental impact including:
 - Cumulative impacts that may occur as a result of the undertaking of the activity during the project life cycle;
 - Nature of the impact;
 - Extent and duration of the impact;
 - The probability of the impact occurring;
 - The degree to which the impact can be reversed;
 - The degree to which the impact may cause irreplaceable loss of resources; and
 - The degree to which the impact can be mitigated.

The overall significance of an impact / effect has been ascertained by attributing numerical ratings to each identified impact. The numerical scores obtained for each identified impact have been multiplied by the probability of the impact occurring before and after mitigation. High values suggest that a predicted impact / effect is more significant, whilst low values suggest that a predicted impact / effect is less significant.

The interpretation of the overall significance of impacts is presented in Table 11-1.

TABLE 11-1: Interpretation of the significance scoring of a negative impact / effect³

Scoring value	Significance
>35	High - The impact is total / consuming / eliminating - In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. Mitigation may not be possible / practical. <u>Consider a potential fatal flaw in the project.</u>
25 - 35	High - The impact is profound - In the case of adverse impacts, there are few opportunities for mitigation that could offset the impact, or mitigation has a limited effect on the impact. Social, cultural and economic activities of communities are disrupted to such an extent that their operation is severely impeded. Mitigation may not be possible / practical. <u>Consider a potential fatal flaw in the project.</u>
20 – 25	Medium - The impact is considerable / substantial - The impact is of great importance. Failure to mitigate with the objective of reducing the impact to acceptable levels could render the entire project option or entire project proposal unacceptable. <u>Mitigation is therefore essential.</u>

³ Source: adapted from Glasson J, Therivel R & Chadwick A. Introduction to Environmental Impact Assessment, 2nd Edition. 1999. pp 258. Spoon Press, United Kingdom.

Scoring value	Significance
7 – 20	Medium - The impact is material / important to investigate - The impact is of importance and is therefore considered to have a substantial impact. <u>Mitigation is required to reduce the negative impacts and such impacts need to be evaluated carefully.</u>
4 – 7	Low - The impact is marginal / slight / minor - The impact is of little importance, but may require limited mitigation; or it may be rendered acceptable in light of proposed mitigation.
0 – 4	Low - The impact is unimportant / inconsequential / indiscernible – no mitigation required, or it may be rendered acceptable in light of proposed mitigation.

The significance rating of each identified impact / effect was further reviewed by the Environmental Assessment Practitioner (EAP) by applying professional judgement.

For the purpose of this assessment, the impact significance for each identified impact was evaluated according to the following key criteria outlined in the sub-sections below.

NATURE OF IMPACT

The environmental impacts of a project are those resultant changes in environmental parameters, in space and time, compared with what would have happened had the project not been undertaken. It is an appraisal of the type of effect the activity would have on the affected environmental parameter. Its description includes what is being affected, and how.

SPATIAL EXTENT

This addresses the physical and spatial scale of the impact. A series of standard terms and ratings used in this assessment relating to the spatial extent of an impact / effect are outlined in Table 11-2.

TABLE 11-2: Rating scale for the assessment of the spatial extent of a predicted effect / impact

RATING	SPATIAL DESCRIPTOR
7	International - The impacted area extends beyond national boundaries.
6	National - The impacted area extends beyond provincial boundaries.
5	Ecosystem - The impact could affect areas essentially linked to the site in terms of significantly impacting ecosystem functioning.
4	Regional - The impact could affect the site including the neighbouring areas, transport routes and surrounding towns etc.
3	Landscape - The impact could affect all areas generally visible to the naked eye, as well as those areas essentially linked to the site in terms of ecosystem functioning.
2	Local - The impacted area extends slightly further than the actual physical disturbance footprint and could affect the whole, or a measurable portion of adjacent areas.
1	Site Related - The impacted area extends only as far as the activity e.g. the footprint; the loss is considered inconsequential in terms of the spatial context of the relevant environmental or social aspect.

SEVERITY / INTENSITY / MAGNITUDE

This provides a qualitative assessment of the severity of a predicted impact / effect. A series of standard terms and ratings used in this assessment which relate to the magnitude of an impact / effect are outlined in Table 11-3.

