CONSTRUCTION OF THE SDANGENI ACCESS ROAD

Basic Assessment Report

Dr Nkosazana Dlamini Zuma Municipality, KwaZulu-Natal

Prepared for: iX Engineers (Pty) Ltd on behalf of:
Dr Nkosazana Dlamini Zuma Municipality

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Authority Reference No.	EDTEA: TBC
SLR Project No.	720.09028.00004
Keywords	Dr Nkosazana Dlamini Zuma Municipality; Department of Economic Development, Tourism and Environmental Affairs; Sdangeni Access Road, National Environmental Management Act, 1998 (No. 107 of 1998)
Report Date	March 2021
Report Status	For Review and Decision Making

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BASIS OF REPORT

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CONSTRUCTION OF THE SDANGENI ACCESS ROAD

BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

Introduction

This Executive Summary provides a comprehensive synopsis of the Basic Assessment Report (BAR) prepared for the proposal by the Dr Nkosazana Dlamini Zuma Municipality (NDZ Municipality) for the proposed construction of the Sdangeni Access Road, in ward 5 in the KwaZulu-Natal Province (see Figure 0-1).

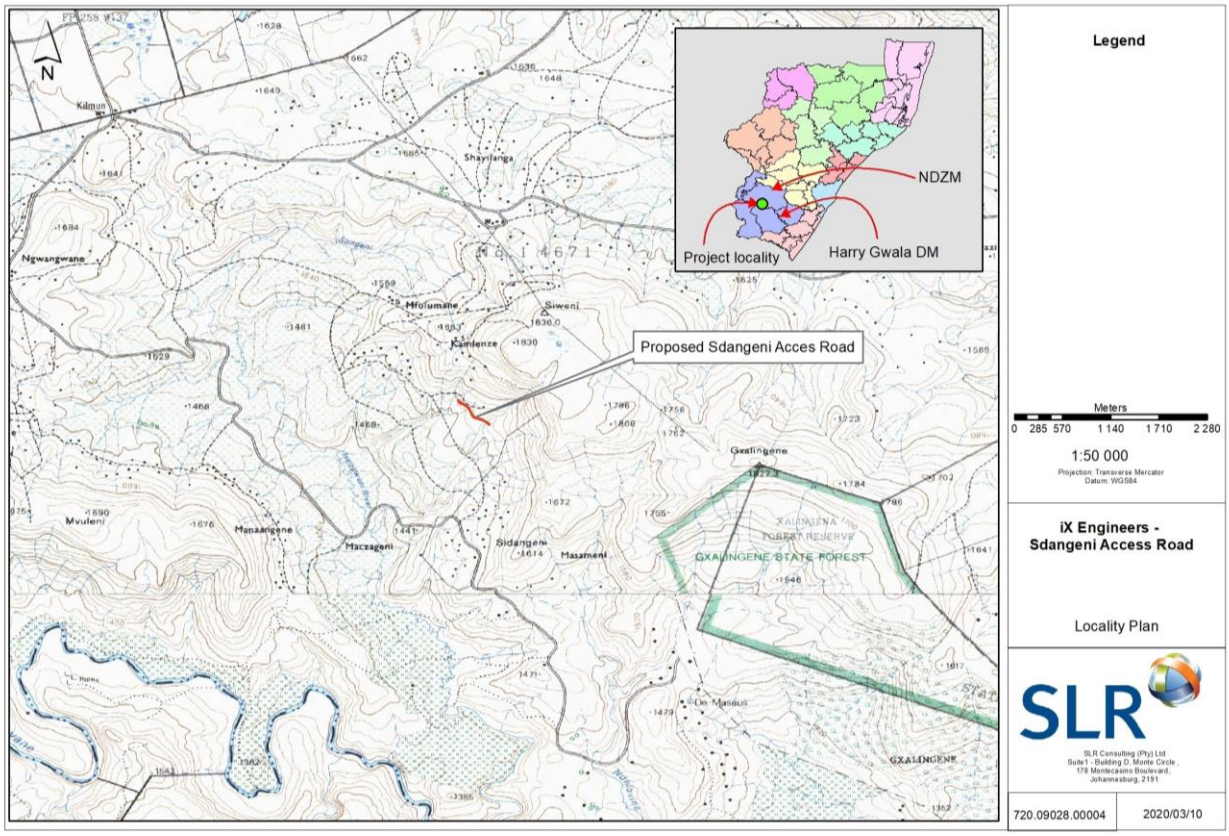

FIGURE 0-1: PROJECT LOCALITY

The construction of the Sdangeni Access Road includes activities listed under the Environmental Impact Assessment (EIA) Regulations 2014, promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA). Such listed activities are prohibited from commencing until environmental authorisation is obtained from the competent authority, which in this case is the Department of Economic Development, Tourism and Environmental (EDTEA). The activities that are triggered require a Basic Assessment (BA) process to inform the DEA's decision on the application for Environmental Authorisation. In addition, the proposed project may also require authorisation from the Department of Human Settlements, Water and Sanitation (DHSWS) for specific water uses under Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA).

SLR Consulting (South Africa) (Pty) Ltd (SLR) has been appointed by iX Engineers (Pty) Ltd (iX Engineers), on behalf of NDZ Municipality, as the independent environmental consultant to undertake the BA process s for the construction of the Sdangeni Access Road.

Opportunity to comment on the BAR

This BAR was distributed for a 30-day comment period from **22 January 2021 to 22 February 2021** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the BA process. A copy of the executive summary was enclosed with the notification letter sent to all I&APs registered on the project database. Copies of the full report have been made available on the SLR website (at https://www.slrconsulting.com/public-documents). Electronic copies (disk) of the report were available upon request from SLR, at the contact details provided below.

Comments were forwarded to SLR at the contact details provided below.

SLR Consulting (South Africa) (Pty) Ltd
Attention: Amishka Mothilal

68 Old Main Road, Kloof, Durban, 3640 (if using post please call SLR to notify us of your submission)

Tel: (011) 467 0945
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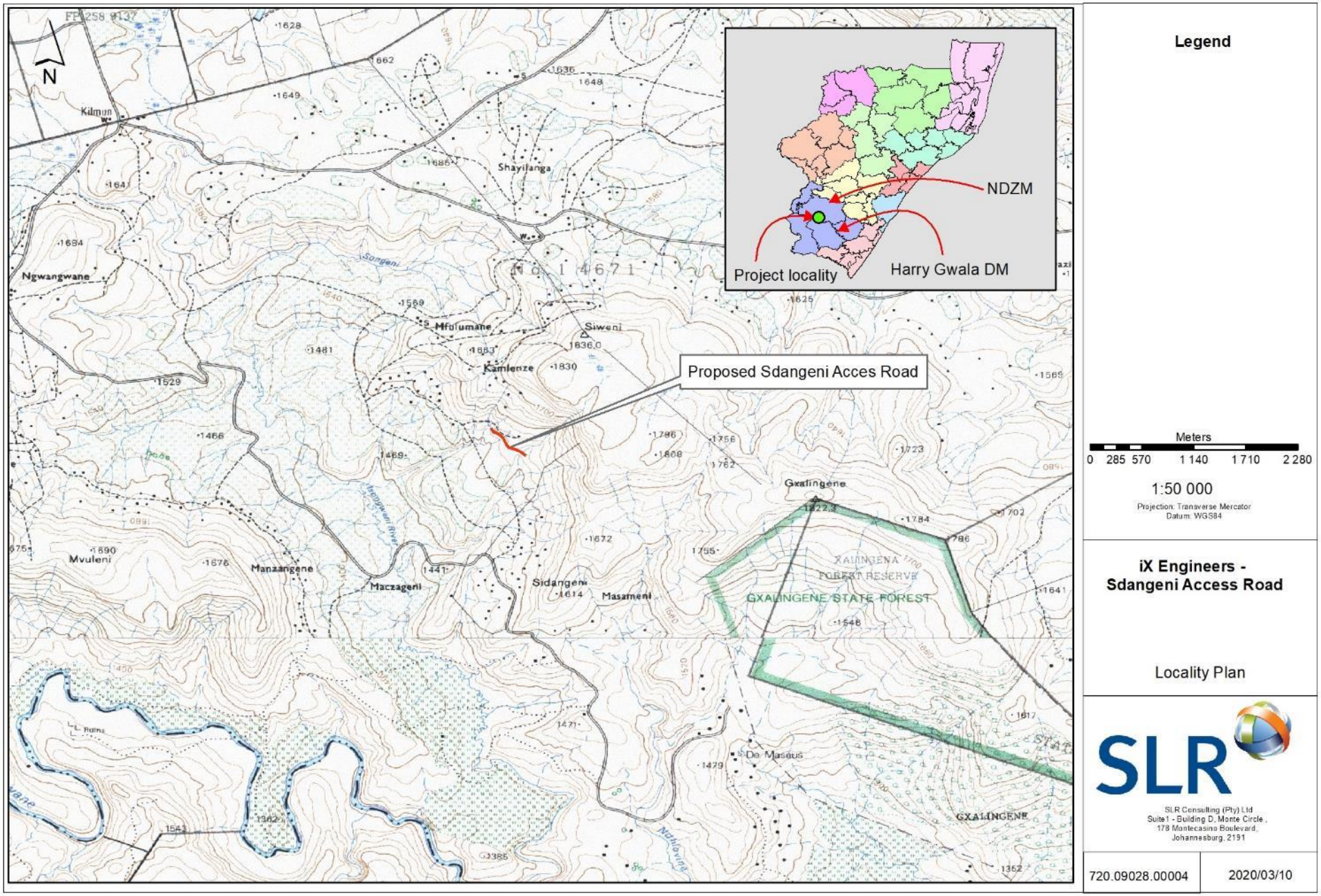

Legend

Meters

0 285 570 1 140 1 710 2 280

1:50 000

Projection: Transverse Mercator
Datum: WGS84

iX Engineers - Sdangeni Access Road

Locality Plan

SLR Consulting (Pty) Ltd
Suite1 - Building D, Monte Circle ,
178 Montecasino Boulevard,
Johannesburg, 2191

720.09028.00004	2020/03/10

Basic Assessment process

Steps undertaken to date during the Basic Assessment process are outlined below.

- An interested and affected party (I&AP) database was compiled using information obtained during a social scan of the project area, the Properties Report compiled by iX Engineers, responses to the advertisements, site notices and notification letters;
- Written notification, including a copy of the BAR executive summary, was circulated to I&APs informing of them of the application for environmental authorisation and BA process;
- A press advertisement was placed in isiZulu in the Isolezwe regional newspaper. Site notices were placed at project start, mid and end points;
- An EA application form was submitted to EDTEA on 23 September 2020;
- Specialist input was provided on the likely impact of the proposed project on the and cultural aspects of the environment; and
- The Draft BAR was made available to I&APs for a 30-day comment period from 22 January 2021 to 22 February 2021.

The following steps will be undertaken in the remainder of the BA process:

- All comments received during the review period have been included in the Final BAR submitted to EDTEA for consideration and decision-making; and
- After EDTEA has reached a decision, all I&APs on the project database will be notified of the outcome of the application and the reasons for the decision and the statutory appeal period.

Overview of the project

The design of the proposed Sdangeni Access road is in accordance with the KwaZulu Natal Department of Transport (KZN DoT) standard engineering design for Local Roads or By Roads (Engineering Standard 7A). the total road alignment is approximately 1 000 m in length and includes:

- A G6 gravel wearing course with a total with of 5.9 m (carriage with = 5 m; 2 x 450 mm G6 gravel shoulders);
- A 2 x 1.5 m wide gravel shoulders
- A meadow drain on the upslope side of the alignment;
- Installation of pre-cast portal culverts at five (5) watercourse crossings.
- Fencing.

Design drawings showing:

- Typical cross sections of a Type 7A (Local Or By- Road) and pre-cast concrete portal culvert are provided as Figure 4-1 and Figure 4-2; and
- The horizontal road alignment are provided in Figure 4-3 and Figure 4-4.

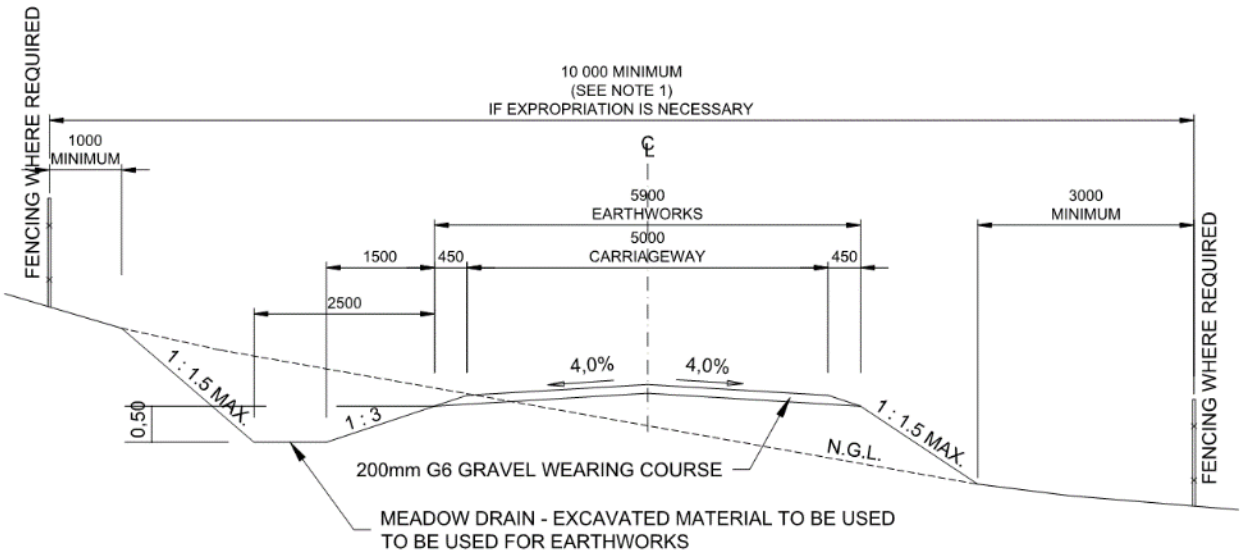

FIGURE 0-2: TYPICAL CROSS SECTION (TYPE 7A LOCAL ROAD OR BY-ROAD)

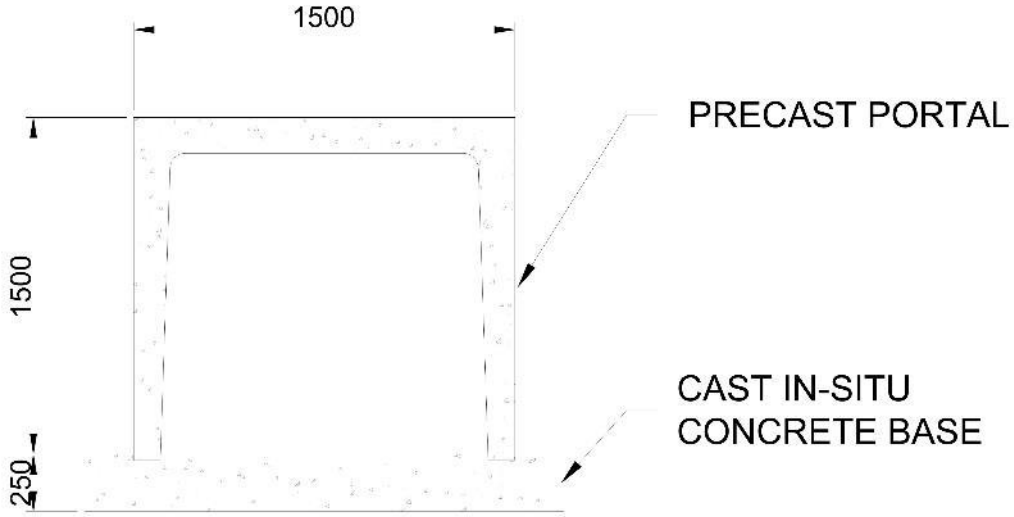

FIGURE 0-3: TYPICAL CROSS SECTION OF A PRECAST CONCRETE PORTAL

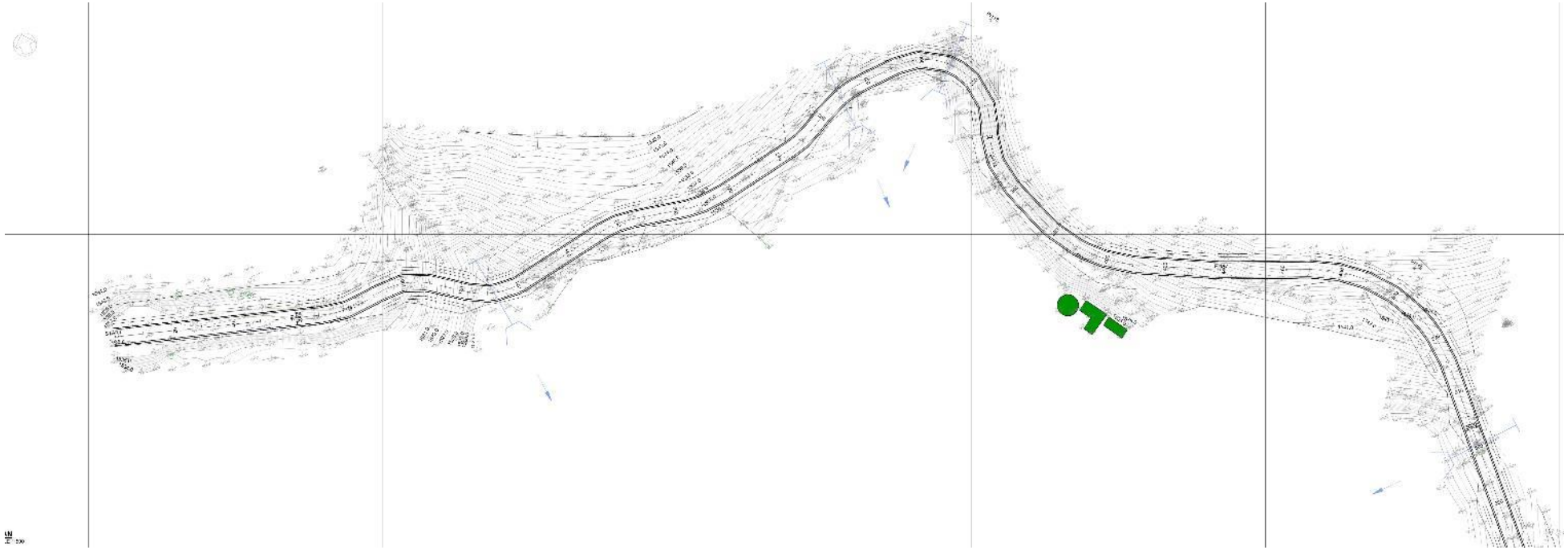

FIGURE 0-4: HORIZONTAL ALLIGNMENT (SECTION 1)

