

ETHEKWINI TRANSPORT AUTHORITY

PROPOSED CONSTRUCTION OF ELEVENTH AVENUE INTERCHANGE, CLERMONT

DRAFT BASIC ASSESSMENT REPORT

EDTEA REFERENCE: DM/0009/2018

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1 INTRODUCTION

1.1 BACKGROUND

The eThekweni Municipality: Transport Authority (ETA) currently holds an environmental authorisation (EA) (Reference number: DM/0044/2012) for the Integrated Rapid Public Transport Network (IRPTN) – Trunk Route (Corridor) 3 which links Bridge City via the M35 (Dinkleman Road) and MR577 to Pinetown Central Business District (CBD), with a spur from Clermont, within the eThekweni Municipality. The EA was issued on 04 October 2013 by the Department of Agriculture and Environmental Affairs (DAEA), now referred to as the Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

The EA authorises the construction of a Bus Rapid Transit (BRT) service supported by a road-based feeder and complementary services known as the IRPTN. The approved Corridor 3 starts from Bridge City (KwaMashu) and transverse areas of KwaMashu, Ntuzuma, KwaDabeka, New Germany and ends in Pinetown and comprises of the following:

- Bus Right of Way (dedicated bus ways and associated priority infrastructure);
- Terminal stations;
- On route stations and station precincts;
- Control centre (Transport Management Centre);
- Bridge City Depot
- Vehicles fleets; and
- Integrated Fare Management Systems.

The ETA has reassessed the authorised design and propose the construction of the Eleventh Avenue Interchange near New Germany (Figure 1). The current Eleventh Avenue Interchange only allows access to KwaDabeka. The interchange has been redesigned to allow for access from both KwaDabeka and Berkshire Downs and allow for pedestrian access to Harmony Heights Station. The proposed Eleventh Avenue Interchange forms part of Corridor 3 from Bridge City (KwaMashu) to Pinetown CBD.

1.2 TERMS OF REFERENCE

The proposed Eleventh Avenue Interchange necessitates an EA in the form of a Basic Assessment (BA) process in accordance with the 2014 Environmental Impact Assessment (EIA) Regulations, as amended in April 2017, promulgated under the National Environmental Management Act (Act 107 of 1998). WSP Environmental (Pty) Ltd (WSP) was appointed in the capacity as independent environmental assessment practitioner (EAP) to undertake the BA process in accordance with the 2014 EIA Regulations, as amended.



Figure 1: Site Locality Map (WSP GIS, 2017)

1.3 PURPOSE OF THE BASIC ASSESSMENT PROCESS

The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process helps identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of potential negative and positive consequences of the proposed Eleventh Avenue Interchange.

1.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP has been appointed in the role of Independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed project. Table 1 outlines the details of the EAP and their expertise. A curriculum vitae is attached as Appendix A of this document.

Table 1: Details of Environmental Assessment Practitioner

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2 BASIC ASSESSMENT PROCESS

2.1 PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the 2014 EIA Regulations, as amended, the objective of the impact assessment process is to, through a consultative process:

- 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:
 - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - The degree to which these impacts—
 - Can be reversed;
 - May cause irreplaceable loss of resources; and
 - Can be avoided, managed or mitigated; and

- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - Identify and motivate a preferred site, activity and technology alternative;
 - Identify suitable measures to avoid, manage or mitigate identified impacts; and
 - Identify residual risks that need to be managed and monitored.
-

2.2 APPLICATION

The authorisation process for the proposed Eleventh Avenue Interchange commenced in April 2017. WSP originally submitted an Application to the EDTEA on 28 June 2017 for an Amendment (Part 2 (substantive)) to the existing EA. This application was withdrawn due to a change in the regulations which requires that a BA application be submitted. The stakeholder notification process undertaken for the amendment application remains valid for the current application and additional notification has been carried out.

A pre-consultation meeting was held with the EDTEA on 14 November 2017, which confirmed the requirement for a BA process to be followed. WSP originally submitted an Application for Environmental Authorisation (EDTEA Reference: DM/0048/2017) to the EDTEA on 20 November 2017. EThekwini were requested by the EDTEA to undertake additional stakeholder engagement with landowners who will be affected by the proposed development. The department responsible for facilitating the process within eThekwini Real Estates Unit were only able to carry out the initial engagement in March 2018. WSP submitted a request to withdraw the application due to the delay in timeframes. A new application form (EDTEA Reference: DM/0009/2018) was submitted on 19 March 2018 and acknowledgment of receipt was received on 19 March 2018 via email. This Basic Assessment Report (BAR) has been prepared in support of the new application, EDTEA Reference: DM/0009/2018.

2.3 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery and mapping. Site investigations were undertaken by the team in April 2017 to verify the desktop review information.

2.4 IMPACT ASSESSMENT METHODOLOGY

The key objectives of the risk assessment methodology are to validate impacts identified through a matrix, identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts.

The impacts associated with the proposed Eleventh Avenue Interchange have been assessed using the Hacking risk assessment methodology. The significance of environmental aspects was determined and ranked by considering the criteria presented in Table 2.

Table 2: Criteria Used to Determine the Significance of Environmental Aspects

Significance Ranking	Negative Aspects	Positive Aspects
H (High)	Will always/often exceed legislation or standards. Has characteristics that could cause significant negative impacts.	Compliance with all legislation and standards. Has characteristics that could cause significant positive impacts.
M (Moderate)	Has characteristics that could cause negative impacts.	Has characteristics that could cause positive impacts.
L (Low)	Will never exceed legislation or standards. Unlikely to cause significant negative impacts.	Will always comply with all legislation and standards. Unlikely to cause significant positive impacts.

Where significant environmental aspects are present (“high” or “moderate”), significant environmental impacts may result. The significance of the impacts associated with the significant aspects was determined by considering the risk:

Significance of Environmental Impact (Risk) = Probability x Consequence

The consequence of impacts were described by considering the severity, spatial extent and duration of the impact.