TABLE 11-3: Rating scale for the assessment of the severity / magnitude of a predicted effect / impact

RATING	MAGNITUDE DESCRIPTOR
7	Total / consuming / eliminating - Function or process of the affected environment is altered to the extent that it is permanently changed.
6	Profound / considerable / substantial - Function or process of the affected environment is altered to the extent where it is permanently modified to a sub-optimal state.
5	Material / important - The affected environment is altered, but function and process continue, albeit in a modified way.
4	Discernible / noticeable - Function or process of the affected environment is altered to the extent where it is temporarily altered, be it in a positive or negative manner.
3	Marginal / slight / minor - The affected environment is altered, but natural function and process continue.
2	Unimportant / inconsequential / indiscernible - The impact temporarily alters the affected environment in such a way that the natural processes or functions are negligibly affected.
1	No effect / not applicable

DURATION

This describes the predicted lifetime / temporal scale of the predicted impact. A series of standard terms and ratings used in this assessment are included in Table 11-4.

TABLE 11-4: Rating scale for the assessment of the temporal scale of a predicted effect / impact

RATING	TEMPORAL DESCRIPTOR
7	Long term – Permanent or more than 15 years post decommissioning. The impact remains beyond decommissioning and cannot be negated.
3	Medium term – Lifespan of the project. Reversible between 5 to 15 years post decommissioning.
1	Short term – Quickly reversible. Less than the project lifespan. The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the project phases or within 0 -5 years.

IRREPLACEABLE LOSS OF RESOURCES

Environmental resources cannot always be replaced; once destroyed, some may be lost forever. It may be possible to replace, compensate for or reconstruct a lost resource in some cases, but substitutions are rarely ideal. The loss of a resource may become more serious later, and the assessment must take this into account. A series of standard terms and ratings used in this assessment are included in Table 11-5.

TABLE 11-5: Rating scale for the assessment of loss of resources due to a predicted effect / impact

RATING	RESOURCE LOSS DESCRIPTOR
7	Permanent – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, <u>or by artificial means.</u>
5	Long term – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, <u>but can be mitigated by other means.</u>
4	Loss of an ‘at risk’ resource - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria, but cumulative effects may render such loss as significant.
3	Medium term – The resource can be recovered within the lifespan of the project. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span between 5 and 15 years.
2	Loss of an ‘expendable’ resource - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria.
1	Short-term – Quickly recoverable. Less than the project lifespan. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span shorter than any of the project phases, or in a time span of 0 to 5 years.

REVERSIBILITY / POTENTIAL FOR REHABILITATION

The distinction between reversible and irreversible impacts is a very important one and the irreversible impacts not susceptible to mitigation can constitute significant impacts in an EIA (Glasson et al, 1999). The potential for rehabilitation is the major determinant factor when considering the temporal scale of most predicted impacts. A series of standard terms and ratings used in this assessment are included in Table 11-6.

TABLE 11-6: Rating scale for the assessment of reversibility of a predicted effect / impact

RATING	REVERSIBILITY DESCRIPTOR
7	Long term – The impact / effect will never be returned to its benchmark state.
3	Medium term – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than the lifetime of the project, or in a time span between 5 and 15 years.
1	Short term – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than any of the phases of the project, or in a time span of 0 to 5 years.

PROBABILITY

The assessment of the probability / likelihood of an impact / effect has been undertaken in accordance with ratings and descriptors provided in Table 11-7.

TABLE 11-7: Rating scale for the assessment of the probability of a predicted effect / impact

RATING	PROBABILITY DESCRIPTOR
1.0	Absolute certainty / will occur
0.9	Near certainty / very high probability
0.7 – 0.8	High probability / to be expected
0.4 - 0.6	Medium probability / strongly anticipated
0.3	Low probability / anticipated
0.2	Possibility
0.0 - 0.1	Remote possibility / unlikely

11.2 MITIGATION

In terms of the assessment process, the potential to mitigate the negative impacts is determined and rated for each identified impact and mitigation objectives that would result in a measurable reduction, or enhancement of the impact, are taken into account. The significance of environmental impacts has therefore been assessed taking into account any proposed mitigation measures. The significance of the impact “without mitigation” is therefore the prime determinant of the nature and degree of mitigation required.

12 IMPACTS IDENTIFIED

The preferred site alternative is located between the George Cross Water Treatment Works, as the supplier of treated potable water, and the receiving community of Wembezi. The Wembezi community is the area which has been identified as having excessive water losses and therefore it is proposed to upgrade and rectify the *status quo* by implementing the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme. As the George Cross Water Treatment Works is the only supplier of water to the Wembezi and Ntabamhlope communities, the site between the George Cross Water Treatment Works and the proposed 10MI reservoir, this is the only site alternative which can meet the need and desirability of the Application.

The George Cross Water Treatment Works is the closest, operational water treatment works in the area that can, and currently does supply water to the communities of Wembezi and Ntabamhlope. As treated potable water is already allocated at this treatment works for the aforementioned communities it is reasonable to assume that it is the best site alternative from which the potable water is to be pumped from.