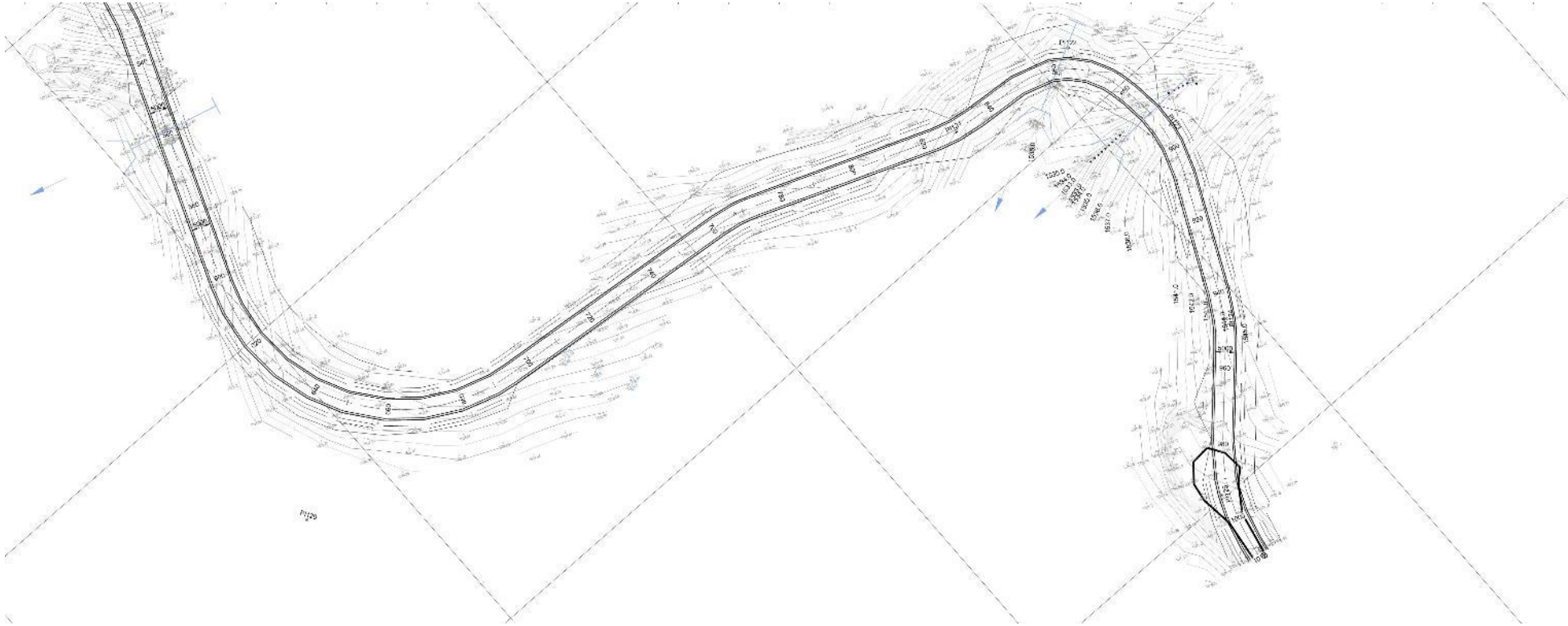

FIGURE 0-5: HORIZONTAL ALLIGNMENT (SECTION 2)

Summary of potential impacts

Potential impacts associated with the project have been identified by the BA project team with input from specialists and I&APs. The range of environmental issues considered in the BA was given specific context and focus through consultation with authorities and I&APs. All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together.

A summary of the potential impacts in the unmitigated and mitigated scenarios is provided in the table below.

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Loss of soil resources through physical disturbance	L	VL
Loss of agricultural soil resources through contamination	M	VL
Loss of terrestrial habitat and biodiversity through physical disturbance	L	VL
Disturbances of aquatic habitat and related biodiversity	L	L
Increase in ambient air concentrations	L	VL
Increase in disturbing noise levels affecting potential human receptors	L	L
Economic impact	H+	NA
Social benefits associated with improved infrastructure	VH+	NA
Disturbance of ground resulting in damage to heritage resources	M	VL

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact;

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the environmental management programme (EMPr) would be included in the detailed design and implemented when the construction commences. As a result, the majority of potential biophysical impacts associated with the proposed upgrade to the project would be short term and limited either to the site or neighbouring land. These include impacts on soils, terrestrial habitats and biodiversity, drainage patterns and surface water quality. The potential impacts on biophysical aspects are considered to be of **LOW** or **Very Low** significance with mitigation.

Proceeding with the project attracts potential direct and indirect positive economic benefits and potential negative environmental and social impacts of lower significance (dust and noise).

The No-go alternative implies that the status quo will be retained implying that the potential negative risks will not occur at the expense of not improving road safety and capacity and the associated revenues generated by construction.

Conclusion and Recommendation

It is the opinion of SLR that in terms the key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice that there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favourable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental Management Programmes for implementation during construction.

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
Amafa	Amafa aKwaZulu-Natali Heritage
ASAPA	Association of Southern African Professional Archaeologists
BA	Basic Assessment
BAR	Basic Assessment Report
BBBEE	Broad Based Black Economic Empowerment
CARA	Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983)
CBA	Critical Biodiversity Areas
CO2	Carbon Dioxide
CR	Critically Endangered
DHSWS	Department of Human Settlements, Water and Sanitation (formerly DWS)
E	Endangered
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act, 1989 (No. 73 of 1989)
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Monitoring Programme
GA	General Authorization
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
LM	Local Municipality
MEC	Member of the Executive Council
NAAQS	National Ambient Air Quality Standards, 2009 (GN. R 1210 of 2009)
NDCR	National Dust Control Regulations, 2013 (GN. R 827 of 2013)
NDP	National Development Plan
NDZM	Nkosazana Dlamini Zuma Municipality
NEMA	National Environmental Management Act, 1998 (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)
NGP	New Growth Path
NHRA	National Heritage Resources Act, 1999 (No. 25 of 1999)
NO_2	Nitrogen dioxide
NWA	National Water Act, 1998 (No. 36 of 1998)
PES	Present Ecological Service
PM_{10}	Particulate Matter
Pr.Sci.Nat	Professionally Registered Natural Scientist
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANS	South African National Standards
SDF	Spatial Development Framework
SMME	Small, Medium and Micro-sized Enterprises
SLR	SLR Consulting (South Africa) (Pty) Ltd
Vu	Vulnerable
VOC	Volatile Organic Compounds

1 INTRODUCTION

This chapter describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the study terms of reference, describes the structure of the report, and outlines the opportunity for comment.

1.1 PURPOSE OF THIS REPORT

This Basic Assessment Report (BAR) has been compiled and distributed for review and decision making as part of a Basic Assessment (BA) process that is being undertaken for proposed construction of the Sdangeni Access Road, in the Dr Nkosazana Dlamini Zuma Municipality (NDZM), KwaZulu-Natal.

This BAR provides a description of the proposed project and the affected environment; summarises the BA process followed to date; identifies and assesses the key project impacts and presents management and mitigation measures that are recommended to enhance positive and limit negative impacts.

Interested and Affected Parties (I&APs) were asked to provide comments on the BAR (see Section 1.6). This document has been compiled as a final report, giving due consideration to the comments received. The BAR will be submitted to the Department of Economic Development, Tourism and Environmental Affairs (EDTEA) for consideration as part of the application for Environmental Authorisation in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA).

1.2 PROJECT BACKGROUND

As part of its municipal planning, the NDZM Integrated Development Plan (IDP) (2019/2020) lists a total of 15 development goals aimed at addressing the municipality's key challenges with Access Roads being listed as its second priority. At a project level, the NZDM has provided in its IDP for Municipal Infrastructure Grant (MIG) funding for the implementation of the Sdangeni Access Road.

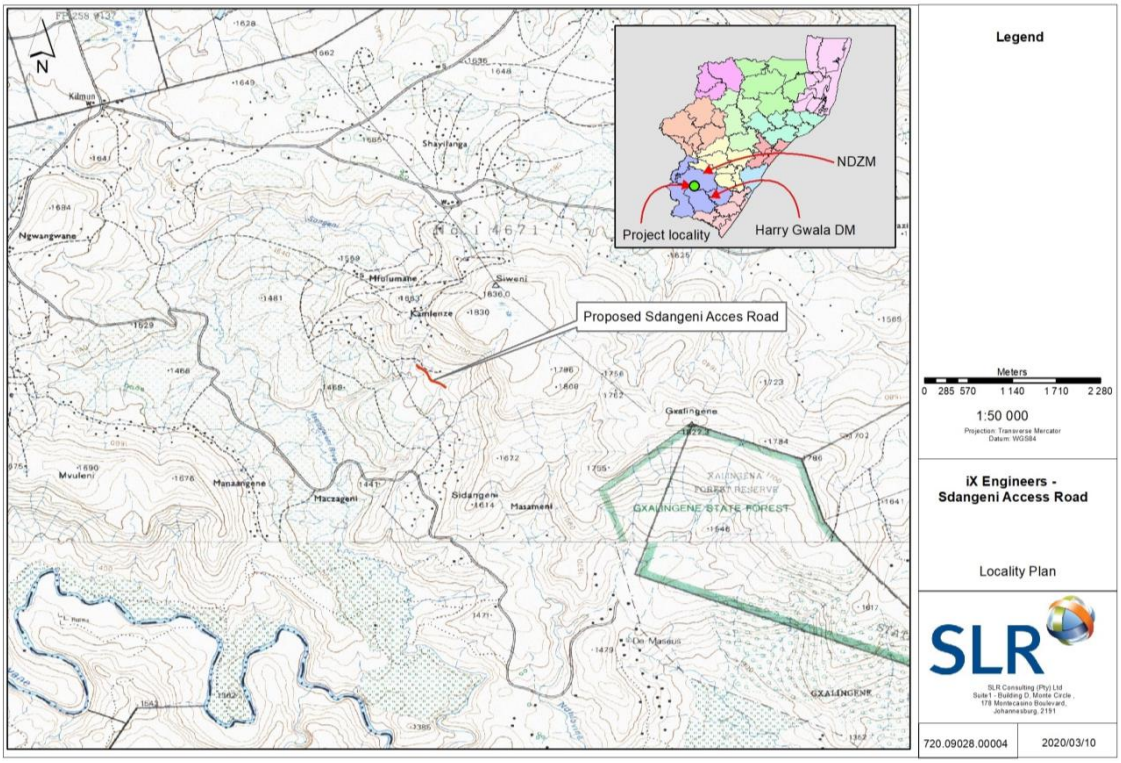


FIGURE 1-1: PROJECT LOCALITY

iX Engineers (Pty) Ltd (iX Engineers) was appointed by the NDZ Municipality as the consulting engineers responsible for the design and construction supervision of the Sdangeni Access Road. SLR Consulting (South Africa) (Pty) Ltd (SLR) was appointed by iX Engineers, as a sub-consultant to the NDZ Municipality, responsible for the required Application for Environmental Authorisation and associated BAR.

1.3 SUMMARY OF AUTHORISATION REQUIREMENTS

The proposed construction of the Sdangeni Access Road includes activities listed under the Environmental Impact Assessment (EIA) Regulations Listing Notices of 2014. Such listed activities are prohibited from commencing until written authorisation is obtained from the competent authority, which in this case is the EDTEA. The activities that are triggered require a BA process in terms of the EIA Regulations, 2014. The BA process is used to inform the Environmental Authorisation application.

In addition, the construction of the Sdangeni Access Road may also require authorisation from the Department of Human Settlements, Water and Sanitation (DHSWS) for specific water uses under Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA). Further detail is included in Section 2.4.

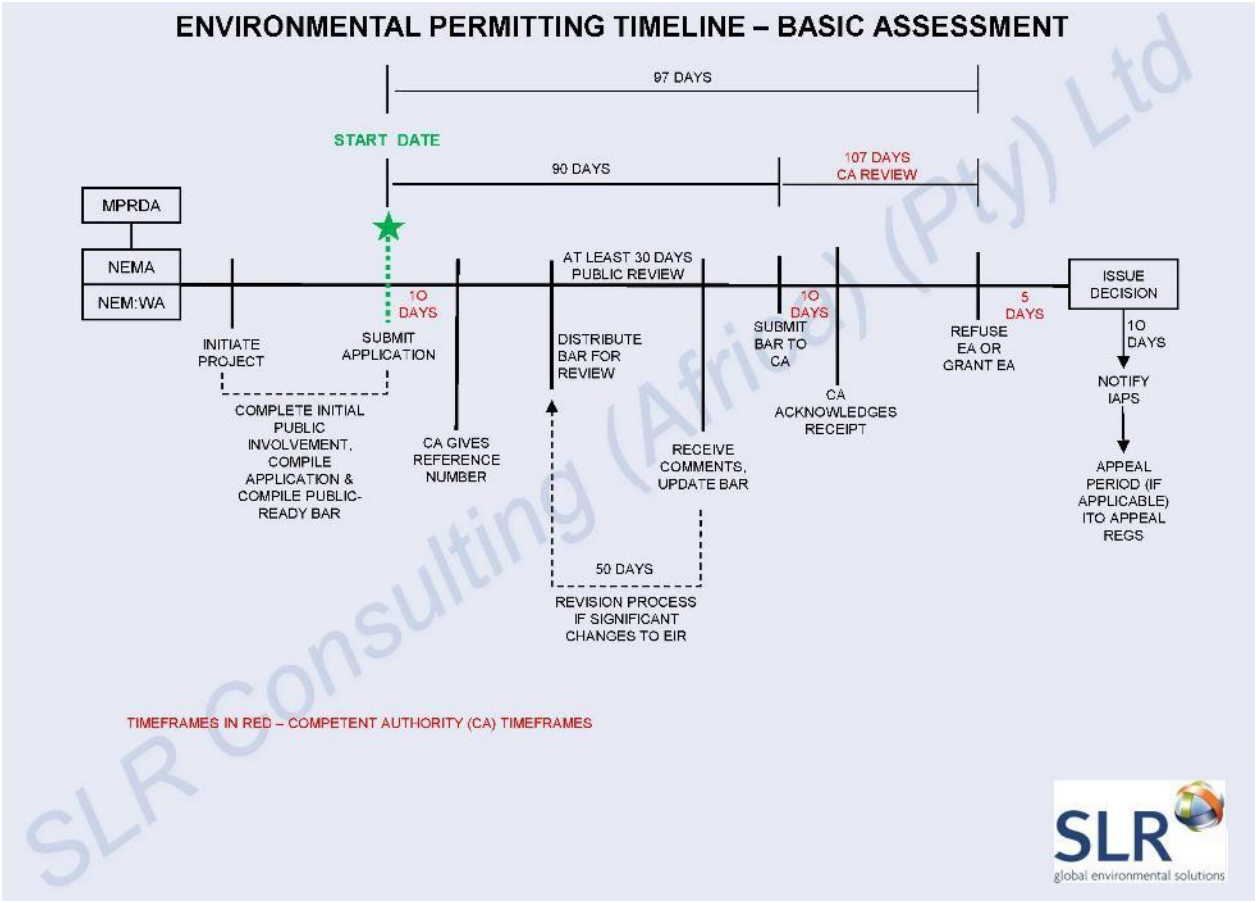


FIGURE 1-2: DIAGRAMATIC REPRESENTATION OF THE BA PROCESS

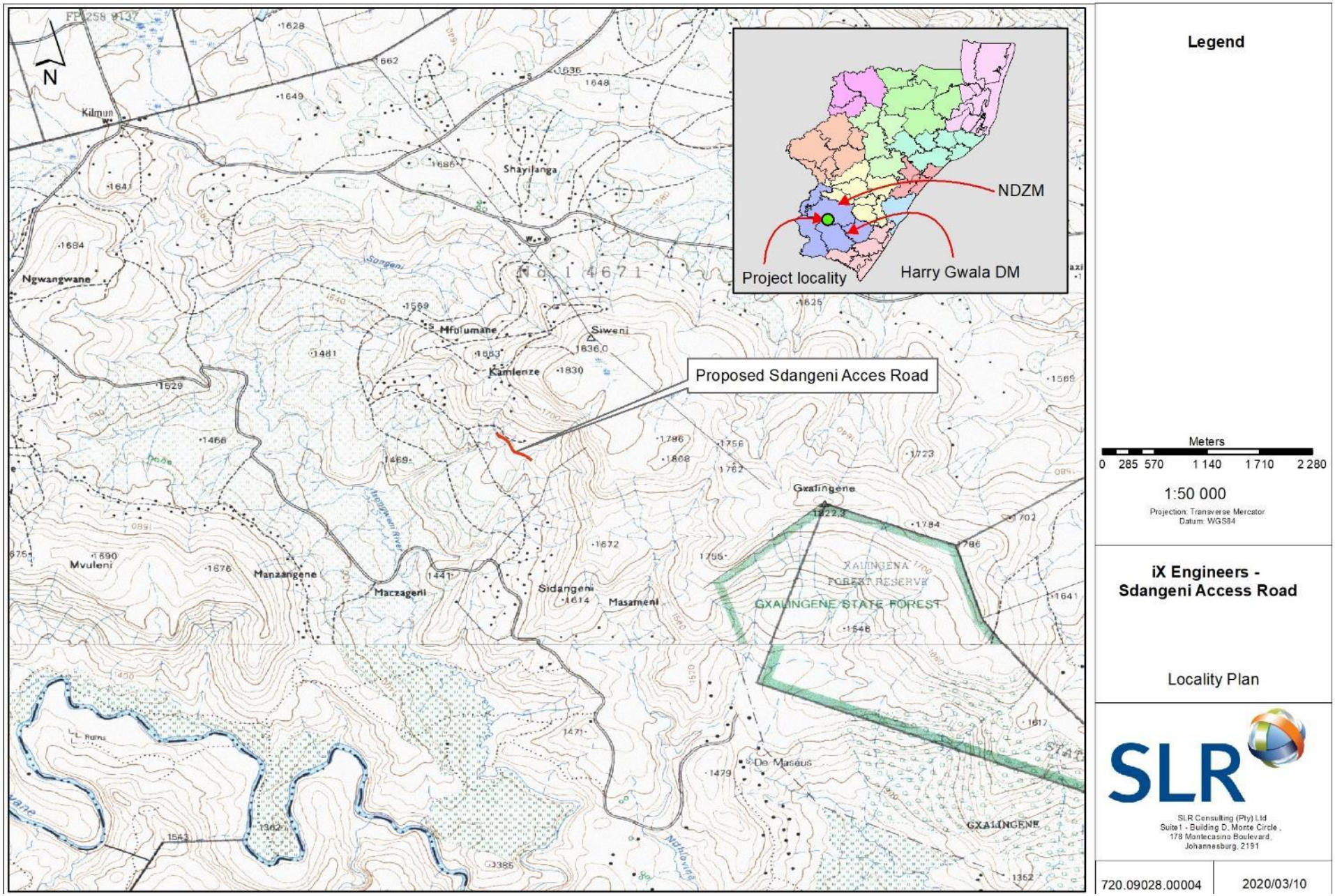


FIGURE 1-3: PROJECT LOCALITY

1.4 TERMS OF REFERENCE

SLR, as the independent environmental assessment practitioner (EAP), is responsible for undertaking the required environmental regulatory process and conducting the public participation process. The terms of reference for the environmental regulatory process are to:

- make application for Environmental Authorisation of the project in terms of NEMA;
- ensure the BA is undertaken in accordance with the requirements of NEMA and the EIA Regulations, 2014;
- ensure the BA is undertaken in an open, participatory manner to ensure that all potential impacts are identified;
- undertake a formal public participation process, which includes the distribution of information to I&APs and provides the opportunity for I&APs to raise any concerns/issues, as well as an opportunity to comment on all BA documentation; and
- integrate all information, including the findings of the specialist studies and other relevant information, into a BAR to allow an informed decision to be taken on the proposed project.