2.4.1 SEVERITY OF IMPACTS

Table 3 presents the ranking criteria used to determine the severity of impacts on the bio-physical and socio-economic environment. Table 4 provides additional ranking criteria for determining the severity of negative impacts on the bio-physical environment.

Table 3: Criteria for Ranking the Severity of Environmental Impacts

	NEGATIVE			POSITIVE		
Criteria	High-	Medium-	Low-	Low+	Medium+	High+
Qualitative	Substantial deterioration. Death, illness or injury.	Moderate deterioration. Discomfort.	Minor deterioration. Nuisance or minor irritation.	Minor improvement.	Moderate improvement.	Substantial improvement.
Quantitative	Measurable deterioration.		Change not measurable i.e. will remain within current range.		Measurable improvement.	
	Recommended level will often be violated.	Recommended level will occasionally be violated.	Recommended level will never be violated.		Will be within or better than recommended level.	
Community Response	Vigorous community action.	Widespread complaints.	Sporadic complaints.		No observed reaction.	Favourable publicity

Table 4: Criteria for Ranking the Severity of Negative Impacts on the Bio-physical Environment

RANKING CRITERIA			
-	Low (L-)	Medium (M-)	High (H-)
Soils and land capability	Minor deterioration in land capability. Soil alteration resulting in a low negative impact on one of the other environments (e.g. ecology).	Partial loss of land capability. Soil alteration resulting in a moderate negative impact on one of the other environments (e.g. ecology).	Complete loss of land capability. Soil alteration resulting in a high negative impact on one of the other environments (e.g. ecology).
Ecology (Plant and animal life)	Disturbance of areas that are degraded, have little conservation value or are unimportant to humans as a resource. Minor change in species variety or prevalence.	Disturbance of areas that have some conservation value or are of some potential use to humans. Complete change in species variety or prevalence.	Disturbance of areas that are pristine, have conservation value or are an important resource to humans. Destruction of rare or endangered species.
Surface and Groundwater	Quality deterioration resulting in a low negative impact on one of the other environments (ecology, community health etc.)	Quality deterioration resulting in a moderate negative impact on one of the other environments (ecology, community health etc.).	Quality deterioration resulting in a high negative impact on one of the other environments (ecology, community health etc.).

2.4.2 SPATIAL EXTENT AND DURATION OF IMPACTS

The duration and spatial scale of impacts can be ranked using the criteria in Table 5.

Table 5: Ranking the Duration and Spatial Scale of Impacts

RANKING CRITERIA			
-	Low (L-)	Medium (M-)	High (H-)
Duration	Quickly reversible Less than the project life Short-term	Reversible over time Life of the project Medium-term	Permanent Beyond closure Long-term
Spatial Scale	Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/national

Where the severity of an impact varies with distance, the severity was determined at the point of compliance or the point at which sensitive receptors will be encountered. This position corresponds to the spatial extent of the impact.

2.4.3 CONSEQUENCES OF IMPACTS

Having ranked the severity, duration and spatial extent, the overall consequence of impacts was determined using the following qualitative guidelines (Table 6).

Table 6: Ranking the Consequence of an Impact

Severity = Low (L)

SPATIAL SCALE		SEVERITY			
		LOW LOCALISED - WITHIN SITE BOUNDARY	MEDIUM BEYOND SITE BOUNDARY	HIGH FAR BEYOND SITE BOUNDARY	
DURATION	Long Term	High	Medium	Medium	Medium
	Medium Term	Medium	Low	Low	Medium
	Short Term	Low	Low	Low	Medium

Severity = Medium (M)

SPATIAL SCALE		SEVERITY			
		LOW LOCALISED - WITHIN SITE BOUNDARY	MEDIUM BEYOND SITE BOUNDARY	HIGH FAR BEYOND SITE BOUNDARY	
DURATION	Long Term	High	Medium	High	High
	Medium Term	Medium	Medium	Medium	High
	Short Term	Low	Low	Medium	Medium

Severity = High (H)

SPATIAL SCALE		SEVERITY			
		LOW LOCALISED - WITHIN SITE BOUNDARY	MEDIUM BEYOND SITE BOUNDARY	HIGH FAR BEYOND SITE BOUNDARY	
DURATION	Long Term	High	High	High	High
	Medium Term	Medium	Medium	Medium	High
	Short Term	Low	Medium	Medium	High

To determine overall significance (Table 6) one of the three "layers" based on the severity ranking was used. Thereafter the consequence ranking was determined by locating the intersection of the appropriate duration and spatial scale rankings.

2.4.4 OVERALL SIGNIFICANCE OF IMPACTS

Combining the consequence of the impact and the probability of occurrence, as shown by Table 7, was used to provide the overall significance (risk) of impacts.

Table 7: Ranking the Overall Significance of Impacts

CONSEQUENCE

(from Table 6)

			LOW	MEDIUM	HIGH
PROBABILITY	Definite Continuous	High	Medium	Medium	High
	Possible Frequent	Medium	Medium	Medium	High
	Unlikely Seldom	Low	Low	Low	Medium

The overall significance ranking of the negative environmental impacts provides the following guidelines for decision-making (Table 8):

Table 8: Guidelines for decision-making

SIGNIFICANCE OF IMPACT	NATURE OF IMPACT	DECISION GUIDELINE
High	Unacceptable impacts.	Likely to be a fatal flaw.
Moderate	Noticeable impact.	These are unavoidable consequence, which will need to be accepted if the project is allowed to proceed.
Low	Minor impacts.	These impacts are not likely to affect the project decision.

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed projects actual extent of impact, and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures, and is thus the final level of impact associated with the development of the Project. Residual impacts also serve as the focus of management and monitoring activities during proposed project implementation to verify that actual impacts are the same as those predicted in this BAR.

2.5 STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement (public participation) is a requirement of the BA process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the BA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by stakeholders that should be addressed in the subsequent specialist studies;

- Highlight the potential for environmental impacts, whether positive or negative; and
- Inform and provide the public with information and an understanding of the proposed project, issues and solutions.