The **preferred layout (layout alternative 1)** of the proposed Ø750mm rising main bulk water pipeline is aligned to run alongside the existing Ø355mm steel bulk rising main pipeline, within an existing 3m wide servitude. As the servitude already exists, this is the preferred layout alternative as an area of disturbance has already been created through the construction of the existing Ø355mm steel pipeline. Further, the servitude is easily accessible and monitoring and maintenance can be conducted on both pipelines simultaneously as they will be located adjacent to each other.

Layout alternative 2 is to align the proposed Ø750mm rising main bulk water pipeline adjacent to the existing Ø315mm AC pipeline, within the road reserve of the P29. The existing Ø315mm AC pipeline is, however, proposed to be decommissioned. Decommissioning will not involve the removal of the pipeline due to potential associated health risks (i.e. asbestosis). Instead, the AC pipe will remain in its current location. Constructing the proposed Ø750mm rising main bulk water pipeline in the same servitude of the AC pipe will result in a risk to construction workers as the AC pipe may be struck or damaged which could result in asbestos fibres becoming air-borne.

The preferred and therefore only layout alternative is layout alternative 1 i.e. aligning the Ø750mm rising main bulk water pipeline alongside the existing Ø355mm steel bulk rising main pipeline, within the existing 3m wide servitude.

The site layout for the proposed new 10MI bulk storage reservoir is adjacent to the existing 10MI bulk storage reservoir. This is preferable as the servitude for the existing Ø355mm steel bulk rising main pipeline (and the proposed alignment of the Ø750mm rising main bulk water pipeline) is already aligned to tie into the reservoirs at this location. Further, the site is located at a suitable elevation to gravity feed the Wembezi reticulation system (i.e. 1 318m). Maintenance will also only need to be undertaken at one location only. There is therefore only one site layout alternative available for the proposed new 10MI bulk storage reservoir.

In terms of the proposed reticulation upgrade, all reticulation will be installed alongside existing roads located within Wembezi or within the existing trenches of the previously installed reticulation. Therefore, an area of disturbance already exists and will be utilised for the installation of the proposed new reticulation network. Therefore, there is no other layout alternative for the proposed reticulation network.

The **preferred technology** is to utilise a HDPE pipeline for the rising main bulk pipeline, as opposed to steel or asbestos. The cost of an HDPE pipeline is less than that of a steel pipeline and HDPE pipelines offer a better hydrodynamic design to that of steel pipelines. The use of an asbestos pipeline was not considered

as it is no longer permissible by law as per GNR 341: Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials.

The preferred technology alternative is therefore to use a HDPE rising main bulk pipeline in the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade as it is the only feasible alternative which meets the need and desirability of the application.

The **No-go alternative** is to not to implement the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade, Inkosi Langalibalele Local Municipality, uThukela District Municipality, KwaZulu-Natal. As a result, the existing infrastructure would remain unchanged. This would result in continued, excessive water leakages, which would probably increase in volume due to additional failures and breakages in infrastructure over time. The Wembezi sewerage system would likely collapse as additional water enters the system, resulting in continued raw sewage overflow through the town. This will likely result in numerous health implications.

Ultimately, failing the implementation of the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade will result in the communities of Wembezi and Ntabamhlophe not receiving a sustainable water supply. Further, no potential employment opportunities will be created and no water conservation strategies / educational programmes will be implemented or communicated to the community.

Based on the identification of the above alternatives, the specialist studies conducted and construction works that will be required to implement the proposal, the following potential impacts to the receiving environment have been identified:

- Impacts to soils during construction;
- Impacts to surrounding vegetation during construction;
- Impacts to local fauna during construction;
- Air quality deterioration and an increase in noise pollution as a result of construction activities;
- An increase in construction traffic as a result of construction activities;
- The impact of construction waste as a result of construction activities;
- Socio-economic impacts;
- Potential to disturb existing infrastructure during construction;
- Safety and security impacts associated with construction activities;
- Watercourse disturbance as a result of construction activities; and
- Potential disturbance to items of heritage significance during construction.

The impacts identified for the proposed activity and the associated mitigation measures which directly and indirectly relate to the Listed Activities being applied for, are provided in Table 12-1.