1.5 STRUCTURE OF THIS REPORT

This BAR has been prepared in compliance with Appendix 1 of the EIA Regulations, 2014 (as amended) and is divided into various chapters and appendices, the contents of which are outlined below.

Section	Contents
Executive Summary	Provides a comprehensive synopsis of the BAR.
Chapter 1	**Introduction** Describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the terms of reference, describes the structure of the report, and outlines the opportunity for comment.
Chapter 2	**Legislative context** Outlines the key legislative context applicable to the proposed project.
Chapter 3	**BA methodology** Outlines the methodology for the assessment and consultation process undertaken in the BA. Also includes a summary of the public participation process undertaken to date and the results thereof.
Chapter 4	**Project description** Provides general project information; a description of the proposed project; and a description of the project alternatives.
Chapter 5	**Need and desirability** Provides an overview of the need and desirability for the proposed project by considering how the project is aligned with the strategic context of national development policy and planning, broader societal needs and regional and local planning, as appropriate.
Chapter 6	**Description of the affected environment** Describes the existing biophysical and social environment that could potentially be affected by the proposed project.
Chapter 7	**Key project issues and impacts** Describes key issues and impacts associated with the proposed project.
Chapter 8	**Environmental Management Programme** Describes action plans to be implemented to mitigate potential impacts; provides monitoring and performance assessment requirements; environmental awareness training; and includes procedures in case of environmental emergencies.
Chapter 9	**Conclusions and Recommendations** Presents the conclusions and recommendations for the project.
Chapter 10	**References** Provides a list of the references used in compiling this report.
Appendices	Appendix A: EAP undertaking

Section	Contents
	Appendix B: Curricula vitae of the EAP team Appendix C: Public participation process Appendix C.4: Proof of advertisement **APPENDIX C.5: PROOF OF IAP NOTIFICATION LETTER** **APPENDIX C.6: PROOF OF SUBMISSION OF DBAR** **APPENDIX C.7: CORRESPONDENCE ON DBAR** **APPENDIX C.8: COMMENTS AND RESPONSES REPORT** Appendix D: Heritage Impact Assessment Appendix E: Terrestrial Ecological Assessment Appendix F: Aquatic Ecological Assessment Appendix G: Environmental Management Programme

1.6 OPPORTUNITY TO COMMENT

This Basic Assessment Report was distributed for a 30-day comment period from **22 January 2021 to 22 February 2021** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the BA process to date. All identified I&APs were notified of the opportunity to comment on the BAR and provided with a copy of the Executive Summary of this BAR. The notice advised of the review period and confirmed this BAR's availability for download on the SLR website (at https://slrconsulting.com/za/slr-documents/).

The address, telephone/fax numbers and e-mail address shown below were provided to IAPs for the submission of comments for inclusion in the final BAR. The commenting period concluded on **22 February 2021**.

SLR Consulting (South Africa) (Pty) Ltd
Attention: Theo Wicks

68 Old Main Road, Kloof, Durban, 3640 (if using post please call SLR to notify us of your submission)

Tel: (011) 467 0945
Fax: (011) 467 0978
E-mail: amothilal@slrconsulting.com

2 POLICY AND LEGISLATIVE CONTEXT

In accordance with the EIA Regulations, 2014, this chapter outlines the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context

2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The NEMA, as amended, establishes principles and provides a regulatory framework for decision-making on matters affecting the environment. All organs of state must apply the range of environmental principles included in Section 2 of NEMA when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. The participation of I&APs is stipulated, as is that decisions must consider the interests, needs and values of all I&APs.

Chapter 5 of NEMA provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of environmental authorisations. To give effect to the general objectives of Integrated Environmental Management, the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment, management and communication of the potential impacts.

In terms of the management of impacts on the environment, Section 24N details the requirements for an Environmental Management Programme (EMPr).

2.1.1 EIA Regulations, 2014

The EIA Regulations, 2014 (as amended by GN R. 326 of 7 April 2017) promulgated in terms of Chapter 5 of NEMA provide for control over certain listed activities. These listed activities are detailed in Listing Notice 1 (as amended by GN R. 327 of 7 April 2017), Listing Notice 2 (as amended by GN R. 325 of 7 April 2017) and Listing Notice 3 (as amended by GN R. 324 of 7 April 2017). The undertaking of activities specified in the Listing Notices is prohibited until Environmental Authorisation has been obtained from the competent authority. Such Environmental Authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations, 2014.

The EIA Regulations, 2014 (as amended) set out the procedures and documentation that need to be complied with when applying for Environmental Authorisation. A Basic Assessment process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3 and a Scoping and EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2.

The proposed construction of the Sdangeni Access Road will trigger activities specified in Listing Notice 1 and 3 (see Table 2-1) and therefore a BA process is required in order for EDTEA to consider the application in terms of NEMA.

TABLE 2-1: NEMA LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

No.	Activity description	Description of activity in relation to the proposed project
Listing Notice 1		
12	*The development of –* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs -* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*	The installation of the five (5) culverts and associated infrastructure will have a footprint in excess of 100 square metres with watercourses.
19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse*	The construction of the Sdangeni Access Road includes for the installation of associated infrastructure including the upgrading of five (5) watercourse crossings. Construction will result in the excavation and subsequent infilling of more than 10 cubic metres of material from watercourses.
48	*The expansion of -* *(ii) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;* *where such expansion occurs –* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;*	The construction of the Sdangeni Access Road entails the expansion of an existing road along an alignment that does not have a road reserve. In order to develop the Sdangeni Access Road, it is necessary to construct road approaches and infrastructure in excess of 100 square metres within a five (5) watercourses.
Listing Notice 3		
4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *d. KwaZulu-Natal* *xii. Outside urban areas* *(aa) 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 areas of a biosphere reserve.*	The Sdangeni Access Road has a road width of 5.0 m and is located within 5 km of the iGxalingenwa Nature Reserve, a statutorily protected area in terms of the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003).
14	*The development of -* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs -* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *d. KwaZulu-Natal* *x. Outside urban areas:* *(aa) 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 areas of a biosphere reserve.*	The installation of the five (5) culverts and associated infrastructure will have a footprint in excess of 10 square metres with watercourses. The development is located within 5 km of the iGxalingenwa Nature Reserve, a statutorily protected area in terms of the National Environmental Management: Protected Areas Act, 2003.
23	*The expansion of -* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs -*	The Sdangeni Access Road is located within 5 km of the iGxalingenwa Nature Reserve, a statutorily protected area in terms of the

No.	Activity description	Description of activity in relation to the proposed project
	(a) within a watercourse; *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *d. KwaZulu-Natal* *x. Outside urban areas:* *(aa) 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 areas of a biosphere reserve.*	National Environmental Management: Protected Areas Act, 2003. In order to develop the Sdangeni Access Road, it is necessary to construct road approaches and infrastructure in excess of 10 square metres within a five (5) watercourses.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004.

The National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA), as amended, provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection.

It provides for the regulated undertaking of restricted activities that, without a permit, may harm listed threatened or protected species or the management of activities that encourage the spread of alien or invasive species.

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT ACT: AIR QUALITY ACT, 2004

The National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004) (NEM:AQA) regulates all aspects of air quality, including prevention of pollution and environmental degradation; providing for national norms and standards regulating air quality monitoring, management and control; and licencing of activities that result in atmospheric emissions and have or may have a significant detrimental effect on the environment.

2.3.1 National Dust Control Regulations, 2013

The National Dust Control Regulations (NDCR) was gazetted on 1 November 2013 (GN. R 827 of 2013) and prescribe the acceptable dust fall limits for residential and light commercial areas (See details in Table 2-2).

In the event that the dust fall monitoring report identifies non-compliance with the acceptable dust fall rates specified in Table 2-2, NZDM may be required to monitor for thoracic particulate matter (PM_{10}) in terms of the National Ambient Air Quality Standards (NAAQS) discussed below.

TABLE 2-2: ACCEPTABLE DUST FALL RATES

Restriction Areas	Dustfall rate (D) (mg/m2/day, 30-days average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months.
Non-residential area	600 < D < 1200	Two within a year, not sequential months.

The requirements of the NDCR have been used to inform the compilation of the EMPr (Appendix G) which NZDM is required to comply with during construction.

2.3.2 National Ambient Air Quality Standards, 2009

The NAAQS (GN. R 1210 of 2009) were determined based on international best practice for inhalable particulate matter, thoracic particulate matter (PM_{10}), sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead and benzene.

As outlined in 2.3.1, should dust fall monitoring report a non-compliance with the NDCR it is necessary for the contractor to monitor for PM_{10} in terms of the National Ambient Air Quality Standards for Particulate Matter which are set out in Table 2-3.

TABLE 2-3: NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER (PM10)

Averaging Period	Concentration	Frequency of Exceedance	Compliance Date
24 hours	120µg/m^3	4	Immediate - 31 December 2014
24 hours	75 µg/m^3	4	1 January 2015
1 year	50 µg/m^3	0	Immediate - 31 December 2014
1 year	40 µg/m^3	0	1 January 2015
The reference method for the determination of the particulate matter fraction of suspended particulate matter shall be EN 12341			

2.4 NATIONAL WATER ACT, 1998

The National Water Act, 1998 (No. 36 of 1998) (NWA) provides a legal framework for the effective and sustainable management of water resources in South Africa. It serves to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders. The NWA also provides national norms and standards, and the requirement for authorisation (either a Water Use Licence or General Authorisation) of water uses listed in Section 21 of the Act. The competent authority is the Department of Human Settlements, Water and Sanitation (DHWS).

2.4.1 General Authorisations

A General Authorisation (GA) replaces the need to apply for a water use licence in terms of the NWA, provided that the water use is within the limits and conditions of the specific GA. Table 2-4 lists the GAs applicable to the proposed construction of the Sdangeni Access Road and explains their relevance.

TABLE 2-4: RELEVENT GENERAL AUTHORISATIONS

General Authorisation	Relevance to the proposed project
General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses defined in Section 21 (c) and (i) (GN. 509 of 2016).	The installation of the five (5) culverts will require the temporary diversion of water to allow for construction. The culverts are regarded as a structure that would impede or divert the natural flow of water in a watercourse. The construction of the Sdangeni Access Road, including the upgrading of associated infrastructure (culverts) will occur within the "regulated area of a watercourse" as defined in the GA. Construction and operation of this infrastructure is considered to have a potential risk to water resource quality objectives.
Revision of the General Authorisation for the taking and storing of water (GN. 538 of 2016).	GN. 538 of 2016 permits the abstraction of a maximum of 80 000 m^3 per annum from the uMzimkhulu River catchment (T51J).

The DHSWS has been notified of the potential Section 21 (c) and (i) uses and have been requested to advise as to the Department requirements to licence these uses, should they be required.

As part of construction, the appointed contractor is responsible for accessing a lawful supply of water. Should they wish to utilize water from a localised water resource, they will be subject to the provisions and limitations provided for in GN. 538 of 2016.

2.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT, 1983

The Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983) (CARA) provides for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, water sources, vegetation and the combating of weeds and invader plants.

Landowners on whose land declared weed species occur must make the necessary arrangements to be compliant with the CARA Regulations.

2.5.1 Conservation of Agricultural Resources Act Regulations, 1984

The Conservation of Agricultural Resources Act, 1983 Regulations (GN. R 1048 of 1984) provide amongst others, for the declaration of weeds and invader plants, which depending on their categorisation require differing levels of management.

Development of the Sdangeni Access Road presents an opportunity for regulated invasive plants to encroach into this region (*Acacia mearnsii* in particular*)*. Accordingly, the EMPr (Appendix G) obliges the NDZM and its appointed contractor to manage the site, preventing the ingress of invasive plants

2.6 ENVIRONMENTAL CONSERVATION ACT, 1989

The Environmental Conservation Act, 1989 (No. 73 of 1989) (ECA) has now largely been replaced by NEMA but certain provisions still remain in force including the Noise Control Regulations (GN. 154 of 1992) which regulates the generation of disturbing noise and nuisance noise.

These Regulations have been considered in the assessment of noise impacts (Section 7.6) and in the compilation of the EMPR (Appendix G).

2.7 NATIONAL HERITAGE RESOURCES ACT, 1999

The National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA) provides for the identification, assessment and management of the heritage resources of South Africa. Section 38(1) of the NHRA lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include:

- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;

The NHRA requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then in turn, notify the person whether a Heritage Impact Assessment (HIA) should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environmental Conservation Act (No. 73 of 1989) (now replaced by NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and consider in its decision-making any comments and recommendations made by the relevant heritage resources authority.

While Amafa AkwaZulu Natali have been notified of this application for Environmental Authorisation, further engagement with this organisation will continue in terms of the requirements of the NHRA, with the exception

of provision being made in the EMPr for the obligation to protect against the degradation of items of cultural heritage significance (See Appendix G)

2.8 GUIDELINES, POLICIES, PLANS AND FRAMEWORKS

The guidelines, policies and plans listed in Table 2-5 have been taken into account during the BA process and as part of specialist studies, where applicable.

TABLE 2-5: GUIDELINE AND POLICY FRAMEWORK

Guideline	Governing body	Relevance
Public participation guideline in terms of NEMA (2017)	DEA	The purpose of this guideline is to ensure that an adequate public participation process is undertaken during the BA process.
Guideline on need and desirability (2017)	DEA	This guideline informs the consideration of the need and desirability aspects of the proposed project.
National Development Plan 2030	National Planning Commission (NPC)	The National Development Plan refers to the country's road network as "*South Africa's largest single public asset ...*" "*National and provincial roads are the prime means of connecting people and moving cargo from small settlements and secondary towns to the centres of economic activity*".
New Growth Path (NGP) (2011)	National Planning Commission	See discussion in Section 5.1.3
Ezemvelo KZN Wildlife's Terrestrial Systematic Conservation Plan (C-Plan)(2010) and Threaten Ecosystems (2008)	Ezemvelo KZN Wildlife	The C-Plan systematic conservation plan that identifies and spatially maps Critical Biodiversity Areas (CBAs) required for biodiversity persistence and to inform protected area planning and rural land-use planning in the Province. For successful implementation of the C-Plan, the CBAs need to be incorporated at all levels of spatial development planning. The proposed Sdangeni Access road is not located within any areas identified as CBA's or within a threaten ecosystem.
Dr Nkosazana Dlamini Zuma Local Municipality Integrated Development Plan (IDP) and Spatial Development Framework	Dr Nkosazana Dlamini Zuma Local Municipality	See discussion in Section 5.2

3 BA APPROACH AND METHODOLOGY

This chapter outlines the assessment methodology and I&AP consultation process followed in the BA process.

3.1 DETAILS OF THE BA PROJECT TEAM

As noted in Chapter 1, SLR has been appointed as the independent EAP to undertake the BA for the proposed Sdangeni Access Road. The details of the EAP project team that are undertaking this BA are provided in Table 3-1.

SLR has no vested interest in the proposed project other than fair payment for consulting services rendered as part of the BA process and has declared its independence as required by the EIA Regulations, 2014. An undertaking by the EAP is provided in Appendix A.

TABLE 3-1: DETAILS OF THE BA PROJECT TEAM

General		
Organisation	SLR Consulting (South Africa) (Pty) Ltd	
Postal address	68 Old Main Road, Kloof, Durban, 3640	
Tel No.	(011) 467 0945	
Fax No.	(011) 467 0978	
Name	Tasks and roles	Email
Matthew Hemming	Inputs into reporting, review and approvals	amothilal@slrconsulting.com
Theo Wicks (SLR)	Management of the BA process, including public consultation, process review, specialist study review and report compilation	
Amishka Mothilal	Project consultant involved in BA process, including public consultation, process review, specialist study review and report compilation	

3.2 QUALIFICATIONS AND EXPERIENCE OF THE EAPS

Matthew Hemming is Principle Environmental Consultant and the Technical Discipline Manager for the SLR Environmental Management Planning and Approvals team in Africa. He holds a Master's Degree in Conservation Biology and has 13 years of relevant experience. He has expertise in a wide range of environmental disciplines, including EIAs, EMPs, Environmental Planning and Review and Public Consultation. Matthew is a professionally registered natural scientist (Pr.Sci.Nat.) and a member of IAIAsa.

Theo Wicks is a Senior Environmental Consultant and Environmental Assessment Practitioner (EAP) and Project Manager with SLR. He holds a Master's Degree in Environmental Management and has more than 10 years' experience in civil infrastructure development, waste management, private sector commercial development and the mining sector.

Amishka is an Environmental Consultant at SLR. She holds an Honours Degree in Environmental Management and has over 5 years of experience in the infrastructure development, oil and gas and power sectors.

Relevant project experience would include:

- Upgrading of the National Route 11 Section 3;
- Upgrading of the N2 Section 26 and 27; and
- Upgrading of the National Route 5 Section 2 and 3.

Relevant curricula vitae are attached in Appendix B.