A Stakeholder Engagement Report (SER) which contains further detail and proof of engagement undertaken by WSP is included in Appendix E1 of this report.

The proposed Eleventh Avenue Interchange requires the expropriation of two entire properties (Erf 615 and Erf 617) as well as small portions from two properties (Erf 600 and Erf 618) to accommodate the construction of an off ramp. The eThekweni Municipality Real Estate Unit distributed a written notice (Appendix E2) of the intention to expropriate to the affected parties (landowners and occupiers) on 09 March 2018. The process for expropriation allows 30 days from the delivery date of the Notice of Intention (NOI), for the affected parties to come forward with any issues or objections. A report which summarises this engagement has not been prepared because the 30 day deadline ends on 15 April 2018. A summary of the engagement by the ETA with the landowners will be included in the final BAR.

2.6 BASIC ASSESSMENT REPORT STRUCTURE

The draft BAR has been prepared to meet the requirements as described in Appendix 1 of GNR 326 of the NEMA EIA Regulations, 2014, as amended. For the purposes of demonstrating legal compliance, Table 9 cross-references the sections within the BAR with the requirements as per Appendix 1 of GNR 326.

Table 9: Legislation Requirements as detailed in Appendix 4 of GNR 326

Appendix 1, Section 3	Legislated requirements as per the NEMA GNR 326	Section
(a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section 1.4
(b)	the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 4.2
(c)	a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is— (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 4.3
(d)	a description of the scope of the proposed activity, including— (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken including associated structures and infrastructure;	Section 3.1
	(i) planning and design;	Section 4.4
	(ii) pre-construction activities;	Section 4.4.1
	(iii) construction activities;	Section 4.4.2

	(iv) rehabilitation of the environment after construction and where applicable post closure; and	Section 4.4.3
	(v) where relevant, operation activities;	Section 4.4.4
(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 have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 3
(f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 4.1
(g)	a motivation for the preferred site, activity and technology alternative;	Section 5
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including — (i) details of all the alternatives considered;	Section 5
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Appendix E
	(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;	Appendix E
	(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 5
	(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;	
	(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;	
	(viii) the possible mitigation measures that could be applied and level of residual risk;	

	(ix) the outcome of the site selection matrix;	
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(i)	a full description of the process undertaken to identify, assess and rank the impacts of 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 2.4
(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 2.4 (Table 17 and Table)
(k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 7
(l)	an environmental impact statement which contains— (i) a summary of the key findings of the environmental impact assessment; (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 7.5
(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;	Appendix F
(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 2.7
(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;	Not applicable
(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; and	EPA Declaration submitted with Application Form.
(s)	where applicable, details of any financial provision 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	To be confirmed
(u)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable

2.7 ASSUMPTIONS AND LIMITATIONS

General assumptions and limitations relating to the BA process are listed below:

- The EAP hereby confirms that they have undertaken to obtain project information from the client that is deemed to be accurate and representative of the project;
- Site visits have been undertaken to better understand the project and ensure that the information provided by the client is correct, based on site conditions observed;
- The EAP hereby confirms their independence and understands the responsibility they hold in ensuring all comments received are accurately replicated and responded to within the EIA documentation; and
- The comments received in response to the public participation process, are representative of comments from the broader community; and
- The competent authority would not require additional specialist input, as per the proposals made in this report, in order to make a decision regarding the application.

Notwithstanding these assumptions, it is the view of WSP that this BA report provides a good description of the issues associated with the project and the resultant impacts.

3 POLICY AND LEGISLATIVE CONTEXT

3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act (Act 107 of 1998) (NEMA) provides for duty of care and remediation of environmental damage imposes an obligation on the responsible person (including an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises) to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

The NEMA serves as the basis for all environmental frameworks in South Africa. On 4 December 2014 new EIA Regulations (GNR. 982) were promulgated in terms of Chapter 5 of the NEMA. These regulations were amended in April 2017 (GNR. 326). They contain three listing notices (GNR. 324, 325 and 327) which identify activities that are subject to either a BA process or Scoping and EIA process in order to obtain an EA. A BA process must be completed if the proposed project triggers activities listed in GNR. 327 (Listing Notice 1) or GNR. 324 (Listing Notice 3). Activities triggered in GNR. 325 (Listing Notice 2), require a Scoping and EIA process to be undertaken.

A pre-consultation meeting was held with the EDTEA on 14 November 2017 (Appendix B) to confirm the listed activities applicable to this application. The listed activities which are applicable to the proposed Eleventh Avenue Interchange for which EA is being applied for are presented in Table 10 below.

Table 10: Applicable NEMA Listed Activities

Listed Activity	Description	Project Relevance
GNR 327 (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: i. a watercourse	The proposed Eleventh Avenue Interchange involves the excavation of more than 10m ³ of material within a watercourse for the construction of a culvert.
GNR 324 (23)	The expansion of— ii. infrastructure or structures where the physical footprint is expanded by 10 square metres where such expansion occurs— (a) within a watercourse; d. KwaZulu-Natal xi. Inside urban areas: (aa) Areas zoned for use as public open space	The proposed project entails the expansion of the Eleventh Avenue Interchange which comprises of a culvert and infrastructure with a footprint 16000m ² . The proposed culvert is required to be constructed within a watercourse on a property that is zoned as open space.

3.2 NATIONAL WATER ACT

National Water Act (Act 36 of 1998) (NWA) aims to ensure that water resources are protected, used, developed, conserved, managed and controlled in a sustainable manner, for the benefit of everyone in South Africa. Section 19 includes various requirements to prevent and control water pollution. Potential risk to water quality during construction (spills) need to be identified and managed. The NWA aims to control the use of water, which may affect water resources through the licencing of specific water uses in terms of Section 21 of the act. Section 21 lists the following water uses which require a Water Use Licence (WUL).

- (a) taking water from a water resource;

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

A water use must be licensed unless it (a) is listed in Schedule 1, (b) is an existing lawful use, (c) is permissible under a GA; or (d) if a responsible authority waives the need for a licence. If none of these exclusions are relevant a WUL must be applied for and obtained prior to the commencement of such listed activity.