TABLE 12-1: Construction phase impacts identified and associated mitigation measures

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
Soil	<ul style="list-style-type: none"> • Potential disturbances include compaction, physical removal and potential pollution: <ul style="list-style-type: none"> – The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of soil and vegetation; – Potential loss of stockpiled topsoil and other materials if not protected properly; – Insufficient stormwater control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding watercourses; – Bank instability alongside the Small Bushmans River and drainage lines could cause erosion; – Increased erosion could result in increased sedimentation which could impact on ecological processes; – The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion; – Physical disturbance of soil and plant removal may result in soil erosion/loss; and – Erosion and potential soil loss from cut and fill activities. 	<ul style="list-style-type: none"> • Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. The site must be monitored weekly for any signs of off-site siltation and erosion. All areas impacted by earth-moving activities should be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. All exposed earth should be rehabilitated promptly with suitable vegetation to stabilize the soil; • Any exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note, that the use of fertilisers, must be undertaken with caution and must not be allowed, in any circumstances, to run into drainage lines, to avoid any possible eutrophication impacts; • The soil excavated from the trenches must be retained with the topsoil and the subsoil being stockpiled separately. Wetland soils must be returned to the trench in the reverse order to which they were removed to re-establish the original soil profiles as best possible.
Vegetation and fauna	<ul style="list-style-type: none"> • Disturbance of the site may lead to encroachment of alien plant species on-site and to the surrounding areas; • Increase in alien invasive species, therefore a possible loss in biodiversity; • Potential off-site pollution as a result of accidental spillages of petrochemicals or bituminous substances; and • Increase in road strikes of birds and wildlife, especially slow-moving organisms such as frogs. 	<ul style="list-style-type: none"> • Identify sensitive fauna and flora prior to construction works; • Site personnel must undergo Environmental Training and be educated on keeping any vegetation disturbance to a minimum; • Poaching or harvesting of indigenous flora / fauna is strictly forbidden; • Alien plant encroachment must be monitored and prevented as outlined in the EMPr (Appendix 5); • No hunting is permitted on-site or the surrounding areas; • No animals required for hunting e.g. dogs, under the supervision of construction workers, should be allowed into the area. All construction personnel on the property should be informed of this ruling; • Any construction personnel found to be poaching in the area should be subjected to a disciplinary hearing.

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> • A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the trenches is well established and complete; • Indigenous grass species suitable for the rehabilitation of the trenches as noted in the Biodiversity Report (Appendix 6) is to be implemented; • Construction should be undertaken during the dry season to avoid the breeding season of the Blue Crane; • The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds; • Excavated wetland plants must be maintained and returned post construction. In the case of the wetland which is under pasture, the rehabilitation must be done in collaboration with the farm owner or manager; • Likewise, construction through pastures must be arranged prior to construction activities being undertaken and reinstated to their original state post-construction; • A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover (wetland plants or pasture) over the trench is well established and complete; and • No construction activities, stockpiles, stores, or personnel may go more than 30m north of the pipeline trench at any time of the year.
Air quality and noise pollution	<ul style="list-style-type: none"> • Potential dust generation from soil stripping, excavations, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality; • Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; and • Dust and noise will be created during the construction phase, which may impact on the local community. 	<ul style="list-style-type: none"> • All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMP (Appendix 5); • Road dampening should be undertaken to prevent excess dust during construction; • Operational Hours: No works shall be executed between sunset and sunrise and on the non-working and special non-working days as stated in the Contract Data unless otherwise agreed between the Engineer and Contractor; and • Construction personnel should be made aware of the need to prevent unnecessary noise such as hooting and shouting.
Traffic	<ul style="list-style-type: none"> • Increase in construction vehicles in the area; • Possible lane closures, traffic delays and congestion during the construction phase; • Slow-moving construction vehicles on the surrounding roads may cause accidents; and • If not properly maintained, increased road use to existing surrounding road infrastructure, for access purposes by 	<ul style="list-style-type: none"> • Appropriate temporary traffic control and warning signage must be erected and implemented on all affected roads in the vicinity; • Construction worker's / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual; and • Any damage to surrounding roads should be repaired as soon as possible to prevent further deterioration to the road network.