3.3 QUALIFICATIONS, ASSUMPTIONS AND LIMITATIONS

The assessment process assumptions and limitations are listed below:

- It is assumed that SLR has been provided with all relevant project description information by the project team and that it was correct and valid at the time it was provided;
- There will be no significant changes to the project description or surrounding environment between the completion of the report and implementation of the proposed project that could substantially influence findings and/or recommendations with respect to mitigation and management, etc.;
- It is assumed that all recommended mitigatory measures would be implemented as proposed; and
- Specialists had all the relevant information in order to produce accurate and unbiased assessments.

3.4 BASIC ASSESSMENT

3.4.1 Objectives

In accordance with Appendix 1 of the EIA Regulations, 2014, the objectives of a BA process are to:

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

This BA process consists of a series of steps to ensure compliance with these objectives and the EIA Regulations, 2014. The process involves an open, participatory approach to ensure that all impacts are identified and that decision-making takes place in an informed, transparent and accountable manner. A flowchart indicating the generic BA process is presented in Figure 1-2.

3.4.2 Pre-application authority consultation

Prior to lodging the Application for Environmental Authorisation, the Department of Economic Development, Tourism and Environmental Affairs (EDTEA) undertook a site inspection with representatives of the NZDM. A copy of the correspondence is included in Appendix C.

3.4.3 Public participation process

A public participation process was undertaken to inform the BA process. A record of the public participation process undertaken prior to submission is outlined in Table 3-2. The purpose of the public participation process was to notify landowners, land users and other key stakeholders of the proposed project and to provide them with opportunity to raise any initial issues or concerns regarding the proposed project. Supporting documentation is presented in Appendix C.

TABLE 3-2: TASKS UNDERTAKEN TO DATE DURING THE PUBLIC PARTICIPATION PROCESS

Steps	Details
I&AP identification	A preliminary I&AP database has been compiled using information obtained during a social scan of the project area and a deed search of adjacent landowners. Additional I&APs were added to the database following responses to the advertisements, site notices and notification letter, and attendance at the focussed stakeholder and public information sharing meetings. To date approximately 21 I&APs have been registered on the project database. It is recorded that : - State Departments/Organs of State including o EDTEA: o DHSWS; o Department of Cooperative Governance and Traditional Affairs; o Department of Human Settlements; o Amafa aKwaZulu-Natali Heritage; o Ezemvelo KZN Wildlife; o Department of Agriculture and Rural Development; and o The Department of Land Affairs and Rural Development - The Harry Gwala District; - The NDZM; - The Ingonyama Trust Board ; and - The respective ward councilor (Ward 5); have been notified and afforded the opportunity to participate in the application process:
Written Notice	All identified I&APs were provided with a written notice of the proposed project, notified of the opportunity to comment on the BAR and provided with a copy the Executive Summary.
Site notices and adverts	Site notices were placed on fences along the route alignment. A press advertisement was placed in isiZulu in the Isolezwe regional newspaper on 22 January 2021.

At the time of compiling the BAR, SLR had yet to receive any comment.

3.4.4 Compilation of the BAR

This BAR has been prepared in compliance with Appendices 1 and 4 of the EIA Regulations, 2014 (see Table 3-3) and has been informed by comments received during the pre-application Public Participation Process.

TABLE 3-3: REQUIREMENTS OF A BAR IN TERMS OF THE EIA REGULATIONS, 2014

Section	Requirements	Location in report
Appendix 1: Content of Basic Assessment Report		
3(1)(a)	*(i & ii) Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report, including a CV.*	Section 3 and Appendix B
(b)	*The location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; or (ii) where available, the physical address and farm name; or (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;*	Section 4.1
(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*	Section 4

Section	Requirements	Location in report
(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.*	Sections 2.1 and 4
(e)	*A description of the policy and legislative context within which the development is proposed including (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process, and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments.*	Section 2
(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 5
(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 the alternatives considered;	Section 4
	(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 3.4
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 3.4.3 and Appendix C
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 6
	(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated.	Section 7
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 3.4.6
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 8
	(ix) the outcome of the site selection matrix;	Section 4.3
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 4.3
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 4.3
(i)	*A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity , including-: (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;*	Section 7
(j)	*An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;*	Section 7
(k)	*Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;*	Sections 6 and 7
(l)	*An environmental impact statement which contains -(i) a summary of the key findings of the environmental impact assessment (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives ;*	Section 8

Section	Requirements	Location in report
(m)	*Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr ;*	Section 8
(n)	*Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;*	Section 8
(o)	*A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;*	Section 3.3
(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 8
(q)	*where the proposed activity does not include operational aspects, the period for which the Environmental Authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;*	Section 4.1.4
(r)	*An undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (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;*	Appendix A
(s)	*Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;*	Not applicable
(t)	*Any specific information that may be required by the competent authority; and*	Not applicable
(u)	*Any other matters required in terms of section 24(4)(a) and (b) of the Act .*	Not applicable

3.4.5 Specialist studies

The following specialist studies were undertaken to inform the BA process:

- Terrestrial ecological (incl. avifauna, insects, mammals, frogs)
- Aquatic ecological assessment
- Cultural and archaeological Heritage Impact Assessment

3.4.6 Integration and assessment

The specialist information and other relevant information has been be integrated into the BAR, which includes an Impact Assessment and EMPr.

The criteria used to assess the impacts and the method of determining the significance of the impacts is outlined in Table 3-4. This method complies with the method provided in the EIA guideline document. Part A provides the approach for determining impact consequence (combining intensity, extent and duration). Impact consequence and significance are determined from Part B and C. The consequence rating is considered together with the probability of occurrence in order to determine the overall significance of each impact. The interpretation of the impact significance is given in Part D.

TABLE 3-4: CRITERIA FOR ASSESSING IMPACTS

PART A: DEFINITIONS AND CRITERIA*		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of intensity, spatial extent and duration**
Criteria for ranking of the INTENSITY of environmental impacts	**VH**	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.
	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.
Criteria for ranking the DURATION of impacts	**VL**	Very short, always less than a year. Quickly reversible
	L	Short-term, occurs for more than 1 but less than 5 years. Reversible over time.
	M	Medium-term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity)
	VH	Very long, permanent, +20 years (Irreversible. Beyond closure)
Criteria for ranking the EXTENT of impacts	**VL**	A part of the site/property.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours
	H	Local area, extending far beyond site boundary.
	VH	Regional/National

PART B: DETERMINING CONSEQUENCE							
INTENSITY = VL							
DURATION	Very long	**VH**	**Low**	**Low**	**Medium**	**Medium**	**High**
	Long term	**H**	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Medium term	**M**	**Very Low**	**Low**	**Low**	**Low**	**Medium**
	Short term	**L**	**Very low**	**Very Low**	**Low**	**Low**	**Low**
	Very short	**VL**	**Very low**	**Very Low**	**Very Low**	**Low**	**Low**
INTENSITY = L							
DURATION	Very long	**VH**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Long term	**H**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Medium term	**M**	**Low**	**Low**	**Medium**	**Medium**	**Medium**
	Short term	**L**	**Low**	**Low**	**Low**	**Medium**	**Medium**
	Very short	**VL**	**Very low**	**Low**	**Low**	**Low**	**Medium**

INTENSITY = M							
DURATION	Very long	**VH**	**Medium**	**High**	**High**	**High**	**Very High**
	Long term	**H**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Very short	**VL**	**Low**	**Low**	**Low**	**Medium**	**Medium**
INTENSITY = H							
DURATION	Very long	**VH**	**High**	**High**	**High**	**Very High**	**Very High**
	Long term	**H**	**Medium**	**High**	**High**	**High**	**Very High**
	Medium term	**M**	**Medium**	**Medium**	**High**	**High**	**High**
	Short term	**L**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**Medium**	**High**
INTENSITY = VH							
DURATION	Very long	**VH**	**High**	**High**	**Very High**	**Very High**	**Very High**
	Long term	**H**	**High**	**High**	**High**	**Very High**	**Very High**
	Medium term	**M**	**Medium**	**High**	**High**	**High**	**Very High**
	Short term	**L**	**Medium**	**Medium**	**High**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**High**	**High**

VL	**L**	**M**	**H**	**VH**
A part of the site/ property	Whole site	Beyond the site, affecting neighbours	Extending far beyond site but localised	Regional/ National
EXTENT				

PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**VH**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Probable	**H**	**Very Low**	**Low**	**Medium**	**High**	**Very High**
	Possible/ frequent	**M**	**Very Low**	**Very Low**	**Low**	**Medium**	**High**
	Conceivable	**L**	**Insignificant**	**Very Low**	**Low**	**Medium**	**High**
	Unlikely/ improbable	**VL**	**Insignificant**	**Insignificant**	**Very Low**	**Low**	**Medium**
			VL	**L**	**M**	**H**	**VH**
			CONSEQUENCE				

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely required.
Very Low	It will not have an influence on the decision. Does not require any mitigation
Insignificant	Inconsequential, not requiring any consideration.

***VH = very high, H = high, M= medium, L= low and VL= very low and + denotes a positive impact.**

3.4.7 Completion of the BAR

Following closure of the BAR commenting period, all comments received have been incorporated and responded to in a Comments and Responses Report. Where required the BAR was updated to address comments received. The final report including I&AP comments will be submitted to EDTEA for consideration and decision-making. Registered I&APs will receive notification of the final submission to EDTEA.

After the EDTEA has reached a decision registered I&APs will be notified of the outcome of the application, the reasons for the decision and details of the appeal process.

4 PROJECT DESCRIPTION

This chapter provides general information on the proposed project, a description of the proposed upgrade activities and a description of alternatives considered.

4.1 GENERAL PROJECT INFORMATION

4.1.1 Applicant details

The applicant for the project is Dr Nkosazana Dlamini Zuma Local Municipality. Details are provided in Table 4-1 below.

TABLE 4-1: APPLICANT DETAILS

Name	Dr Nkosazana Dlamini Zuma Local Municipality
Address	P.O Box 62, Creighton 3263
Responsible person	Mr N.C. Vezi
Tel	039 833 1038

4.1.2 Project locality

The project is located between the towns of Creighton, Underberg and Bulwer in the Dr Nkosazana Dlamini Zuma Local Municipality in the KwaZulu-Natal Province (See Figure 1-1). The project start, mid and end points are provided in Table 4-2.

TABLE 4-2: PROJECT LOCATION (START, MID, END POINTS)

	Latitude	Longitude
Road start	29°58'44.86"S	29°34'19.27"E
Culvert 1	29°58'45.18"S	29°34'28.65"E
Culvert 2	29°58'45.33"S	29°34'29.83"E
Culvert 3	29°58'50.54"S	29°34'34.82"E
Culvert 4	29°58'51.87"S	29°34'34.78"E
Culvert 5	29°58'53.88"S	29°34'44.11"E
Road end	29°58'56.59"S	29°34'43.44"E

4.1.3 Affected Properties

The proposed Sdangeni Access road is located with the Remainder of the Farm Upper Umkomaas, Location No. 1 (Surveyor General Code: N0FS00000001641500000). This property is understood to be administered by the Ingonyama Trust Board.

4.1.4 Project timeline

Should environmental authorisation be granted it is anticipated the proposed project will commence in the 2020/21 financial year with construction spanning a period of 2 to 4 years.

4.2 DESCRIPTION OF THE PROPOSED ACCESS ROAD AND ASSOCIATED INFRASTRUCTURE

The design of the proposed Sdangeni Access road is in accordance with the KwaZulu Natal Department of Transport (KZN DoT) standard engineering design for Local Roads or By Roads (Engineering Standard 7A). the total road alignment is approximately 1 000 m in length and includes:

- A G6 gravel wearing course with a total with of 5.9 m (carriage with = 5 m; 2 x 450 mm G6 gravel shoulders);
- A 2 x 1.5 m wide gravel shoulders
- A meadow drain on the upslope side of the alignment;
- Installation of pre-cast portal culverts at five (5) watercourse crossings.
- Fencing.

Design drawings showing:

- Typical cross sections of a Type 7A (Local Or By- Road) and pre-cast concrete portal culvert are provided as Figure 4-1 and Figure 4-2; and
- The horizontal road alignment are provided in Figure 4-3 and Figure 4-4.

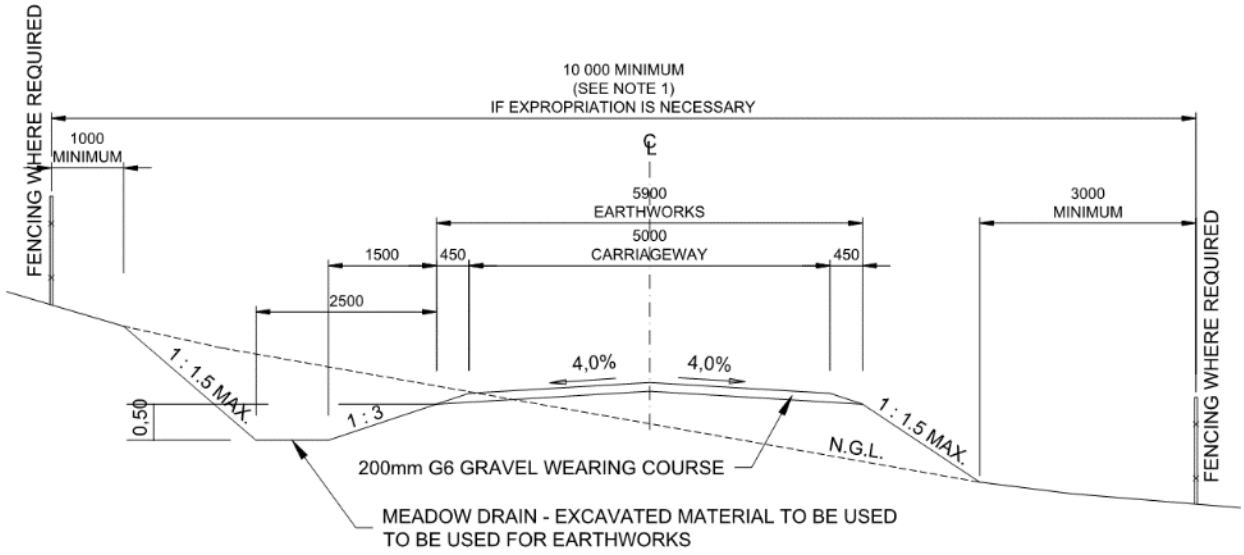


FIGURE 4-1: TYPICAL CROSS SECTION (TYPE 7A LOCAL ROAD OR BY-ROAD)

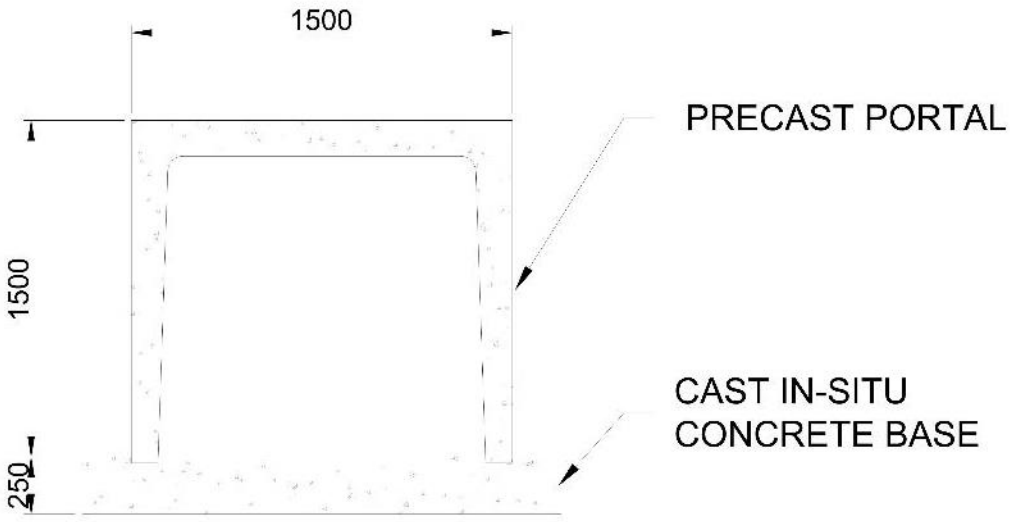


FIGURE 4-2: TYPICAL CROSS SECTION OF A PRECAST CONCRETE PORTAL

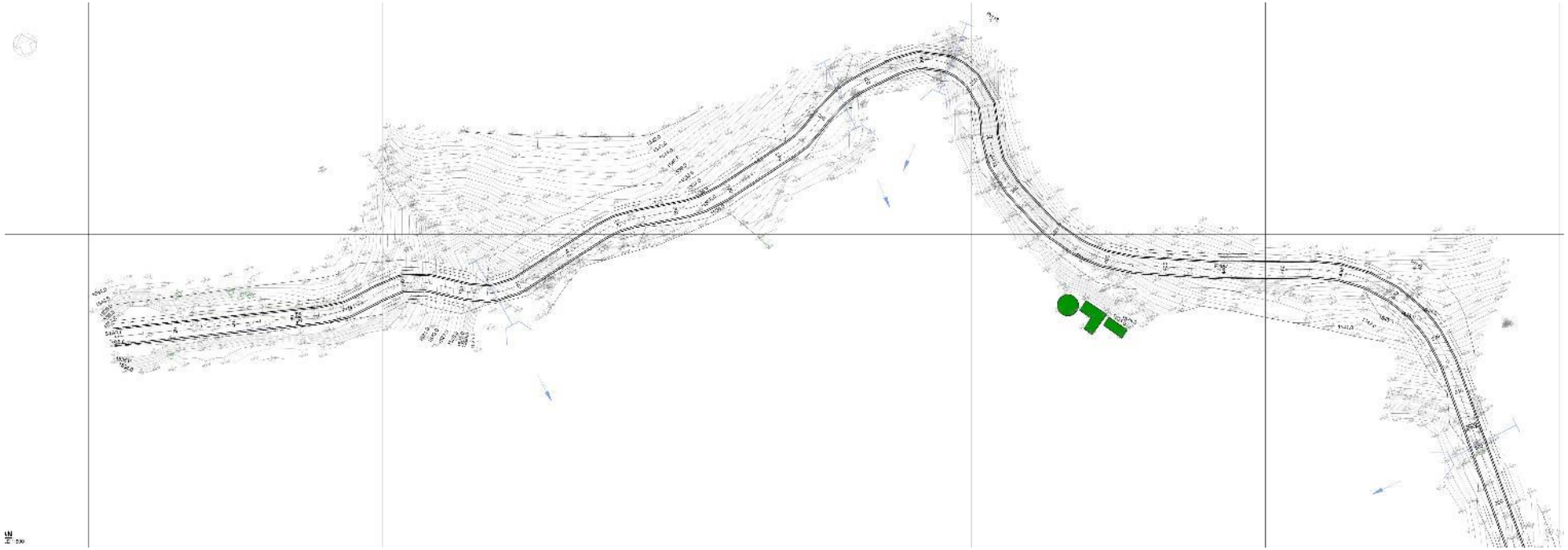


FIGURE 4-3: HORIZONTAL ALLIGNMENT (SECTION 1)