The proposed Interchange footprint lies within a wetland area (Appendix C1) and entails the construction of box culvert over the Aller River. The Section 21 water uses applicable to the proposed are listed in Table 11 below.

Table 11: Section 21 Water Uses

Relevant NWA Section	Water Use Description	Relevance to Proposed Activity
21 (c)	Impeding and diverting the flow of water in a watercourse;	The construction activities associated with the box culvert will require a temporary diversion of the Aller River.
21 (i)	Altering the bed, banks, course and characteristics of a watercourse.	The temporary diversion of the watercourse during construction will alter the characteristics of the watercourse.

A WUL application (General Authorisation (GA)) for the construction activities associated with the proposed Eleventh Avenue Interchange will be submitted to the Department of Water and Sanitation (DWS).

3.3 NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resources Act (Act 25 of 1999) (NHRA) provides protection of and management of conservation worthy places, areas and objects by heritage authorities, by means of registration and the implementation of certain protections. South African Heritage Resource Agency (SAHRA) is tasked with protecting heritage resources of national significance. Under Section 38 "(1)...any person who intends to undertake a development categorised as – (a) the construction of a road, wall powerline, canal or other similar form of linear development exceeding 300m in length; and (i) any development or activity exceeding 5000m² in extent...must at the earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. (2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1)notify the person who intends to undertake the development to submit an impact assessment report....or (b) notify the person concerned that this section does not apply".

A heritage impact assessment (HIA) (Appendix D2) undertaken by Active Heritage cc (2012) during the initial EIA of the proposed IRPTN Corridor 3 identified no heritage sites or features within the road reserve and within 30m on either side of the proposed corridor. The Eleventh Avenue Interchange will occur within an existing road reserve and properties adjacent to the road. Impacts on heritage resources are not anticipated as this was already confirmed during the initial

HIA. Should heritage resources be discovered during construction, work will cease immediately and notification made to suitably qualified relevant authorities, namely SAHRA. Relevant mitigation measures have been included in the Environmental Management Programme (EMPr).

3.4 EXPROPRIATION ACT

The proposed Eleventh Avenue Interchange require the expropriation of two full properties as well as small portions of two other properties to accommodate the construction of an off ramp. The proximity of dwellings to the existing Eleventh Avenue makes it impossible to expand the interchange without encroachment to private property. Compensation will need to be planned in accordance with the Expropriation Act, 1975, read with section 25(3) of the Constitution of the Republic of South Africa. Any required expropriation of the land will be managed by the applicant (eThekweni Municipality) in consultation with the affected parties prior to commencement of construction activities.

3.5 POLICIES AND GUIDELINES

3.5.1 NATIONAL DEVELOPMENT PLAN

The National Development Plan (NDP) envisages an urban South Africa in 2030 that is one of functionally integrated, balanced and vibrant urban settlements. Despite considerable government investment in urban areas of the country over the last 20 years, many urban residents are still extremely poor, have inadequate access to basic services and job opportunities, and face lengthy, expensive trips to work as a result of poorly located housing and poorly integrated and inaccessible public transport. The proposed Eleventh Avenue Interchange has been identified as infrastructure which will improve the link of previously disadvantaged communities to economic and social nodes, eliminating the inequalities of the apartheid settlement patterns.

3.5.2 KWAZULU NATAL PROVINCIAL GROWTH AND DEVELOPMENT PLAN

The KwaZulu-Natal Provincial Growth and Development Plan (PGDP) aims to curb poverty, inequality and achieve shared growth. The PGDP has identified spatial marginalisation as one of the key issues to be addressed through ensuring economic opportunities that will meet the majority of the population's needs. The proposed Eleventh Avenue Interchange forms part of Corridor 3 which will improve access for Clermont and KwaDabeka communities to economic and social opportunities.

3.5.3 ETHEKWINI INTEGRATED DEVELOPMENT PLAN (IDP)

The focus of the operational strategy is to develop the integrated rapid public transport network (IRPTN), services and modes and develop schedules in such a manner that passengers can move optimally from origin to destination most effectively, in the shortest possible time and with the minimum of fare-paying transactions. Consequently, the ETA's vision for transport recognises the imperatives of the IDP vision and sets a framework for goals and related policy which will have a positive impact on social and economic development and activities in the municipal area.

3.5.4 ETHEKWINI SPATIAL DEVELOPMENT FRAMEWORK (SDF)

The SDF is a transformation tool which guides the form and location of future spatial development in a manner that addresses the imbalances of the past. The SDF is also largely influenced by the Sustainable Development Goal (SDG) 11 which looks at making cities and human settlements inclusive, safe, resilient and sustainable. It aims to provide access to safe, affordable, accessible and sustainable transport systems by 2030. This entails improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations (i.e. women, children people with disabilities). The proposed interchange forms part of a Corridor 3 of the IRPTN which will link public transport, human settlement, economic and social infrastructure. The proposed interchange will provide efficient access for communities within the Clermont and Berkshire region to a higher level of economic and social opportunities.

Within the eThekweni Municipality, land acquisition functions are assigned to the Real Estate Unit and Land Assembly department within the Human Settlement Unit. The Real Estate Unit is the custodian of all municipal land and responsible for the disposal of municipal land and acquisition of land for development purposes. This unit will be responsible for undertaking the required land acquisition and compensation negotiations with the affected parties.

4 PROJECT DESCRIPTION

4.1 NEED AND DESIRABILITY

Public transport is one of the fundamental influences on economic and social well-being in the municipal area. Poorer communities and a large segment of the workforce are entirely dependent on public transport. Rapidly escalating costs accompanied by deteriorating service levels and standards of safety and security have characterised the public transport sector for many years. The ETA is mandated and is responsible for the planning, implementation and operations of public transport within the eThekweni district. They are responsible for providing fully functional integrated public transport networks that respond to the needs of the users. The eThekweni Municipality is in the process of restructuring public transport within the City in order to ensure that a sustainable, safe and efficient service is delivered. The overall goal of this initiative is to improve the quality of life for the city's residents through the establishment of an integrated rapid public transport network (IRPTN).