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
	<p>construction personnel, may cause damage to the existing infrastructure.</p>	
Waste	<ul style="list-style-type: none"> • There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil / bitumen spills, litter from personnel on-site, sewage from ablutions etc.); and • Waste generation could be created by the following: <ul style="list-style-type: none"> - Solid waste - plastics, metal, wood, concrete, stone, asphalt; - Chemical waste- petrochemicals, resins and paints; and - Sewage generated by employees. 	<ul style="list-style-type: none"> • All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported; • All solid wastes should be disposed of at a registered landfill site and records maintained to confirm safe disposal; • Adequate scavenger-proof refuse disposal containers should be supplied to control solid waste on-site; • It should be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction; • Chemical waste should be stored in appropriate containers and disposed of at a licensed disposal facility; • Portable sanitation facilities should be erected for construction personnel. Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and serviced regularly so as to prevent contamination of the watercourses; • The construction site should be inspected for litter on a daily basis. Extra care should be taken on windy days. Precautions should be taken to avoid litter from entering the watercourses; • Soil that is contaminated with, e.g. cement, petrochemicals or paint, should be disposed of at a registered waste disposal site and is NOT to be deposited into the watercourses; • It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100m of a wetland or within the 1:100 year floodline; and • Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / EDTEA etc.) and must be remediated as per the EMP (Appendix 5).
Socio-Economic	<ul style="list-style-type: none"> • Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. labourers); • Skills development of the local community through employment opportunities; • Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity; and 	<ul style="list-style-type: none"> • Inform the surrounding communities and general public of the proposed activity as soon as possible. This will serve to ease potential social anxiety; • Local people should be employed where possible; and • A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community and landowners to the contractor.

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
	<ul style="list-style-type: none"> Possible economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase. 	
Existing infrastructure disturbance	<ul style="list-style-type: none"> If not properly designed, existing powerlines and telephone lines could be damaged during construction activities; Damage to Cemetery 2 as per Heritage Survey Report (Appendix 6); Works within the SANRAL N3 servitude; and Disruption / damage to existing pipelines. 	<ul style="list-style-type: none"> Notify appropriate stakeholders as soon as possible, e.g. Eskom, SANRAL; No-go areas must be demarcated prior to construction commencing; and Cognisance must be taken of existing pipelines at all times in order to prevent water disruptions and damage.
Safety and security	<ul style="list-style-type: none"> There is potential for construction labour to trespass onto neighbouring properties; and Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users and local residents. 	<ul style="list-style-type: none"> Any construction personnel found to be trespassing must be subjected to a disciplinary hearing; Construction worker's / construction vehicles should take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual; and A designated speed limit should be set by the developer to limit possible road strikes.
Water Resources	<ul style="list-style-type: none"> Contamination of ground and surface water and soil; Accidental spillages of petrochemicals from vehicles and equipment, or concrete; The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity; Possible damage to the watercourses and surrounds; and Risk of initiating erosion gullies. 	<ul style="list-style-type: none"> Appropriate stormwater / surface water management measures must be put in place before construction commences and maintained; An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the construction phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any water resources or outside of the 1:100 year floodline; Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums, and must not be allowed to enter into the watercourses; The construction camp should be positioned on previously disturbed areas (if possible) and outside of the 1:100 year floodline; Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site should be monitored by the Contractor weekly for any signs of off-site siltation. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding; Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering surrounding watercourses;

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> • Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use; • Watercourse bank slopes must be graded to the lowest possible angle to prevent scour and erosion potential; • Watercourse bank slopes must be planted with indigenous grasses; • No surplus soil or other such material may be disposed of in the channels; and • Wetlands: <ul style="list-style-type: none"> – The soil excavated from the trenches must be retained with the topsoil and the subsoil being stockpiled separately. They must then be returned to the trench in the reverse order to which they were removed so as to re-establish the original soil profiles as best possible; – Compaction of the soils to match the porosity of the surrounds must be undertaken; – The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds. It is recommended that any wetland plants which are excavated should be set aside and be kept moist until they can be returned for use on the trench; and – A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover over the trenches is well established and complete.
Heritage	<ul style="list-style-type: none"> • Potential disruption to items of significance. 	<ul style="list-style-type: none"> • A buffer of 20m is to be implemented around Cemetery 2. A clear boundary fence must be erected between the cemetery and the edge of the footprint, as per the HIA Report (Appendix 6).

13 IMPACT ASSESSMENT

Table 13-1 presents the impact assessment findings in relation to the proposed construction activities.