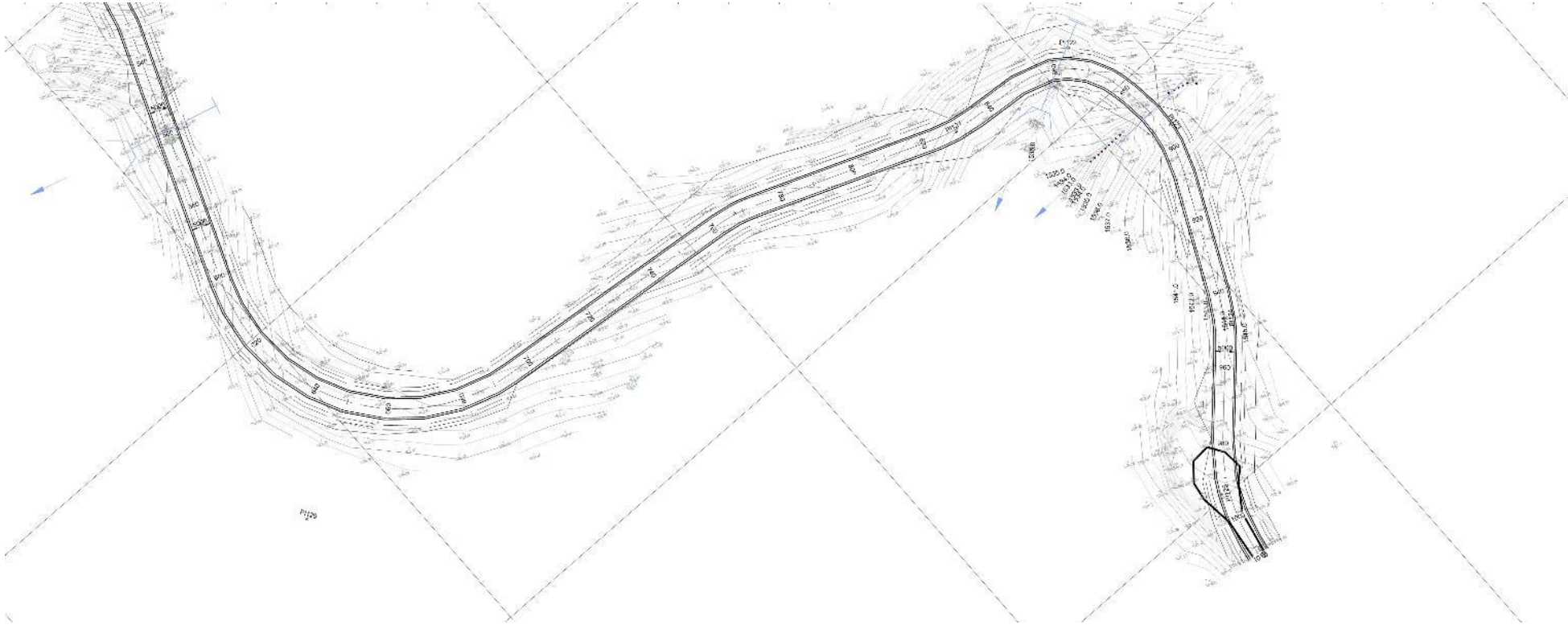


FIGURE 4-4: HORIZONTAL ALLIGNMENT (SECTION 2)

4.3 PROJECT ACTIVITIES

The key design and construction activities associated with the proposed project include:

- Route surveys;
- detailed design of the road alignment, geometry and infrastructure;
- site camps;
- transportation of construction materials and staff;
- material stockpiling;
- access and haul roads;
- route pegging;
- traffic diversions;
- clearing of vegetation;
- site establishment including storm water controls;
- stripping and stockpiling of soil resources in accordance with a soil management plan;
- bulk earthworks (cut and fill);
- grading and layerworks;
- construction of engineered base layers;
- construction of storm water infrastructure;
- road surfacing, painting and signage (including recovery of existing layer works and asphalt);
- collection, storage and removal of construction related waste;
- perimeter fencing; and
- landscaping and rehabilitation.

4.4 CONSIDERATION OF ALTERNATIVES

As per GN R 982, 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 -*

- *Property on which or location where the activity is proposed to be undertaken;*
- *Type of activity to be undertaken;*
- *Design or layout of the activity;*
- *Technology to be in the activity; or*
- *Operational aspects of the activity;*

And includes the option of not implementing the activity."

The details of the reasonable and feasible alternatives considered as part of this application are provided in Table 4-3 below.

TABLE 4-3: PROJECT ALTERNATIVES CONSIDERED

No.	Alternatives	Description
1. Property or Locality alternatives		
1.1	Layout alternatives	The alignment of the proposed Sdangeni Access Road was developed through an iterative process where engineers considered the existing start and end points, the mountainous/ hilly terrain and existing residences. The alignment was then further refined, proposing two minor deviations to avoid a grave site (See Figure 4-5). Each of these routes were then subject to a cursory assessment to determine which if there was any preference.

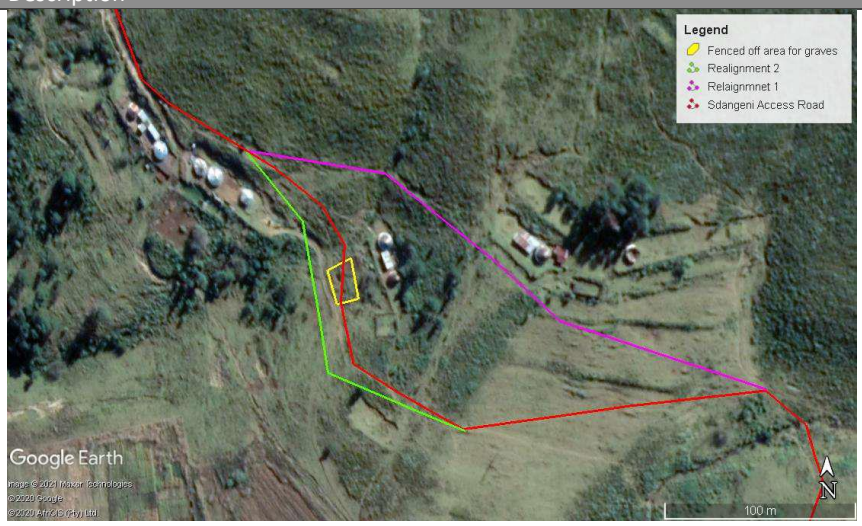
<table>
<tr><th>No.</th><th>Alternatives</th><th>Description</th></tr>
<tr><td></td><td></td><td>


FIGURE 4-5: ALTERNATIVE DEVIATIONS

TABLE 4-4: ALTERNATIVE LAYOUT MATRIX
<table>
<tr><th>Route</th><th>Original route</th><th>Alternative 1</th><th>Alternative 2</th></tr>
<tr><td>Aquatic Pref</td><td>3</td><td>3</td><td>2</td></tr>
<tr><td>Terrestrial Pref</td><td>3</td><td>3</td><td>2</td></tr>
<tr><td>Social</td><td>3</td><td>3</td><td>2</td></tr>
<tr><td>Heritage Pref</td><td>1</td><td>3</td><td>3</td></tr>
<tr><td>Total</td><td>10</td><td>12</td><td>9</td></tr>
</table>
Discussion

Aquatic Ecology. The Original and Alternative Route 1 follow an existing alignment limiting impacts on aquatic ecology in comparison to Alternative 2 which would require a new watercourse crossing.
Terrestrial Ecology. The Original and Alternative Routes follow an existing alignment limiting the disturbance to terrestrial ecology in comparison to Alternative 2.
Social. The Original and Alternative Route 1 follow an existing impacted upon alignment. Alternative 2 would introduce additional impacts on a homestead.
Heritage. The original alignment would require the exhumation of an existing grave. Alternatives 1 and 2 avoid the grave.

Alternative 1 is the preferred alignment.
</td></tr>
<tr><td colspan="3">2. Technology alternatives</td></tr>
<tr><td>2.1</td><td>Alternative Culvert designs</td><td>The five (5) watercourse crossings require the installation of pre-cast concrete portal culverts which are cast on in-situ concrete foundations.
The dimensions of these portal culverts are determined through hydraulic modelling of the watercourse, typically using the 1: 100-year return period flood. Instances do occur where the dimensions of a culvert are oversized to allow for pedestrian and livestock traffic, however with regards to the Sdangeni Access Road, oversizing the culverts would not provide for this need.
An alternative to the use of pre-cast culverts is the construction of bridges. However, this would be against industry standards and best practises because:

Construction of a concrete bridge requires techniques more specialised than required for pre-cast concrete culverts; and
Manufacture of concrete would be required on site as long distance haulage impacts on concrete curing process.

These factors increase the construction cost without any benefit to the environment. Consideration of in-situ construction of bridges to cross the five (5) watercourses is therefore considered unreasonable. Assessment per a comparative matrix is not considered necessary.</td></tr>
</table>

No.	Alternatives	Description
4. “No-Go” alternative		
4.1	No-go	The No-go Alternative refers to the current status quo and the risks and impacts associated with it. This would mean the benefits of the project will not materialise (i.e. no job creation, no improved road accessibility and safety etc.). The environment will remain relatively undisturbed, there would be no improvement to traffic and pedestrian mobility. Local short-term employment opportunities would not be generated and the NDZM mandate to provide local infrastructure would not be met.

5 NEED AND DESIRABILITY

The DEA guideline on need and desirability (GN R 891, 20 October 2017) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services. Thus, the over-arching framework for considering the need and desirability of development in general is taken at the policy level through the identification and promotion of activities / industries / developments required by civil society as a whole. The DEA guideline further notes that at a project level (as part of a BA process), the need and desirability of the project should take into consideration the content of regional and local plans, frameworks and strategies.

5.1 NATIONAL POLICY AND PLANNING FRAMEWORK

This section aims to provide an overview of the regional and local policy and planning context relating to the Sdangeni Access Road.

5.1.1 The Municipal Systems Act, 2000 (No. 32 of 2000)

The Constitution of South Africa envisages a robust local government system, which can provide democratic and accountable government for local communities; ensure the provision of services to communities in a sustainable manner; promote social and economic development; promote a safe and healthy living environment; and encourage the involvement of communities and community organisations in the matters of local government.

In partial fulfilment of these responsibilities, the Municipal Systems Act, 2000 (No. 32 of 2000) requires the periodic drafting of Integrated Development Plans. The intention is that the IDP must link, integrate and co-ordinate all the municipality's plans. It must also consider any proposals on the table for the development of the local area. Further discussion of the NDZM IDP is provided in Section 5.2.1

5.1.2 National Development Plan 2030

The National Development Plan (NDP) 2030 provides the context for all growth in South Africa. The NDP provides a broad strategic framework, setting out an overarching approach to confronting poverty and inequality through the promotion of development, based on the six focused and interlinked priorities. One of the key priorities is "*faster and more inclusive economic growth*". In order to transform the economy and create sustainable expansion for job creation, an average economic growth exceeding 5% per annum is required. The NDP sets out that transforming the economy also requires changing patterns of ownership and control.

It is also acknowledged that environmental challenges are in conflict with some of these development initiatives. As such, it is emphasised that there is also a need to:

- protect the natural environment;
- enhance the resilience of people and the economy to climate change;
- reduce carbon emissions in line with international commitments;
- make significant strides toward becoming a zero-waste economy; and
- reduce greenhouse gas emissions and improve energy efficiency.

With regards to NDZM's mandate and the proposed Sdangeni Access Road, the NDP sets out the following critical action "*Public infrastructure investment at 10 percent of gross domestic product (GDP*), financed through tariffs, public-private partnerships, taxes and loans and focused on transport, energy and water." The proposed Sdangeni Access Road seeks to pursue this aim by providing safe, more easily accessible and direct transport infrastructure.

5.1.3 New Growth Path

The New Growth Path (NGP) (2011) reflects the commitment of Government to prioritise employment creation in all economic policies and sets out the key drivers and sectors for employment which will be the focus of Government. The sectors identified for prioritisation include infrastructure, agriculture, mining, manufacturing, tourism and the green economy.

5.2 REGIONAL AND LOCAL POLICY AND PLANNING FRAMEWORK

This section aims to provide an overview of the regional and local policy and planning context relating to the proposed development.

5.2.1 Nkosazana Dlamini Zuma Municipality Integrated Development Plan and Spatial Development Framework

The municipal Integrated Development Plan is the principle planning procedure that, through a community participative procedure, identifies the key challenges facing the municipality and its residences, develops approaches to overcoming these challenges and prioritises their implementation.

As part of the NZDM Local Municipality IDP, the municipality has:

- Identified that service delivery is a key challenge facing the municipality and notes access as being one of the primary concerns;
- Prioritised the provision of access roads (Priority No.2 on the list of priorities); and
- Through the Municipal Infrastructure Grant programme, has allocated specific budget for the implementation of the Sdangeni Access Road.

5.3 CONSISTENCY WITH NEMA PRINCIPLES

The national environmental management principles contained in NEMA serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations, 2014. In order to demonstrate consistency with the NEMA principles, a discussion of how these principles are taken into account during the BA process is provided in Table 5-1 below.

TABLE 5-1: CONSIDERATION OF THE NEMA PRINCIPLES IN RELATION TO THE PROPOSED PROJECT

National Environmental Management Principles	Comment
(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.	Infrastructure development has been identified as a key driver of economic growth and job creation and as such the proposed project is anticipated to serve the developmental interests of people. The BA process also serves to identify the needs and interests of potentially affected parties and to address issues and concerns raised through the course of the study.
(3) Development must be socially, environmentally and economically sustainable.	Government has set development goals aimed at reducing poverty, unemployment and inequality. The contribution of the infrastructure sectors in this regard is promoted in the national, regional and local policy and planning frameworks, thus the proposed development is deemed acceptable in principle. The specific sustainability of the proposed project has been assessed in the BA process.
(4)(a) Sustainable development requires the consideration of all relevant factors including the following: *(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*	The BA process considers potential social, economic, biophysical impacts that could result through the implementation of the proposed upgrades. Measures have been identified to avoid, minimise and/or remedy potential pollution and/or degradation of

National Environmental Management Principles	Comment
(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; *(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;* *(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;* *(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;* *(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*	the environment that may occur as a result of the proposed project.
(4)(a)(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and	Assumptions, uncertainties and limitations associated with the compilation of the BAR are discussed in Section 3.3. Compliance with the various legislative requirements is presented in Section 2.
(4)(a)(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.	The BA process considers and assesses the identified potential social, economic and biophysical impacts of the project (refer to Section 7). The EMPr provides the recommended management measures to mitigate the significance of identified impacts (refer to Appendix G).
(4)(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.	The BA process that is being followed recognises that all elements of the environment are linked and interrelated. EDTEA, as the decision-making authority, will be responsible for taking all aspects of the environment, including whether or not the potential impacts of the project would unfairly discriminate against any person, into consideration when making a decision regarding the proposed project.
(4)(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.	
(4)(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.	The proposed project is not anticipated to limit access to environmental resources that meet basic human needs.
(4)(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.	The applicant is committed to comply with environmental health and safety consequences of its existing operations.
(4)(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.	The public participation process has been undertaken in accordance with the requirements of the EIA Regulations, 2014 (see Section 3.4.3).
(4)(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.	The BA process will take into the account the interests, needs and values of all I&APs, through the submission of comments on the proposed project. Thus, the decision-makers will have all the necessary information before them on which to base an informed decision.
(4)(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.	The BAR prepared for the proposed project will be made available to communities for review and comment (see Section 1.6).
(4)(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered,	The BA process considers identified potential social, economic, biophysical impacts of the project in an

National Environmental Management Principles	Comment
assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.	integrated manner. The significance of these impacts has been assessed (see Section 7).
(4)(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.	The owners and managers of the plant would be required to comply with the requirements of the Occupational Health and Safety Act (No. 181 of 1993). An Environmental Awareness Plan has been prepared, which will require staff be informed about any aspects of their work that may pose a danger to the environment (refer to Appendix G).
(4)(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.	As mentioned previously, the public consultation process is being undertaken in accordance with the requirements of the EIA Regulations, 2014 (as amended) and will allow for the distribution of the BAR for public review and comment. This information will be provided in an open and transparent manner.
(4)(l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.	The public participation process for the proposed project provides an opportunity for the organs of state to provide comment on the proposed project and address any potential conflicts between policies or other developmental proposals administered by them that may be in conflict with the proposed project before decision-making.
(4)(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.	It is not anticipated that the proposed project would result in any conflicts between organs of state.
(4)(n) Global and international responsibilities relating to the environment must be discharged in the national interest.	EDTEA, as the decision-making authority, will be responsible for taking cognisance of any international obligations that could have an influence on the project.
(4)(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.	The BA process considers and assesses the identified potential social, economic, biophysical impacts of the project (refer to Section 7).
(4)(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.	NDZM and their designated agents will be responsible for the implementation of the measures included in the EMPr.
(4)(q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted.	The public participation process for the proposed project has been and will continue to be inclusive of women and the youth.
(4)(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	The BA process undertaken for the proposed project has identified relevant sensitive and/or vulnerable areas and assessed potential impacts if applicable. Appropriate mitigation measures have been proposed where required.

6 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter provides baseline information on relevant environmental (geographical, physical, biological, social, economic, heritage and cultural) aspects associated with the project site and has been informed by specialist studies undertaken as part of the BA process. Specialist reports are included as appendices to this report.

6.1 REGIONAL SETTING/LOCALITY

The project is located in Ward 5, forming part of the NDZM in the KwaZulu-Natal Province.

6.2 BIOPHYSICAL

6.2.1 Climate

a. Temperature and Rainfall

The monthly distribution of the average daily minimum, average and maximum temperatures for Underberg is shown in the Table below. The average maximum temperature varies between 25°C in January and 18°C in July and the average minimum temperature varies from 3°C in June and 15°C in January.

Temperatures drop to below 10°C during the period from May to September and could therefore affect surfacing operations during this period. Below freezing temperatures do occur during the winter months and frost occurs on average 37 times per annum, most frequently in June and July.