In 2013, the ETA was authorised to construct Corridor 3 from Bridge City (KwaMashu) to Pinetown CBD of the BRT Service (Figure 2). The proposed Corridor 3 route traverses a variety of land uses such as established townships, high and low density residential areas, commercial, light industrial and dense retail areas. It will provide new connections between two major centres Bridge City and Pinetown. The approved Corridor 3 layout is attached as Appendix D. The C3 corridor is approximately 23km long, starting at Bridge City and traverses areas of KwaMashu, Ntuzuma, KwaDabeka, New Germany and ends in Pinetown. The corridor has a variety of land uses, consisting of established townships, low density suburbs, commercial and light industrial and retail uses.

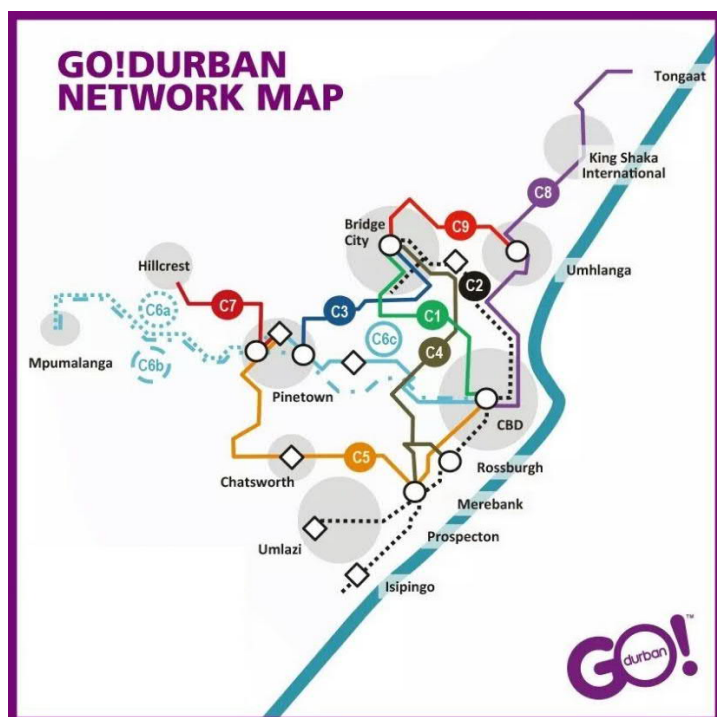


Figure 2: Integrated Public Transport Network (eThekweni Municipality)

The proposed Eleventh Avenue Interchange project includes the construction of additional roads, culvert and upgrade of the existing road network (Figure 3). The existing Eleventh Avenue Bridge over the Dinkleman Road only allows for access from and to KwaDabeka. Access from Berkshire Downs on the eastern side of the Dinkleman Road is through a grade intersection on Cummor Gardens Road. The revised layout comprises of a new grade separated interchange with access to the Dinkleman Road from both KwaDabeka and Berkshire Downs. It has been designed to accommodate pedestrian access to Harmony Heights Station over the Dinkleman Road.

The reasons for the proposed Eleventh Avenue Interchange are as follows:

- Provide universal access to the Harmony Heights Bus Station;
- Link the communities of Berkshire Downs and Clermont;
- Allow access to both North and South directions of Dinkleman Road; and
- Increase pedestrian safety.

4.2 PROJECT LOCATION

The proposed Eleventh Avenue Interchange is located near New Germany, which is approximately 15 kilometres south east from Durban city centre, in KwaZulu-Natal. The centre of the site is located at the following geographical co-ordinates Longitude: 30° 53' 13"E Latitude: 29° 47' 9"S. The proposed interchange site falls within ward 21 and ward 22 (Berkshire and Clermont) of the EThekweni Municipality.

4.2.1 21 SURVEYOR GENERAL CODES

The surveyor general codes for each of the cadastral land parcels associated with the project are outlined in Table 12.

Table 12: 21 Digit Surveyor General Code

21 Digit Surveyor General Codes																			
N	O	F	T	0	0	2	3	0	0	0	0	0	6	7	3	0	0	0	0
N	O	F	T	0	0	2	3	0	0	0	0	1	2	3	5	0	0	0	0
N	O	F	T	0	0	2	3	0	0	0	0	0	2	6	3	0	0	0	7
N	O	F	T	0	0	2	3	0	0	0	0	0	2	4	6	0	0	0	1
N	O	F	T	0	0	2	3	0	0	0	0	0	6	7	2	0	0	0	0
N	O	F	T	0	0	2	3	0	0	0	0	0	2	1	9	0	0	0	3
N	O	F	T	0	0	2	3	0	0	0	0	0	2	5	3	0	0	0	1
N	O	F	T	0	0	2	3	0	0	0	0	1	2	3	7	0	0	0	0
N	O	F	T	0	0	2	3	0	0	0	0	0	2	6	3	0	0	0	7
N	O	F	T	0	0	2	3	0	0	0	0	0	2	1	9	0	0	0	3
N	O	F	T	0	0	2	3	0	0	0	0	0	6	6	7	0	0	0	0
N	O	F	T	0	0	6	1	0	0	0	0	0	6	1	7	0	0	0	0

N	O	F	T	0	0	0	0	0	0	0	0	1	2	1	1	8	0	0	0	0	0
N	O	F	T	0	0	6	1	0	0	0	0	0	0	6	1	5	0	0	0	0	0
N	O	F	T	0	0	6	1	0	0	0	0	0	0	6	0	0	0	0	0	0	0
N	O	F	T	0	0	6	1	0	0	0	0	0	0	6	1	6	0	0	0	0	0
N	O	F	T	0	0	6	1	0	0	0	0	0	0	6	1	8	0	0	0	0	0
N	O	F	T	0	2	6	0	0	0	0	0	0	8	0	4	0	0	0	0	0	0

4.2.2 LANDUSE

The land use around the site is residential with the communities of Berkshire and KwaDabeka as the nearest receptors. The proposed Eleventh Avenue Interchange will be expanded onto the existing Eleventh Avenue Bridge over Dinkleman Road, utilising existing road alignments. New interchange sections will lie on land zoned as an Open Space which is under the eThekweni Municipal ownership. The south bound ramp will require the acquisition of private owned land Table 13 outlines the properties which will be affected by the construction of the proposed Eleventh Avenue Interchange. Two entire properties (Erf 615 and Erf 617) will expropriated as well as a small portions from two other properties (Erf 600 and Erf 618) to accommodate this component of the interchange. Some of the properties are occupied by land owners and tenants and one is vacant.