TABLE 13-1: Assessment of impacts

	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
CONSTRUCTION IMPACTS	Soil impacts	4	2	4	2	3	1	7	7	1	1	0.3	25	3.9
	Flora and fauna impacts	3	1	4	1	3	1	3	3	1	1	0.3	16	2.1
	Air quality and noise pollution impacts	2	1	3	1	1	1	1	1	1	0.7	0.2	5.6	1
	Traffic impacts	2	1	4	3	3	1	1	1	1	0.4	0.3	4.4	2.1
	Waste impacts	3	1	4	1	3	1	3	1	1	0.9	0.1	12.6	0.7
	Socio-economic impacts	2	2	2	2	3	3	1	1	1	0.4	0.4	3.6	3.6
	Existing infrastructure disturbance	4	1	5	1	1	1	1	1	1	0.6	0.1	7.2	0.5
	Safety and security impacts	1	2	3	2	3	1	1	3	1	0.4	0.2	4.4	1.4
	Watercourse impacts	5	1	4	1	3	1	7	3	1	1	0.3	22	3.3
	Heritage impacts	1	1	4	1	7	1	7	7	1	0.6	0.1	15.6	1.1
Overall impact significance												11.64	1.97	
												MEDIUM	LOW	

13.1 SIGNIFICANCE

Based on the outcome of the significance scoring noted in Table 13-1, the overall significance impact without mitigation, is considered to be MEDIUM, with a score of 11.64. With mitigation, the overall significance impact is considered to be LOW, with a score of 1.97

The greatest impact of significance is considered to be the potential for soil impacts, while watercourse impacts are rated as the second highest possible impact. However, with the correct mitigation measures employed as noted in Table 12-1 and as per the EMPr (Appendix 5), these impacts can be significantly reduced. As such, the Preferred Site Alternative and the Preferred Technology Alternative should be adopted.

14 ENVIRONMENTAL IMPACT STATEMENT

Based on the assessment undertaken, the following conclusions are made:

- The preferred **site alternative** is located between the George Cross Water Treatment Works, as the supplier of treated potable water, and the receiving community of Wembezi. The Wembezi community is the area which has been identified as having excessive water losses and therefore it is proposed to upgrade and rectify the *status quo* by implementing the Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Upgrade Scheme. As the George Cross Water Treatment Works is the only supplier of water to the Wembezi and Ntabamhlope communities, the site between the George Cross Water Treatment Works and the proposed 10MI reservoir, this is the only site alternative which can meet the need and desirability of the Application.
- The preferred and only **layout alternative** is layout alternative 1 i.e. aligning the **Ø750mm rising main bulk water pipeline** alongside the existing Ø355mm steel bulk rising main pipeline, within the existing 3m wide servitude.
- The **site layout** for the proposed new **10MI bulk storage reservoir** is adjacent to the existing 10MI bulk storage reservoir. This is preferable as the servitude for the existing Ø355mm steel bulk rising main pipeline (and the proposed alignment of the Ø750mm rising main bulk water pipeline) is already aligned to tie into the reservoirs at this location. Further, the site is located at a suitable elevation to gravity feed the Wembezi reticulation system (i.e. 1 318m). Maintenance will also only need to be undertaken at one location only. There is therefore only one site layout alternative available for the proposed new 10MI bulk storage reservoir.
- In terms of the proposed **reticulation upgrade**, all reticulation will be installed alongside existing roads located within Wembezi or within the existing trenches of the previously installed reticulation. Therefore, an area of disturbance already exists and will be utilised for the installation of the proposed new reticulation network. Therefore, there is no other **layout alternative** for the proposed reticulation network.
- The preferred **technology alternative** is the use of a **HDPE** rising main bulk pipeline in the proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation Scheme Upgrade as it is the only feasible alternative which meets the need and desirability of the application.

Assuming all phases of the project adhere to the conditions stated in the EMPr (Appendix 5) it is believed that the impacts associated with the proposed upgrade will have limited to no significant, adverse, long term environmental impact on the surrounding environment.

Positive impacts associated with construction include:

- Reduction in the estimated daily water loss of 9 MI through the existing water supply network;
- Water conservation;
- Demand reduction from the George Cross Water Treatment Works by 4.48 MI/d in terms of treating water and the supply thereof;
- Reduction in pressure on the existing Wembezi sewerage network;
- Provision of a reliable potable water supply to the areas of Wembezi and Ntabamhlope;
- Skills development and knowledge transfer in the Wembezi community through job creation during the construction phase;
- Local economic growth and development;
- Compliance with Goal 4 of the KZN Provincial Growth and Development Plan; and
- Education of the receiving community in terms of the importance of water conservation through:
 - Promoting water use efficiency; and
 - Relaying the importance of protecting water resources and the associated supply system.

It is perceived that these impacts will be long term and have sustainable benefits.

It must be ensured that the construction phase, in no way, hampers the health of any of the ecological systems or items of heritage significance identified on site, and that post-construction rehabilitation leaves the surrounding environments in an as good, if not better, state.

After the construction phase of the project, the contractors must ensure that all hazardous materials are removed from the site and that rehabilitation of land is undertaken according to the requirements of the EMPr (Appendix 5), as well as the recommendations put forward by the Biodiversity and Watercourse Specialist (Appendix 6).