TABLE 6-1: TEMPERATURE AND RAINFALL STATISTICS FOR UNDERBERG

Month	Temperature (° C)		Precipitation
	Ave Daily Max	Ave Daily Min	Ave Monthly (mm)
January	25	15	169
February	25	15	123
March	23	13	109
April	22	10	56
May	20	7	22
June	18	3	16
July	18	4	13
August	20	5	25
September	23	8	49
October	23	11	127
November	24	12	147
December	25	14	176

The project area normally receives the most rainfall during the summer months i.e., October to April as can be seen in Table 6-1 above. The lowest average monthly rainfall is in July (16 mm) and the maximum in February (176 mm). The mean annual precipitation is 1032 mm.

b. Wind

The prevailing winds for the Underberg region are westerly and an east-north-east wind with a predominantly mild velocity (See Figure 6-1 and Figure 6-2 for characterisation and wind rose diagram).

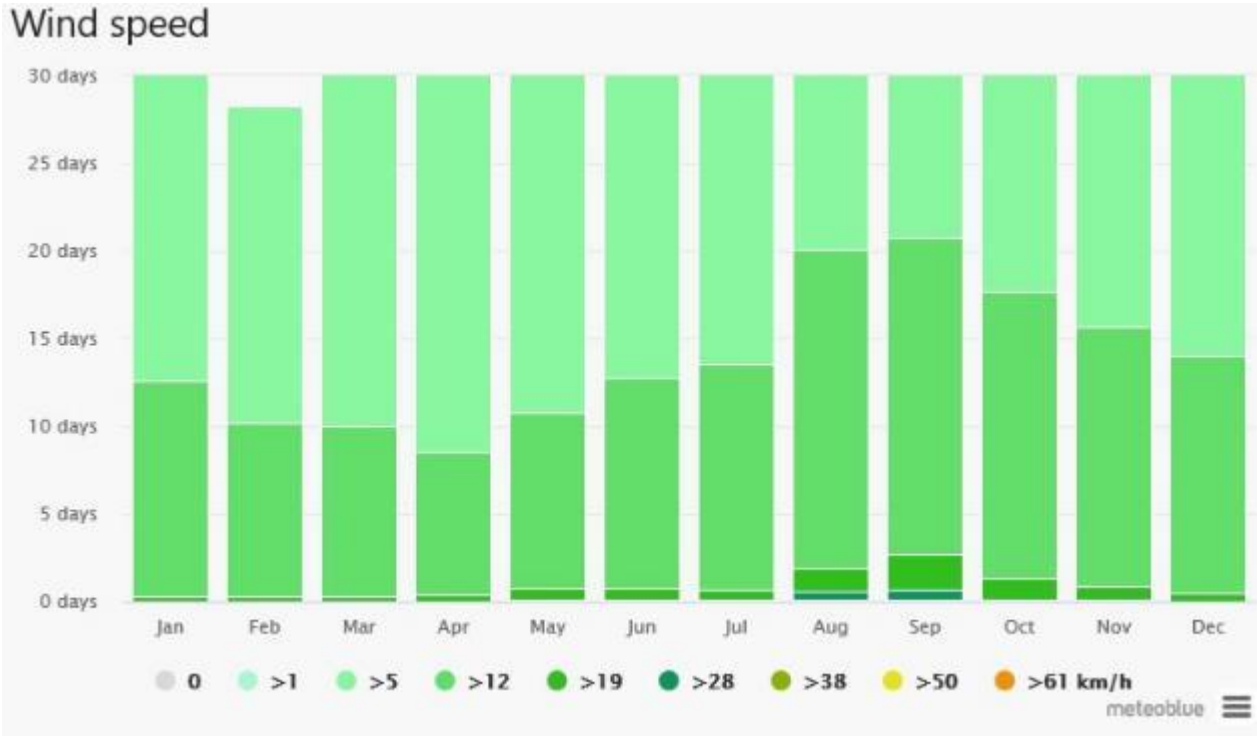


FIGURE 6-1: REGIONAL WIND SPEEDS

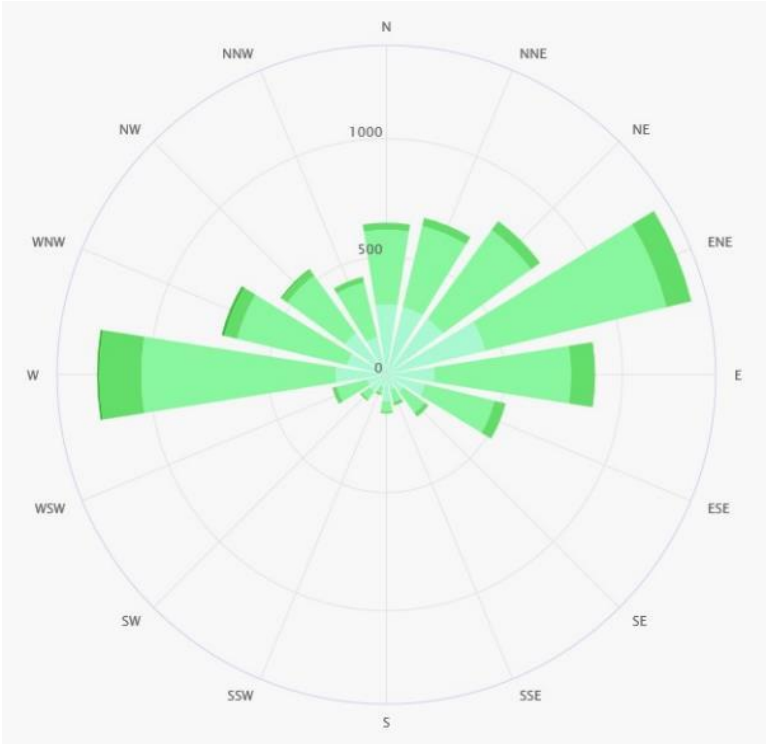


FIGURE 6-2: REGIONAL WIND ROSE

6.2.2 Topography

The project is located on a south facing hillside approximately 1 540 m above mean sea level.

The alignment passes through mountainous terrain characterised by steep inclines and several major watercourses. Some high fills are expected to achieve suitable road grades and at the approaches to the causeways/ culverts. The topography and vertical alignment are illustrated in Figure 6-3 and Figure 6-4.

FIGURE 6-3: ILLUSTRATION OF THE CHANGING GRADIENT IN THE VERTICAL ALIGNMENT

FIGURE 6-4: VIEW OF THE LOCAL TOPOGRAPHY

6.2.3 Surface water

a. Catchment

The project site falls within the Mvoti to uMzimkhulu Water Management Area (code 11) (WRC, 2012) in quaternary catchment T51J. The site is located upslope of the Isongweni River which drains into the Ngwangwane River, a major tributary of the uMzumkhulu River.

b. Freshwater resources

The proposed Sdangeni Access Road traverses a total of five (5) non-perennial rivers which join before draining into the into the perennial Isongweni River (watercourses 1, 2 and 3 are first order streams which combine to form a second order stream; and watercourse 4 and 5 are also first order streams which combine to form a second order stream). Given the steep topography, these watercourses are highly incised into the landscape.

A channelled valley bottom wetland, associated with one of the five (5) non-perennial rivers, was identified near the project end-point. Seep wetlands located at the toe of the hill were noted and have been used for cultivation.

Photographs showing watercourse 1 and 5 are provided below (Figure 6-5 and Figure 6-6).

FIGURE 6-5: PHOTOGRAPH OF WATERCOURSE 1

FIGURE 6-6: PHOTOGRAPHIC VIEW DOWN RIVER OF WATERCOURSE 1

FIGURE 6-7: VIEW OF WATERCOURSE 5 UPSTREAM OF THE PROPOSED CROSSING

6.2.4 Terrestrial ecology

a. Vegetation

The proposed site is located is located in the Grassland Biome and falls within the Sub-Escarpment Grassland Bioregion (Mucina and Rutherford, 2006). This bioregion is sub-divided into a number of grassland (Gs) vegetation units, with the Sdangeni Access Road being located in the Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit (Mucina and Rutherford, 2006). A site visit was conducted on the 15th December 2020 by terrestrial ecologist to conduct necessary in-field procedures to verify the presence of flora within the study area. Table 6-2: Plant List presents a list of species identified at the site.

The Gs10 Drakensberg Foothill Moist Grassland Vegetation Unit occurs on moderately rolling and mountainous terrain covered by forb-rich grassland dominated by bunch grasses such as *Themeda triandra* and *Tristachya leucothrix*, with scattered forest patches in incised areas (Mucina and Rutherford, 2006). Important grass

species include *Themeda triandra*, *Tristachya leucothrix*, *Diheteropogon filifolius, Eragrostis racemosa, Heteropogon contortus, Microchloa caffra, Monocymbium ceresiiforme, Panicum natalense, Rendlia altera, Trachypogon spicatus, Alloteropsis semialata subsp. eckloniana, Aristida junciformis subsp. galpinii, Brachiaria serrata,* and *Hyparrhenia hirta* (Mucina and Rutherford, 2006). There are small areas of intact grassland within the road extent, these areas are used for local cattle grazing. Grass species such as *Digitaria, Aristida, Themeda* and *Eragrostis* were common throughout the site. It is likely that this grass undergoes burning periodically.

Important forbs found in this vegetation unit include *Helichrysum simillimum (See , Senecio retrorsus, Acalypha depressinerva, Ajuga ophrydis, Berkheya rhapontica subsp. aristosa, Dicoma anomala, Euryops laxus, Haplocarpha scaposa, Helichrysum chionosphaerum, H. cooperi, H. herbaceum, H. nudifolium var pilosellum, H. subglomeratum, H. umbraculigerum, Kohautia amatymbica, Pentanisia prunelloides, Schistostephium crataegifolium, Sebaea sedoides, Senecio asperulus, Hilliardiella hirsuta* and *Wahlenbergia undulata* (Mucina and Rutherford, 2006). *Felicia* and Pelagonium are common forb species that were observed throughout the site during the site visit.

Important geophytic herbs include *Oxalis depressa, Cheilanthes hirta, Habenaria dregeana, Haemanthus humilis subsp. hirsutus, Hypoxis rigidula subsp. pilosissima, Ledebouria sandersonii, Rhodohypoxis baurii var. platypetala, Watsonia pillansii* and *Zantedeschia albomaculata subsp. albomaculata* (Mucina and Rutherford, 2006).

Although the site consists of mostly grass and forb species, some indigenous tree were noted although these were isolated to stream channels. Halleria, Leucosidia, Buddleja and Diospyros were the key species identified on site. These species indicate that they would be the most suitable trees to plant for future management as they grow well under these conditions and are indigenous to the area. Halleria lucid and Leucosidia sericea should be encouraged at crossing points

Other important species include the climber *Rhynchosia totta* and the low shrubs *Chrysocoma ciliata, Felicia filifolia subsp. filifolia, Lasiosiphon kraussianus, Helichrysum sutherlandii* and *Searsia discolor* (Mucina and Rutherford, 2006).

A complete plant list is provided in Table 6-2.

TABLE 6-2: PLANT LIST

Species name	Common name	Category
Grasses		
**Paspalum dialatatum*	Dallisgrass	Alien grass
Aristida junciformis Trin. & Rupr. subsp. junciformis.	Bristle Grass	Grass
Alloteropsis semialata subsp. semialata	#N/A	Grass
Brachiaria serrata	Red top grass	Grass
Digitaria tricholaenoides Stapf	Purple finger grass	Grass
Elionurus muticus	#N/A	Grass
Eragrostis curvula	Weeping love grass	Grass
Eragrostis capensis		Grass
Eragrostis curvula	Weeping love grass	Grass
Eragrostis plana	Soft love grass	Grass
Eragrostis racemosa	Narrow heart love grass	Grass
Harpochloa falx	#N/A	Grass
Michrochloa caffra	#N/A	Grass
Monocymbium ceresiiforme (Nees) Stapf	Wild oatgrass	Grass
Themeda triandra	Red grass	Grass
Trachypogon spicatus	#N/A	Grass
Tristachya leocothrix	#N/A	Grass
Herbs		
**Cirsium vulgare (Savi) Ten.*	Spear Thistle	Alien Herb
**Oenothera rosea L'Her. Ex Aiton*	Evening-primrose	Alien Creeper

Solanum pseudocapsicum	#N/A	Indigenous
Oxalis obliquifolia	#N/A	Indigenous
Acalypha sp.	#N/A	Indigenous
Anthospermum streyii	#N/A	Indigenous
Aristea cognata	#N/A	Indigenous
Artemisia afra	#N/A	Indigenous
Berkheya multijuga	#N/A	Indigenous
Commelina africana L.	Yellow wandering jew	Indigenous
Cucumis zeyheri		Indigenous
Felicia muricata (Thunb.) Nees subsp. muricata	Bloublommetjie	Indigenous
Geranium caffrum	#N/A	Indigenous
Helichrysum nanum	#N/A	Indigenous
Hypericum armerioides	#N/A	Indigenous
Impatiens hochstetteri	#N/A	Indigenous
Inulanthera calva	#N/A	Indigenous
Laportea peduncularis	#N/A	Indigenous
Lobelia erinus	#N/A	Indigenous
Monsonia attenuata	#N/A	Indigenous
Oxalis obliquifolia	#N/A	Indigenous
Pelargonium alchemilloides	#N/A	indigenous
Pentanisia angustifolia	#N/A	Indigenous
Ranunculus multifidus	African Buttercup	Indigenous
Wahlenbergia krebsii	Tenane	Indigenous
Zantedeschia aethiopica (L.) Spreng.	Arum Lillie	Indigenous (protected)
Zantedeschia albomaculata	Arum Lillie	Indigenous (protected)
Trees & Shrubs		
**Acacia longifolia*	Long leaved wattle	1b
**Oenothera rosea L'Her. Ex Aiton*	Evening-primrose	Alien
**Solanum mauritianum Scop.*	Bugweed	Alien
Buddleja auriculata	#N/A	Indigenous
Conostomium natalense	Wild Pentas	Indigenous
Diospyros lycioides susbsp. guerkei	Blue bush	Indigenous
Diospyros whyteana (Hiern)	bladder-nut	Indigenous
Halleria lucida L.	Tree Fuchsia	Indigenous
Leonotis leonurus (L.) R.Br.	Wild dagga	Schrub
Leucosidea sericea	Ouhout	indigenous
Rumex sagittatus	#N/A	Creeper
Searsia discolor	Grassveld currant	Indigenous

*denotes an alien species

FIGURE 6-8: *HELICHRYSUM SIMILLIMUM* OBSERVED ON SITE

While the initial section (~ 280 m) of the Sdangeni Access Road follows an existing tracked alignment, it will require widening to accommodate the Type 7A (Local Or By- Road) design standards and to allow for bank stabilisation. The photograph in Figure 6-9 shows the extent of the existing track.

FIGURE 6-9: PORTION OF EXISTING TRACK/ALIGNMENT

The remaining ~ 720m is located within predominantly undisturbed vegetation. Clearing and grubbing will require the removal of approximately 0.72 ha of Drakensberg Foothill Moist Grassland.

FIGURE 6-10: VIEW OF THE PREDOMINANTLY UNDISTURBED GRASSLAND

b. Faunal ecology

The distribution of local inhabitants makes the possibility of large mammals unlikely. However, the grassland biome and wetland are known to provide habitat for various birds, rodents, amphibians and reptiles. Typical species expected to be found within the Drakensberg Foothill Moist Grassland Vegetation Unit include:

- Birds
  - Buff-streaked Chat *(Oenanthe bifasciat)*;
  - Speckled Pigeon *(Columba guinea);*
  - Common Fiscal (*Lanius collaris);*
  - African Stone-chat *(Saxicola torquata);*
  - Red-winged Starling *(Onychognathus morio;*
  - Wing-snapping Cisticola *(Cisticola ayresii);*
  - Wailing Cisticola *(Cisticola lais);*
  - Cape Wagtail *(Motacilla capensis);*
  - Yellow Bishop *(Euplectes capensis);*
  - Southern Red bishop (visitor) *(Euplectes orix);*
  - Long-tailed Widowbird *(Euplectes progne);*
  - Red-collared Widowbird *(Euplectes ardens);*
  - African Quailfinch *(Ortygospiza atricollis);*
  - Cape Grassbird *(Sphenoeacus afer); and*
  - Cape Bunting *(Emberiza capensis).*
- Small mammals
  - Stripped mouse (*Rhabdomys pumilio);*
  - Highveld Gerbils *(Tatera brantsii);*
  - Shrews (Family *Soricidae*) are also present, based on the finding of a single dead individual, and
  - Various species of molerat (based on the distribution map (Smithers, 1983).
- Amphibians
  - Raucous Toad *(Bufo rangeri)*
  - Guttural Toad *(Bufo gutturalis);*
  - Common River Frog *(Afana angolensis);*
- Reptiles
  - Spotted or Rhombic Skaapsteker *(Psammophylax rhombeatus);*
  - Rinkhals (*Hemachatus haemachatus);*

- Puff Adder *(Bitis arietans);*
- Red-Lipped Herald (*Crotaphopeltis hotamboeia);*
- Southern Rock Agama *(Agama atra);* and
- Striped Skink *(Mabuya striata).*

6.2.5 Conservation characteristics

The conservation characteristics of the study area, extracted from available literature resources and databases, are summarised below.

- The site is not protected in terms of the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEM:PAA). The nearest protected area is the iGxalingenwa Nature Reserve, located 2 km south of the site. The study area does not fall within a focus area as per the National Protected Areas Expansion Strategy (2009) and as such is not earmarked for conservation within the near future (See Figure 6-11).
- The site is not located within 10 km of any areas identified by the South African National Biodiversity Institute as being Endangered or Critically Endangered Ecosystems.
- The nearest Important Bird Areas is associated with the KwaZulu-Natal Mistbelt Forest located within the iGxalingenwa Nature Reserve, 2 km to the south east of the site (See Figure 6-11).
- Drakensberg Foothill Moist Grassland is listed as Least threatened with a national conservation target of 23%. Only 2–3% is statutorily conserved in the uKhahlamba Drakensberg Park, Ntsikeni Wildlife Reserve as well as in the Karkloof, Mount Currie, Coleford, Fort Nottingham, Impendle, Ngeli, and Umgeni Vlei Nature Reserves.
  Almost 20% is already transformed due to cultivation, plantations and by urban sprawl.
  Alien woody species such as *Rubus, Acacia dealbata* and *Solanum mauritianum* may become invasive in places (Mucina and Rutherford, 2006).