Table 13: Affected Properties

Property Description	Property Size	Total Area to be Expropriated	Ownership
Property 1 - Clermont Erf 600	1008 m ²	23m ²	Private
Property 2 - Clermont Erf 615	936 m ²	936m ²	Private
Property 4 - Clermont Erf 617	1614m ²	1614m ²	Private
Property 5 - Clermont Erf 618	1318. m ²	25m ²	Private

4.2.3 SITE ACCESS

Access to the site is off M5 (Dinkleman Road) onto the existing Eleventh Avenue or alternatively onto Lambourne Crescent and left onto Cunmor Gardens (Figure 4).

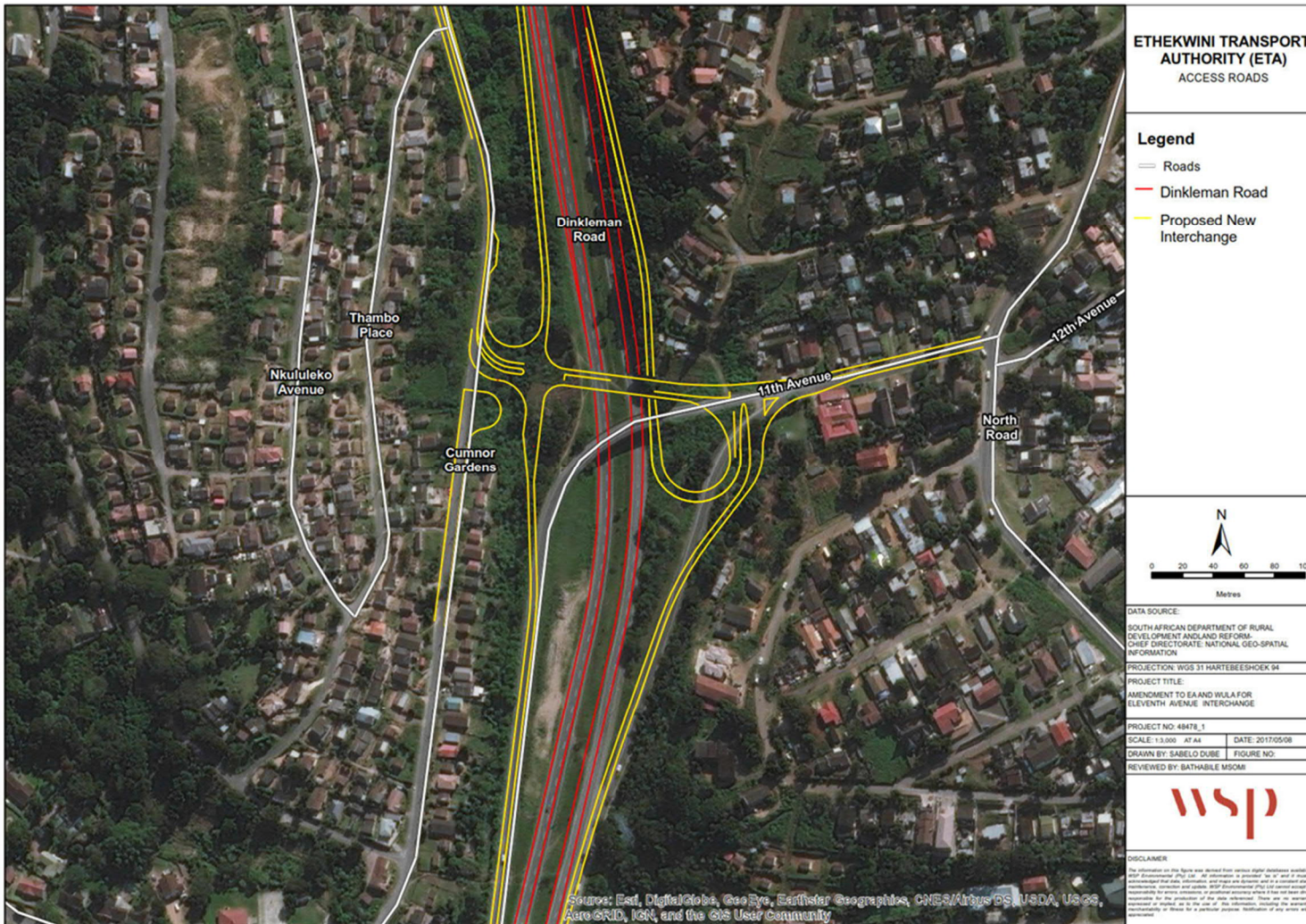


Figure 3: Roads Map (WSP GIS, 2018)