Any alien plant management programmes that are implemented during the construction phase must be maintained during the construction defects liability period. It is important that drainage lines, wetlands and the working strip are monitored for alien plant infestation.

15 RECOMMENDATIONS OF THE EAP

The proposed development should not result in impacts on the natural or social environment that are highly detrimental, nor result in undue risks to the natural environment. The nature and types of negative impacts do not outweigh the potential benefits of this project, provided that the short term localised impacts of the construction phase are adequately mitigated. In this regard, an EMPr has been compiled and is attached to this report (see Appendix 5). It is recommended that external bi-monthly EMPr monitoring takes place by an independent Environmental Control Officer (ECO) to ensure that the requirements of the EMPr are being correctly implemented, thus ensuring the protection of the surrounding environs during construction.

It is the recommendation of the EAP that the following management and mitigation measures be incorporated into any project approvals which may be issued:

- Prior to the planned commencement of the construction work it must be determined whether the Blue Cranes are present on-site or not. If they are in the area, then the construction of the Ø750mm rising main bulk water pipeline in the area between the N3 highway and the road which borders Wembezi should be scheduled to be done outside of the normal breeding season (i.e. between April and August);
- During construction no construction activities, stockpiles, stores, or personnel may go more than 30m north of the pipeline trench at any time of the year (refer Figure 15-1: No-go areas);
- A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the pipeline trenches is well established and complete;
- 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;
- The recommendations of the Biodiversity and Watercourse Identification and Delineation Assessment Report must be adhered to (Appendix 6);
- A buffer of 20 metres must be implemented around Cemetery 2 as per the Specialist Heritage Survey (Appendix 6);
- Construction employees are to be notified of the possibility of unearthing significant palaeontological artefacts during construction, especially in excavations exceeding 1.5m. An information session is recommended as per the Phase 1 Palaeontological Assessment Report (Appendix 6);
- Should fossils be observed during construction, the appointed Heritage Impact Assessment consultant must be notified immediately and the fossils collected by a suitably qualified palaeontologist;
- The “Chance Find Protocol” as appended to the EMPr (Appendix 5) is to be implemented and updated as per the requirements of the Phase 1 Palaeontological Assessment Report (Appendix 6); and
- Should fossils be identified and recorded, a suitably qualified palaeontologist must be appointed to inspect all areas where excavations of deeper than 1.5m are made into sediments of Normandien and Masotcheni Formations and a protocol for the chance find of fossils must then be developed and discussed with the contractor on site.