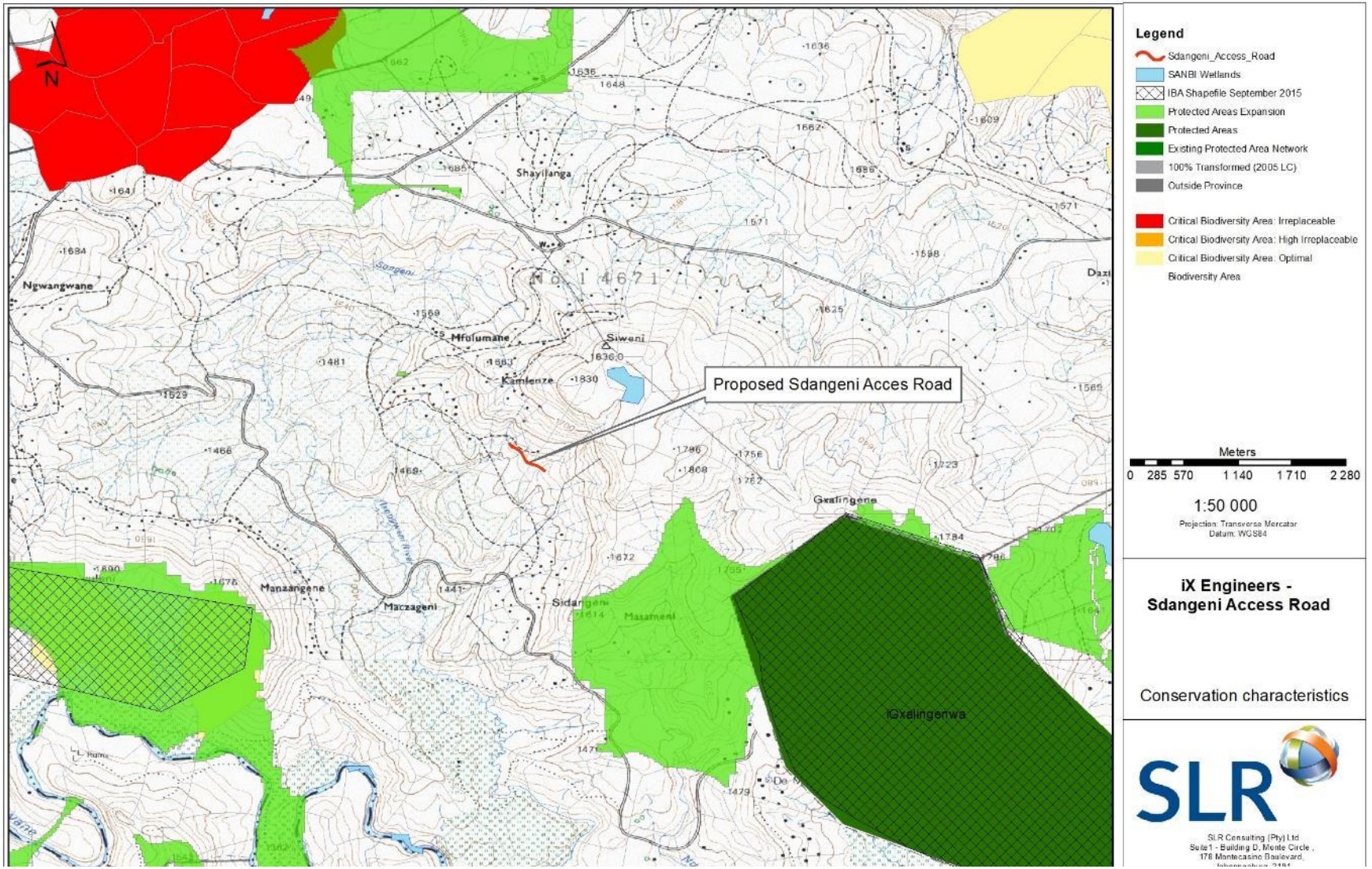


FIGURE 6-11: CONSERVATION CHARACTERISTICS

6.2.6 AIR QUALITY

Air quality is assumed to be good based on the rural setting above the temperature inversion layer. Localised sources affecting ambient air quality are considered to be:

- Minor vehicle emissions;
- Dust emanating from the use of gravel road networks; and
- Particulate matter resulting from the burning of bio-matter (veld fires, wood fuelled cooking fires).

6.2.7 NOISE

In terms of the South African National Standard (SANS) 10103:2008, the expected ambient noise profile characterising the route alignment is equivalent to Rural districts (Table 6-3 below provides the acceptable rating levels for Rural districts specified in SANS 10103: 2008).

TABLE 6-3: SOUTH AFRICAN NATIONAL STANDARD SANS 10103: 2008

Equivalent Continuous rating level LReq.T for ambient noise dBA						
	Outdoors			Indoors, with open windows		
Type of district	Day-night	Daytime	Night-time	Day-night	Daytime	Night-time
a) Rural districts.	***45***	***45***	***35***	***35***	***35***	***25***
b) Suburban districts with little road traffic.	50	50	40	40	40	30
c) Urban districts.	55	55	45	45	45	35
d) Urban districts with some workshops, with business premises and with main roads.	60	60	50	50	50	40
e) Central business district	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

6.3 SOCIO-ECONOMIC

6.3.1 Land use

Local land uses are typical of the rural setting and include residences (predominantly informal) and subsistence agricultural fields located on gentle gradients.

6.3.2 Socio-economic profile

The socio-economic profile of the NDZM is provided in Table 6-4.

TABLE 6-4: POPULATION STATISTICS AND BREAKDOWN (BASED ON STATS SA COMMUNITY SURVEY, 2016)

Population		Marital status	
Total	118 480	Formally married	17.85%
0-14	39.65%	Common law married	4.11%
15-34	38.35%	Widow/widower	4.11%
35-65	15.17%	Separated	0.32%
60+	6.83%	Divorced	0.23%
Gender Ratio		Never married	74.02%
Females	52.12%	Socio-economic	
Males	47.88%	Dependency Ratio	75.47%

Households		Unemployment rate	62.52%
Total	29 619	Youth unemployment rate	59.84%
Formal dwellings	38.16%	Female headed households	59.84%
Levels of Education		Potential total working Age Group (20-64)	41.68%
No Schooling	16.62%	Elderly (65+)	5%
Primary schooling	38.31%	Agricultural	14 048
Some secondary	31.43%	Annual income	
Matric	11%	No income	4505
Tertiary	2.15%	R1 – R 4 800	562
Service levels		R 4 801 – R 38 400	7 703
Piped (tap) water inside dwelling	9.63%	R 38 401 – R 307 200	794
Electricity for lighting from mains	83.27%	R 307 201 +	131
Weekly refuse removal	18.01%	Unspecified	299

6.4 HERITAGE AND CULTURAL RESOURCES

Given the rural settling, it is highly likely that sites of cultural heritage significance will be located within the region. Two potential grave sites were identified during the site inspection.

FIGURE 6-12: GRAVE SITE BEING EXCAVATED

7 IMPACT DESCRIPTION AND ASSESSMENT

The potential impacts described in this chapter have been identified by the EIA project team with input from specialists and I&APs. The sequence in which these issues are listed are in no order of priority or importance. The assessment and rating of potential impacts has been informed by specialist studies. These are attached as appendices to the BAR.

All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together.

7.1 ISSUE: LOSS OF SOIL RESOURCES THROUGH PHYSICAL DISTURBANCE

Description of impact

Construction of the infrastructure and related services has the potential to damage soil resources through physical disturbance including removal, compaction and/or erosion.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. In areas along the project route past and current land uses have led to significant soil losses. Its disturbance and loss should be prevented wherever this is avoidable.

Impact Assessment

Site preparation and earthworks could result in soils being disturbed or lost and should be managed through the removal and stockpiling of topsoil. Improper recovery and separation of soils could result in topsoil being left under infrastructure or mixed with fill and spoil material and thus lost. Improper handling of the soils could compromise the soil structure and functionality. Vehicle movement and machinery could result in the compaction of soils. In the case of compaction the soils' functionality would firstly be compromised through a lack of rooting ability and aeration, and secondly the compacted soils are likely to erode because with less inherent functionality there would be little chance for the establishment of vegetation and other matter that naturally protects the soils from erosion. Disturbed and exposed soils are susceptible to erosion (through action of wind or water) as a result of the lack of vegetative cover and friability of the soil structure. Eroded soils, although the erodibility of the soils on site is not considered to be high, would be lost from the area of disturbance.

Stripping and handling of soils within the widened and realigned footprint would result in a resource loss that would remain until such time as the discontinued sections are rehabilitated. The extent of these footprints are limited and predominantly within the existing road servitude.

Issue: Soil Conservation		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate disturbance	Minor disturbance
Duration	Short-term	Very short
Extent	Part of the site	Part of the site
Consequence	Low	Low
Probability	Probable	Probable
Significance	Low	Very Low
Nature of cumulative impacts	Loss of soils due to continued poor land management (existing soil erosion) and grazing could contribute to cumulative impacts.	
Degree to which impact can be reversed	Provided that soils are recovered from the proposed road footprint, and reused in the region, the impact reversibility is high.	

Degree to which impact may cause irreplaceable loss of resources	High – topsoil is a critical resource
Degree to which impact can be mitigated	Moderately high
Residual impacts	Once soil is removed from *in situ* and handled, the area of land and natural soil functionality would be permanently lost.
Mitigated outcome	The area in which soils are disturbed by development activities is minimised. The recovery of topsoil from development areas is maximised. The area and duration for which disturbed soils are exposed to potential erosion is minimised.

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- Establish the site boundary/servitude at the start of construction and keep all activities within this boundary/servitude.
- Restrict vehicle and machinery movement to designated areas.
- Strip, store and maintain soils in line with the soil management plan (this includes measures for erosion control). Soil from the construction footprint must be carefully excavated with the subsoils being stockpiled separately from the topsoil.
- When disturbed areas are rehabilitated, the subsoils must go back first, and then the topsoil. Gentle compaction must be done. If there is to be surplus soil then the quantity of subsoil returned must be reduced. All topsoil must be used as it will contain seeds of indigenous plants. Where possible, beneficial uses for soils should be pursued.
- Ensure that the duration for which soils are stripped and stored is kept to a minimum with soils utilized to rehabilitate the road upgrade areas as construction progresses.
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Prevent concentrated surface water flow across rehabilitated areas.
- Prevent livestock access to rehabilitated areas until vegetation is established.

Monitoring

The following monitoring is recommended (see EMPr in Appendix G):

- Visual inspections of disturbed areas for erosion and rehabilitation status.

7.2 ISSUE: LOSS OF SOIL RESOURCES THROUGH CONTAMINATION

Description of impact

The construction activities associated with the proposed Sdangeni Access Road has the potential to damage soil resources through contamination.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable.

Contamination of soil resources could occur through potential spillages from the use and handling of fuels, lubricants and other potential contaminants. Additionally dirty surface water runoff or effluent from activity areas and poor waste management practices could result in soil contamination. This could alter the soil composition, negatively impacting on the chemistry of the soils such that current growth conditions are impaired.

Impact assessment

Sources of contamination exist during construction through the operation of earth moving equipment and the refuelling/ servicing thereof. Fuel and chemical storage areas as well as batching facilities are potential

contamination sources. Contamination of soil resources is considered to be of **MEDIUM** significance without mitigation and **VERY LOW** with mitigation (see Table 7-1 below).

TABLE 7-1: IMPACT SUMMARY – CONTAMINATION OF SOIL RESOURCES

Issue: Loss of agricultural soil resources through contamination		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or disturbance	Moderate change or disturbance
Duration	Medium term	Short term
Extent	A part of the site	A part of the site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium	Very Low
Nature of cumulative impacts	Contaminations might occur from surrounding vehicular movements.	
Degree to which impact can be reversed	Soils can be bio-remediated in situ or alternatively the contamination can be collected and removed.	
Degree to which impact may cause irreplaceable loss of resources	High	
Degree to which impact can be mitigated	High	
Residual impacts	With mitigation, no residual impacts are expected.	
Mitigated outcome	The area in which soils are disturbed by development activities is minimised. The potential for soil contamination from exposure to fuels, chemicals and other hazardous materials is minimised.	

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- Store and manage fuels, chemicals and other hazardous materials in manner that prevents spillages and dispersion to the environment.
- Maintain vehicles and plant to prevent accidental release of fuels.
- Vehicle servicing should be done offsite and any emergency repairs should make use of appropriate impermeable surfaces.
- Manage waste generated on site.
- Handle major spillage incidents in accordance with the emergency response procedure.

Monitoring

The following monitoring is recommended (see EMPr in Appendix G):

- Visual inspections of disturbed areas for signs of contamination.

7.3 ISSUE: LOSS OF TERRESTRIAL HABITAT AND BIODIVERSITY THROUGH PHYSICAL DISTURBANCE

Description of impact

Impact assessment

Site preparation and earthworks would result in removal of vegetation and soils. The development of infrastructure over these areas would completely transform the site, rendering it unavailable as habitat for flora and fauna. Vehicle and machinery movement, material storage and handling and other construction activities are likely to result in trampling of vegetation and compaction of soils in the adjacent areas. This would dramatically reduce the habitat quality and alter biodiversity. Such areas could be partially restored during landscaping and rehabilitation such that certain naturally occurring flora and fauna occupy the site.

The loss and transformation of habitat as well as increased levels of disturbance would also render the site less suitable as a corridor for the movement of biodiversity between remaining habitats in the region. The establishment and spread of alien invasive floral species as a result of disturbances could further degrade habitat and limit food availability of various faunal species.

The above impacts are expected to mainly occur during the construction phase. It is expected that a site boundary would be established at the start of construction and that direct impacts would therefore be limited to the project site. The impact on the terrestrial biodiversity resources is considered to be of **LOW** without mitigation and **Very Low** with mitigation (see Table 7-2 below).

TABLE 7-2: IMPACT SUMMARY – LOSS OF TERRESTRIAL HABITAT AND BIODIVERSITY

Issue: Loss of terrestrial habitat and biodiversity through physical disturbance		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor disturbance	Minor disturbance
Duration	Short-term	Short Term
Extent	Part of the site	Part of the site
Consequence	Low	Low
Probability	Probable	Probable
Significance	Low	Very Low
Nature of cumulative impacts	Loss of biodiversity due to continued poor land management and grazing could contribute to cumulative impacts.	
Degree to which impact can be reversed	Removal of the infrastructure and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely.	
Degree to which impact may cause irreplaceable loss of resources	Low. There are a few protected species within the grassland and riparian areas, however, no species of conservation importance were identified during the site visit.	
Degree to which impact can be mitigated	High	
Residual impacts	While the significance of the impact (post mitigation) is Low, a net loss of terrestrial habitat will occur.	
Mitigated outcome	The area in which soils and vegetation are disturbed by development activities is minimised. Areas disturbed during construction are required to be rehabilitated and revegetated on a progressive basis ensuring a coverage equal to 75% of the neighbouring vegetative cover.	

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- Implement soil mitigation measures per previous sections.
- Arum lillys, which are protected, need to be conserved along the development footprint.
- Fauna encountered during the development should not be harmed.
- If livestock are encountered measures should be implemented to exclude them from the
- development footprint.
- Concurrent landscaping and revegetation are to be undertaken as the construction front progresses.
- Utilize locally appropriate, indigenous plant species in the landscaping.
- Manage alien invasive plant species within rehabilitated areas

Monitoring

The following monitoring is recommended (see EMPr in Appendix G):

- Visual inspection to confirm successful re-vegetation of disturbed and alien invasive plant encroachment.

7.4 ISSUE: DISTURBANCES OF AQUATIC HABITAT AND RELATED BIODIVERSITY

Description of impact

When making inferences on the impact of road construction on the local aquatic ecosystems, it is important to understand that these impacts speak specifically to their effect on the PES and EIS or functional value of aquatic ecosystems. All of these are linked to the physical components and processes of aquatic ecosystems, including hydrology, geomorphology and vegetation as well as the biota that inhabit these ecosystems. Impacts will vary across water resource types depending on natural site attributes that affect local sensitivity including aspects such as:

Impact assessment

Impacts will vary across water resource types depending on natural site attributes that affect local sensitivity including aspects such as:

- The source of water inputs to the system.
- The patterns of flows within the system.
- Existing water quality characteristics.
- The vulnerability of the site to erosion.
- Natural biotic characteristics including the presence of important species.
- The importance of existing functional values.
- The nature and design of the proposed road infrastructure.

Physical alteration of water resources brought about by the road may result in a decline in the condition and functional value of affected ecosystems. Impacts to aquatic ecosystems are not necessarily limited to the road footprint however and could have implications on downstream environments.

Disturbance of the downstream natural aquatic habitat and related biodiversity is assessed to be of **LOW** significance without mitigation and **Very Low** significance with mitigation (see Table 7-3 below).

TABLE 7-3: IMPACT SUMMARY – DISTURBANCES OF AQUATIC HABITAT AND RELATED BIODIVERSITY

Issue: Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor change	Negligible change
Duration	Very short-term	Very short-term
Extent	A part of the site	A part of the site
Consequence	Very Low	Very Low
Probability	Conceivable	Unlikely
Significance	Low	Insignificant
Nature of cumulative impacts	The contribution of the project to the cumulative impact is insignificant.	
Degree to which impact can be reversed	The impact would largely be reversed on cessation of the construction activities.	
Degree to which impact may cause irreplaceable loss of resources	Limited given the low value of the existing environment	
Degree to which impact can be mitigated	High	
Residual impacts	The completed watercourse crossings are not expected to have any significant residual impact.	
Mitigated outcome	Disturbance footprints within watercourses/aquatic areas are minimised. Development does not result in further degrading of the ecological functionality of the affected watercourses.	

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- Demarcate the watercourse areas along the route and advise the construction manager of the need to work with care to minimize disturbance and risks.
- Implement adequate stormwater runoff attenuation structures and rehabilitate the sites around the crossing.
- Concentrated flow release points should dissipate and regulate flow off the surfaces towards the natural drainage lines, via a number of discharge points.
- At all times, disturbance to wetland areas should be avoided.
- Employ soil erosion protection to prevent ingress of sediments and contaminants and to protect against increased flow velocities within the watercourse.
- Implement soil mitigation measures per previous sections (See Sections 7.2 and 7.3).
- Maintain through flow of water through the aquatic ecosystem.

Monitoring

The following monitoring is recommended (see EMPr in Appendix G):

- Visual inspection of watercourses.
- Monitoring of SASS, PES and EIS.

7.5 ISSUE: INCREASE IN AMBIENT AIR CONCENTRATIONS

Description of impact

During construction dust generated from vegetation clearing, soil grubbing, material handling and the movement of vehicles on unsurfaced areas may contribute to elevated particulate matter levels in the air. In addition wind erosion from exposed materials could also contribute to elevated particulate matter levels. This could result in increased dust fall on a local scale and higher particulate matter loads. Emissions would also be generated by vehicles and other combustion-driven equipment (e.g. generators) that release nitrogen oxides (NO_X), carbon dioxide (CO_2), carbon monoxide (CO) and volatile organic compounds (VOC).