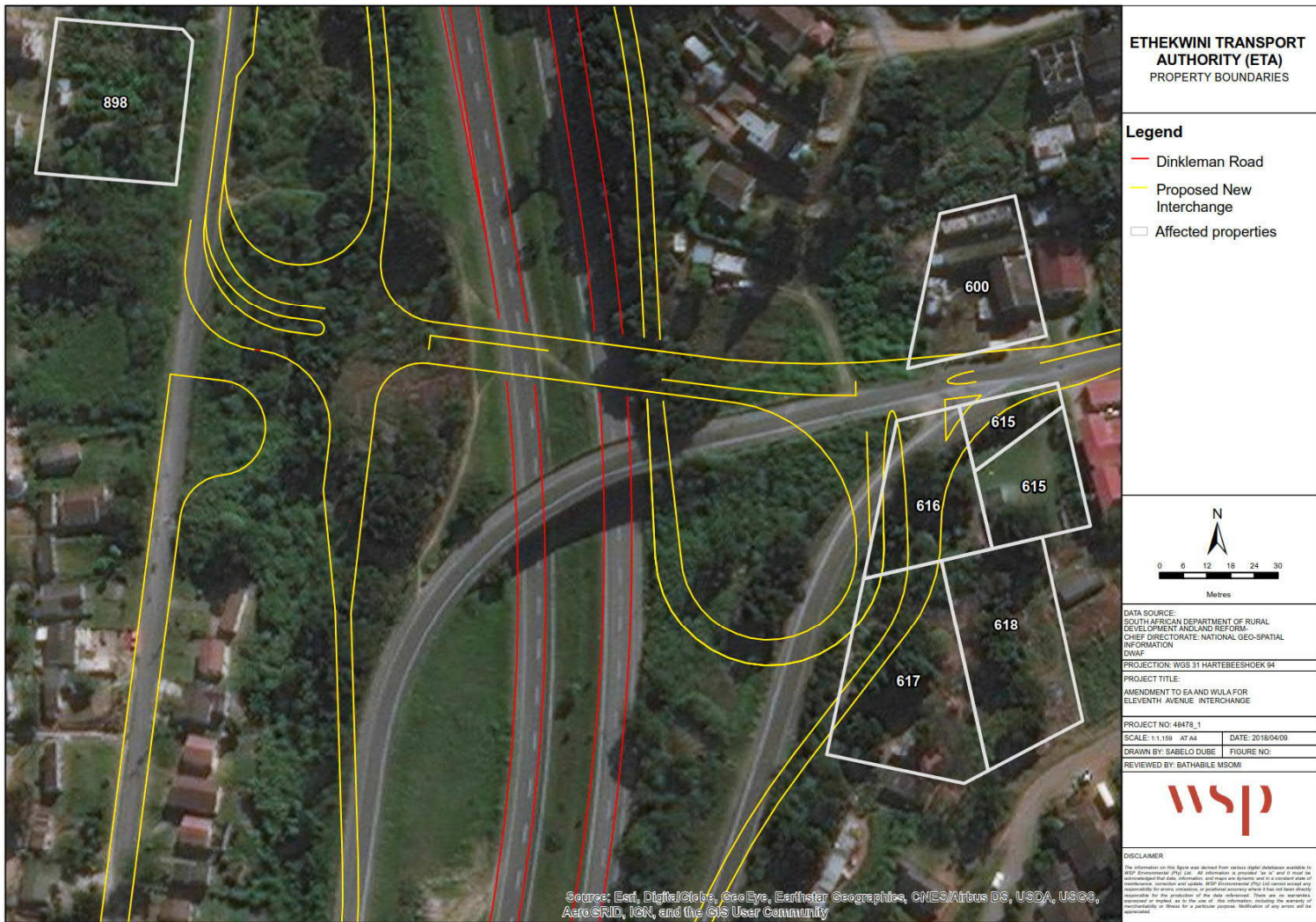


Figure 4: Affected Properties (WSP GIS, 2018)

4.3 LAYOUT

The existing Eleventh Avenue Bridge over the Dinkleman Road only allows for access from and to KwaDabeka. Access from Berkshire Downs on the eastern side of Dinkleman Road is through a grade intersection on Cummor Gardens Road. The proposed layout comprises of a new grade separated interchange with access to the Dinkleman Road from both KwaDabeka and Berkshire Downs. Public transport (primarily minibuses and buses) is the primary mode of transport for the majority of the population within the KwaDabeka and Berkshire area. The proposed interchange has been designed to accommodate pedestrian access to Harmony Heights Station over the Dinkleman Road (Figure 3, Appendix C1). The corridors effectively connect low to middle income communities with major economic nodes and community services, while also providing infrastructure for areas that have been earmarked for development, or have the potential for future development. This proposed interchange will provide improved connectivity with the city centre as well as areas immediately adjacent to Dinkleman Road, as a result this will significantly enhance the regional integration of the area. The road design conforms to all geometric design standards as set out by the eThekweni Traffic Authority (ETA).

4.4 SCOPE OF PROPOSED ACTIVITY REQUIRING AUTHORISATION

The ETA recently completed the wall to wall Integrated Rapid Public Transportation Network (IRPTN) Plan, in response to the National Public Transport Agenda which proposes a fully functional integrated public transport network plan which incorporates a range of models. The IRPTN is designed to replace the existing transport system with a high quality, high frequency, integrated, scheduled service. The IRPTN plan comprises approximately 250km of trunk public transport corridors of which some 60km are rail based. The full IRPTN network will be within 800m (10-15min walk) of more than 85 percent of the Municipality's population.

The ETA intends on adding the proposed Eleventh Avenue Interchange to the approved C3. The interchange will ensure that the public transport system works efficiently. The interchange has been redesigned to allow for access from both KwaDabeka and Berkshire Downs and pedestrian access to Harmony Heights Station.

At present Eleventh Avenue is connected to Dinkleman Road with two south facing directional ramps. The proposed interchange will be constructed at the same position. It will convert the existing directional ramps into south facing on and off-ramps. A new northbound on-ramp and southbound loop on ramp will be constructed. A new bridge will be built over the Aller River to replace the existing skew bridge.

4.4.1 PLANNING AND DESIGN

The planning and design phase for the proposed Eleventh Avenue Interchange must be conducted to minimise environmental and social disruption where practical.

LAND ACQUISITION

The proposed interchange requires the expropriation of four properties (Erf 615, Erf 617). A written notice (Appendix E2) was issued by eThekweni Real Estate Unit to notify landowners of the intention to expropriate their properties. The process of expropriation of the affected properties must be undertaken in accordance with the relevant legislation and must include engagement with the affected landowners.