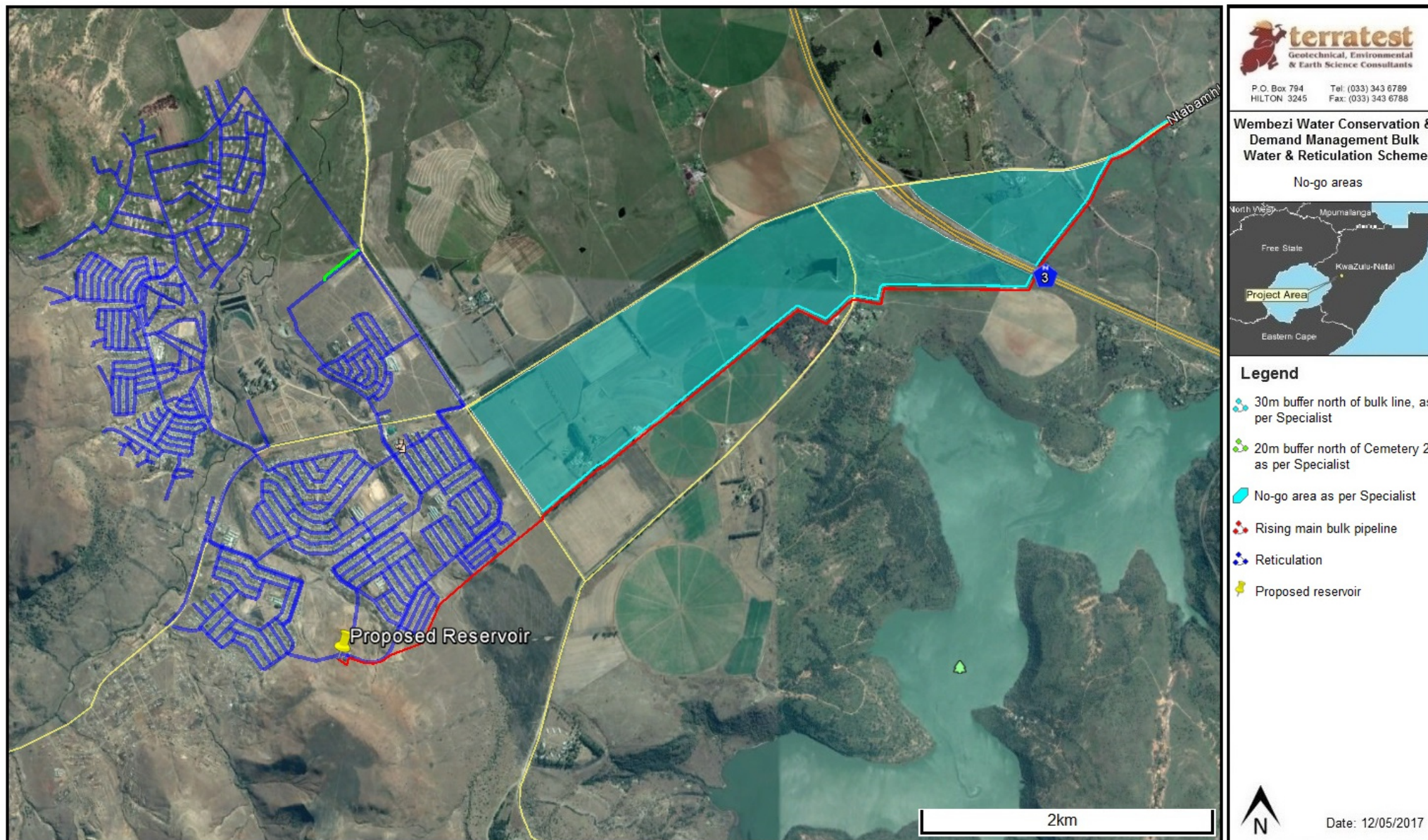


FIGURE 15-1: No go areas as recommended by specialists

16 CONSTRUCTION TIMEFRAMES

Construction timeframes are estimated to be 36 months.

It is requested that the Environmental Authorisation, if issued by the Competent Authority, be valid for a period of ten (10) years from date of signature in order to account for any unforeseen construction plan deviations.

17 SUBMISSION AND CONSIDERATION OF DOCUMENTATION BY THE COMPETENT AUTHORITY

It is to be noted that in terms of the EIA Regulations (2014), GNR 326 43(2) as amended, all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the EAP, as per the request of the EAP. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

All comments received in response to the BA Report will be attached to, summarised and responded to in a final version of the BA Report (i.e. Final BA Report), which will be submitted to the Competent Authority, (i.e. EDTEA) for consideration in terms of issuing an Environmental Authorisation.

18 UNDERTAKING

Terratest (Pty) Ltd hereby confirms that the information provided in this report is correct at the time of compilation.

Terratest (Pty) Ltd further confirms that all comments received from Stakeholders and IAPs will be included in the Final BA Report submitted to the EDTEA. Further, a record has to-date and will continue to be kept of all comments, which will be consolidated and incorporated into all subsequent reports, either submitted for comment to IAPs, or to the EDTEA for consideration and decision-making.

For Terratest (Pty) Ltd:

**LIZ DRALLE
ENVIRONMENTAL SCIENTIST**

19 REFERENCES

Mucina, L. & Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Municipalities of South Africa (2012-2017). Inkosi Langalibalele Local Municipality (KZN237). WWW Document. URL: <https://www.localgovernment.co.za/locals/view/237/Inkosi-Langalibalele-Local-Municipality#demographic>. Date accessed: 13 July 2017

Scott-Shaw, C.R and Escott, B.J. (Eds) (2011). *KwaZulu-Natal Provincial Pre-Transformation Vegetation Type Map – 2011*. Unpublished GIS Coverage [kznveg05v2_1_11_wll.zip], Biodiversity Conservation Planning Division, Ezemvelo KZN Wildlife, P. O. Box 13053, Cascades, Pietermaritzburg, 3202.

APPENDIX 1: CVs of the EAP

APPENDIX 2: 21 digit SG Codes and property details

APPENDIX 3: Environmental Authorisation Application

APPENDIX 4: EDTEA Pre-Application Meeting Minutes

APPENDIX 5: Environmental Management Programme

APPENDIX 6: Specialist Reports

- **Biodiversity and Watercourse Identification and Delineation Assessment**
- **Heritage Impact Assessment**
- **Palaeontological Survey**

APPENDIX 7: Design Drawings

APPENDIX 8: Public Participation Documentation