Impact assessment

Dust impacts are linked directly to the location of the active construction front and are considered a nuisance related impact. Air quality related impacts from an increase in emissions is considered from the perspective that the receiving environment is already impacted from dust and that receptors are limited. With mitigation and given that the construction phase is short term/temporary, the overall intensity and consequence of potential impacts would be low. The related significance is considered to be **LOW** without mitigation and **VERY LOW** with mitigation

TABLE 7-4: IMPACT SUMMARY – INCREASE IN AMBIENT AIR CONCENTRATIONS

Issue: Increase in ambient air concentrations		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minor (Slight) change or disturbance
Duration	Short-term	Short-term
Extent	A part of the site	A part of the site
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low	Very Low
Nature of cumulative impacts	Existing emissions from vehicles and fugitive dust from the environment and agricultural land practises	

Degree to which impact can be reversed	Incremental impact would cease when construction halts.
Degree to which impact may cause irreplaceable loss of resources	Unlikely, with mitigation.
Degree to which impact can be mitigated	Medium
Residual impacts	Despite the cessation of construction, there will remain a residual impact on ambient air quality as a result of the operation of road and land use practises in the region.
Mitigated outcome	Emissions from the construction site comply with the NAAQS and Dust Control Regulations.

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- Limit dust sources.
- Ensure that vehicles and construction machinery are maintained as per the manufacturer's specifications.
- Application of a dust allaying agent at the source of the impact will reduce the likelihood of an impact.
- Implement soil mitigation measures.

Monitoring

The following monitoring is recommended (see EMPr in Appendix G):

- Maintain a complaints register.
- Emissions are to be monitored in terms of the NAAQS and Dust Control Regulations in the event dust limits are exceeded.

7.6 ISSUE: INCREASE IN DISTURBING NOISE LEVELS AFFECTING POTENTIAL HUMAN RECEPTORS

Description of impact

Despite the ambient noise levels of the project being elevated as a result of the existing traffic movement along the route, construction will introduce related noise different to what is experienced on site prior to the upgrade commencing.

Table 7-5 details the acceptable noise levels as published in the SANS 10103:2008 for various districts. Levels considered applicable to the proposed Sdangeni Assess Road a) Rural Districts.

TABLE 7-5: SANS 10103:2008 AVERAGE NOISE LEVELS

Equivalent Continuous rating level LReq.T for ambient noise dBA						
	Outdoors			Indoors, with open windows		
Type of district	Day-night	Daytime	Night-time	Day-night	Daytime	Night-time
a) Rural districts.	**45**	**45**	**35**	**35**	**35**	**25**
c) Urban districts.	55	55	45	45	45	35
d) Urban districts with some workshops, with business premises and with main roads.	60	60	50	50	50	40
e) Central business district	65	65	55	55	55	45

Operation of earth moving equipment such as Front-End-Loaders, excavators, tipper trucks typically exceeds these permitted ranges.

Impact assessment

Naturally noise attenuates as the sound wave moves away from its source, however the residents living on the boundary of the proposed site will be impacted upon by sudden noises outside of the ambient, such as tipper truck bins slamming shut, or reversing sirens.

These noises would have a high intensity but occur at the construction front where after the impact would process along the site.

The impact on human noise receptors is considered to be of **Low** significance without mitigation and remain **LOW** as mitigation is limited (see Table 7-6 below).

TABLE 7-6: IMPACT SUMMARY – INCREASE IN DISTURBING NOISE

Issue: Increase in disturbing noise levels affecting potential human receptors		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change	Prominent change
Duration	Very short	Very short
Extent	Part of the site	Part of the site
Consequence	Low	Low
Probability	Definite	Definite
Significance	Low	Low
Nature of cumulative impacts	Developments within the area could contribute to noise impacts on third party receptors.	
Degree to which impact can be reversed	Low.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable.	
Degree to which impact can be mitigated	High.	
Residual impacts	With mitigation it is unlikely that noise induced stress and related health issues would be felt beyond the life of the project.	
Mitigated outcome	Dust emissions remain within the limits defined in the SANS 10103: 2008.	

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- Keep all equipment and machinery in proper working order.
- Minimise vehicle-related noise emissions.
- Implement an equipment and vehicle maintenance programme.
- Restrict construction

Monitoring

The following monitoring is recommended (see EMPr in Appendix G):

- Register and address any noise complaints.
- Noise monitoring in terms of SANS 10103:2008 is to occur during construction if complaints are registered.

7.7 ISSUE: ECONOMIC IMPACT (POSITIVE)

Description of the impact

Municipal construction procurement processes are conducted in strict accordance with the South African National Treasury requirements. Procurement is specifically in line with the countries Broad Based Black Economic Empowerment (BBBEE) which encourages the use of conforming local providers as suppliers of construction materials and labour. Furthermore, it is expected that the project will be undertaken in terms of the South African Expanded Public Works Programme.

Impact assessment

According to the NDZM, the unemployment rate within the municipality is one of the highest in the South Africa at 62.52% and has a youth unemployment rate of 70.71%, statistics which national government has highlighted as critical items to redress.

Employment as a result of the proposed project is temporary in nature, however given the high unemployment rate, regardless of the short-term duration is to be encouraged.

The structures through which the procurement of labour and supplies and the upskilling of local labour are implicit in the Department of Public Works, Expanded Public Works Programme. The mitigated scenario is therefore superfluous.

TABLE 7-7: IMPACT SUMMARY – ECONOMIC IMPACT (POSITIVE)

Issue: Economic impact (positive and negative)		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or improvement	NA
Duration	Short-term	
Extent	Local area	
Consequence	High	
Probability	Definite	
Significance	High (positive)	
Nature of cumulative impacts	Localised spending by contractors employed as part of the proposed project would present a cumulative (positive) impact. Similarly, any employment subsequent to local contractors having undertaken one of the upskilling programmes would also be a cumulative impact of the proposed project.	
Degree to which impact can be reversed	Not applicable	
Degree to which impact may cause irreplaceable loss of resources	Not applicable	
Degree to which impact can be mitigated	Not applicable	
Residual impacts	Any employment post the completion of the project as a result of experience gained or improved skills base would be a residual impact.	

Mitigation actions

Mitigation of this impact is not required.

Monitoring

Monitoring is not required.

7.8 ISSUE: SOCIAL BENEFITS ASSOCIATED WITH IMPROVED INFRASTRUCTURE (POSITIVE)

Description of the impact

Motivation for the proposed project is to improve mobility of local residences. Currently, the Sdangeni residences are required to undertake a significant detour to access the main arterial route linking to the local commercial nodes of Bulwer and Underberg. The proposed Sdangeni Access Road will reduce time and costs for commuters.

Impact assessment

While, these positive impacts are linked primarily to the operation of the Sdangeni Access Road, it is important to note the benefits afforded to society at local and regional scales. These impacts are considered to have a **High positive** significance. Mitigation is unnecessary

TABLE 7-8: IMPACT SUMMARY – BENEFITS ASSOCIATED WITH IMPROVED INFRASTRUCTURE

Issue: Social benefits associated with improved infrastructure (positive)		
Phases: Upon completion of construction and operational		
Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or improvement	NA
Duration	Very long commencing with the cessation of construction	
Extent	Local/ regional	
Consequence	High (Low during construction)	
Probability	Definite	
Significance	Very High (positive)	
Nature of cumulative impacts	Commuter time will be reduced and associated costs	
Degree to which impact can be reversed	Not applicable, as this is a positive impact.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable, as this is a positive impact.	
Degree to which impact can be mitigated	Not applicable.	
Residual impacts	None	

Mitigation actions

Mitigation of this impact is not required.

Monitoring

Monitoring is not required.

7.9 ISSUE: DISTURBANCE OF GROUND RESULTING IN DAMAGE TO HERITAGE RESOURCES

Description of impact

The HIA identified that the current suggested road alignment intersects an area demarcated for graves. Construction of the infrastructure and related services has the potential to damage or uncover heritage resources through direct physical disturbance.

Risks to the grave area associated with the proposed implementation of the Sdangeni Access Road include:

- Increased human activity close to the grave area;

- Vibrations resulting from the operation of construction equipment and earth moving machinery resulting in a disturbance graves.

The proposed access road is located in an area of very high palaeontological sensitivity. Heritage resources and places or objects of cultural significance and are protected by the NHRA.

Impact assessment

The presence of grave sites within the proposed access road route presents an environmental risk that without mitigation will result in a High intensity impact.

Mitigation measures will significantly reduce the intensity of an impact should an impact occur. Mitigation would also reduce the duration of the impact as the contract would have the mechanism through which an impact could be identified, qualified, and rectified. These mitigation measures would reduce a Medium significance to Very-Low.

TABLE 7-9: DISTURBANCE OF GROUND RESULTING IN DAMAGE TO HERITAGE RESOURCES

Issue: Disturbance of ground resulting in damage to heritage resources		
Phases: Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	High	Low
Duration	Long-term	Short -term
Extent	Whole site	Whole site
Consequence	High	Medium
Probability	Possible	Unlikely
Significance	Medium	Very - Low
Nature of cumulative impacts	No cumulative impacts are anticipated.	
Degree to which impact can be reversed	Should a disturbance occur, impacts are reversable through a consultative process with the aggrieved party and ECHRA/ SAHRA	
Degree to which impact may cause irreplaceable loss of resources	Unmitigated, the impacts would result in a medium to high irreplaceable loss of resources. However, with mitigation, can be replace or rectified.	
Degree to which impact can be mitigated	Very high. The road requires a minor realignment to avoid the grave sites	
Residual impacts	None	
Mitigated outcome	Impact to heritage resources is minimised.	

Mitigation actions

The following measures are recommended (see EMPr in Appendix G):

- The contractor is required to undertake environmental awareness training.
- Implement Chance Find Protocol in the event of a potential discovery.
- The access road will need to be realigned or the graves need to be relocated. Realignment is the preferred option in terms of Heritage management. Preferably there needs to be a 20m buffer between the footprint and the graves; however, if the lower route option is chosen then there will be minimal area to work and the buffer could be reduced to 5m – 10m. The road will need to stop at the existing fence and not extend into the fenced off area. A buffer should be built between the road edge and the fence. This can be in the form of an earthwork barrier. The proposed realignment 2 is recommended. Figure 7-1 depicts the proposed road realignments and grave site area.

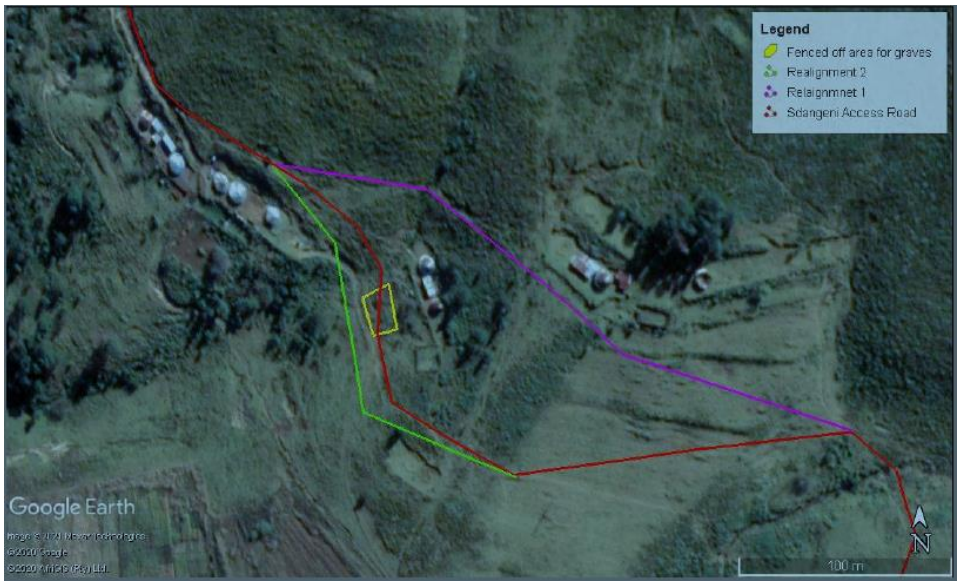


FIGURE 7-1: PROPOSED ROAD REALIGNMENT OPTIONS

Monitoring

- A photographic record of all gravesites and headstones is to be collected prior to construction
- A suitably qualified paleontologist will need to be hired to undertake monitoring and sampling of the access road during construction phase.

8 CONCLUSIONS AND RECOMMENDATIONS

This chapter summarises the key findings of the study.

8.1 ENVIRONMENTAL IMPACT STATEMENT AND SUMMARY

The applicant, Nkosazana Dlamini Zuma Municipality, is proposing the development of the Sdangeni Access Road, in the KwaZulu-Natal Province. The objective of the proposed project is to provide the Sdangeni Community with direct access to regional road network and nearby centres such as Bulwer and Underberg.

The proposed upgrade includes activities listed under the EIA Regulations, 2014, promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998), as amended. In addition, the proposed project also requires authorisation from the Department of Human Settlement, Water and Sanitation for specific water uses under Section 21 of the National Water Act, 1998 (No. 36 of 1998).

Specialist input was provided on the likely impact of the proposed project on the biophysical and cultural aspects of the environment. The findings of the specialist input and other relevant information have been integrated and synthesised into this final BAR. The main objectives of this final BAR are, firstly, to assess the environmental significance of impacts resulting from the proposed upgrade activities and to suggest ways of mitigating negative impacts and enhancing benefits. A summary of the assessment of potential impacts is provided in Table 8-1.

TABLE 8-1: SUMMARY OF THE SIGNIFICANCE OF THE POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED PROJECT

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Loss of soil resources through physical disturbance	L	VL
Loss of agricultural soil resources through contamination	M	VL
Loss of terrestrial habitat and biodiversity through physical disturbance	L	VL
Disturbances of aquatic habitat and related biodiversity	L	L
Increase in ambient air concentrations	L	VL
Increase in disturbing noise levels affecting potential human receptors	L	L
Economic impact	H+	NA
Social benefits associated with improved infrastructure	VH+	NA
Disturbance of ground resulting in damage to heritage resources	M	VL

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact;

The mitigated assessment assumes that design controls, as included in the project scope, together with mitigation measures included in the EMPr would be included for implementation during construction. As a result, the majority of potential biophysical impacts associated with the Sdangeni Access Road would be restricted to the construction site or parts thereof and only persist for a finite duration (short or very short term). The potential impacts on biophysical aspects are considered to be a of **lower** significance with mitigation.

Noise and emissions from construction activities present a social environmental risk which, if unmitigated, presents a **MEDIUM** significance. Mitigation is therefore necessary, and if implemented, is assessed to decrease the significance to an acceptable **LOW** significance.

The socio-economic benefits associated with the proposed Sdangeni Access Road are both considered to have a **HIGH** significance relating to economic stimulation and increased commuter mobility. The significance of these positive benefits is directly linked to the projects implementation and as a result supports the recommendation that the No-go Alternative is not supported.

8.2 ENVIRONMENTAL SENSITIVITY

A consolidated illustration of the environmental sensitivities associated with the proposed project is provided in Figure 8-1.

FIGURE 8-1: ENVIRONMENTAL SENSITIVITY MAP

8.3 IMPACT MANAGEMENT OUTCOMES FOR THE DEVELOPMENT FOR INCLUSION IN THE EMPR

The assessment of environmental impacts in Section 7 is based on the implementation of reasonable mitigation actions in order to arrive at an outcome considered reasonable to arrive at outcomes considered acceptable. These impacts and outcomes are listed in Table 8-2.

TABLE 8-2: ENVIRONMENTAL IMPACTS AND OUTCOMES

	Potential impact	Outcome
i.	Loss of soil resources through physical disturbance	The area in which soils are disturbed by development activities is minimised. The potential for soil contamination from exposure to fuels, chemicals and other hazardous materials is minimised.
ii.	Loss of agricultural soil resources through contamination	The area in which soils are disturbed by development activities is minimised. The potential for soil contamination from exposure to fuels, chemicals and other hazardous materials is minimised.
iii.	Loss of terrestrial habitat and biodiversity through physical disturbance	Areas disturbed during construction are required to be rehabilitated and re-vegetated on a progressive basis ensuring a coverage equal to 75% of the neighbouring vegetative cover.
iv.	Disturbances of aquatic habitat and related biodiversity	Construction is prohibited from further degrading the ecological functionality of the affected watercourses.
v.	Increase in ambient air concentrations	Emissions from the construction site are required to comply with the NAAQS.
vi.	Increase in disturbing noise levels affecting potential human receptors	Dust emissions are required to remain within the limits defined in the SANS 10103: 2008.
vii.	Economic impact	Municipal procurement objectives are met.
viii.	Social benefits associated with improved infrastructure	Improved infrastructure longevity and functionality.
ix.	Disturbance of ground resulting in damage to heritage resources	Impact to heritage resources is minimised.

8.4 OPINION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

The key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice, are integrated below as part of the supporting rationale for recommending an opinion on whether the proposed project should be approved.

Ecological integrity

Based on the specialist findings used to inform this BAR, the proposed project will not further detrimentally impact on the ecological functionality of the receiving environment. Identified impacts are considered to have a low significance and are not considered a risk to ecological integrity.

Economic efficiency

The implementation of the proposed project will serve to increase the functionality of the route and to provide a short-term source of economic stimulus in one of the poorest regions in KwaZulu-Natal.

Equity and social justice

Project spend by NDZM in order to implement the proposed project will be administered in accordance with South Africa's BBBEE objectives. The implication is that significant financial benefit will be afforded to local enterprises and service providers. This is expected to have a wider reaching positive trickledown effect on the wider community in a region regarded as being one of the poorer and more marginalised in South Africa.

Conclusion and Recommendation

It is the opinion of SLR that in terms the sustainability criteria described above there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favourable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental Management Programmes for implementation during construction.

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APPENDIX A: EAP UNDERTAKING

APPENDIX B: CURRICULA VITAE OF THE EAP TEAM

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Appendix C.1: Pre-application meeting notes
Appendix C.2: I&AP database
Appendix C.3: Proof of placement of site notices
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APPENDIX C.4: PROOF OF ADVERTISEMENT

APPENDIX C.5: PROOF OF IAP NOTIFICATION LETTER

APPENDIX C.6: PROOF OF SUBMISSION OF DBAR

APPENDIX C.7: CORRESPONDENCE ON DBAR

APPENDIX C.8: COMMENTS AND RESPONSES REPORT

APPENDIX D: HERITAGE IMPACT ASSESSMENT

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APPENDIX G: ENVIRONMENTAL MANAGEMENT PROGRAMME