TRAFFIC MANAGEMENT

Temporary traffic management will be needed to provide safe access and working areas for the construction workers and their and equipment. It will also provide a safe route for pedestrians and residents adjacent to the site. These traffic restrictions must be carefully planned and managed and will include measures from separating works areas from public access areas to full closures of certain roads for short duration. A traffic management plan (Appendix C3) must be submitted by the contractor for approval by the relevant authority before commencement of construction.

CONSTRUCTION PHASE

The Proposed Eleventh Avenue Interchange is expected to be completed within a 14 month period. It is planned that bulk earthworks (including excavation) will be undertaken within two months. The proposed interchange is associated with construction of the following:

- A total of 1,8 km of roadworks (that includes new ramps and upgrading of existing roadways)
- Eleventh Avenue Bridge Structure
- New stormwater reticulation
- Retaining walls

ROAD WORKS

The construction of roadworks associated with proposed Eleventh Avenue Interchange entail the following:

- Earthwork excavations and compaction to design level;
- Import of suitable materials as per the design report; and
- Stormwater installation.

The designs for both the interchange and the roadworks are in line with eThekweni design standards and are best suited for that particular area and terrain. Below is the design for the proposed pavement (Figure 5).

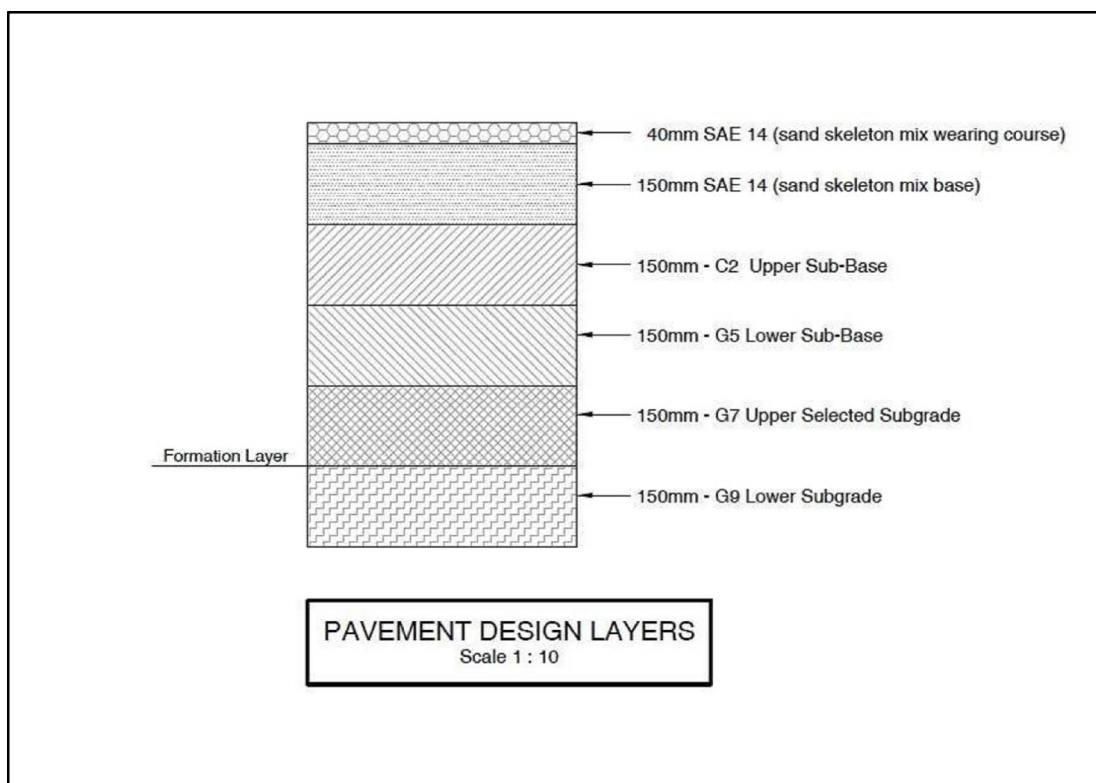


Figure 5: Pavement Design Layer (Source: eThekweni Municipality)

BOX CULVERT

The construction of the box culvert entails setting out, temporary diversion of the Aller River, excavations, surface preparation, blinding, reinforcement, formwork, batching and mixing, quality control, placing of culvert, curing and backfilling and finishing off.

A temporary diversion will be prepared at the watercourse channelling into the Aller River to allow the water to continue flowing during construction. Where the watercourse contributing to the Aller River is flowing. Excavations

will be done by the use of an excavator to the satisfaction of the engineer. Foundations will be prepared as per the construction drawings approved by the engineer. Once complete, the surface will be inspected and approved by the engineer. Reinforcements will be laid and concrete mix material that complies with specifications will be poured into foundations. The casted concrete will be compacted using a poker vibrator. The culvert will be lifted over by a crane /excavator and placed on top of the constructed floor slab.

The concrete will be cured using portable water. After curing is complete, backfill material (specification compliant) will be added back and adequately compacted. The diversion will be closed off and material will be compacted to acceptable standard. All excessive excavated material will be removed from the site and disposed of at a licensed disposal site.

TRAFFIC CONTROL

Temporary traffic management would be required on the local road network in order to safely construct the proposed Eleventh Avenue Interchange. This will include temporary restrictions such as reduced lane widths and speed limits. There will be traffic signal controls and public rights of way diversions to ensure the safety of pedestrians.

STORMWATER MANAGEMENT

A stormwater management layout is attached as Appendix C4 of this report.

4.4.2 OPERATIONAL PHASE

The operational phase will commence immediately upon the completion of the construction of the proposed interchange. The operational phase of the proposed interchange entails monitoring and maintenance of the interchange. Maintenance entails condition assessment and repairs of proposed interchange.

4.4.3 DECOMMISSIONING PHASE

The proposed interchange will be in operation for the near future, and therefore the likely impacts of decommissioning cannot be accurately predicted at this stage. However, impacts during decommissioning are likely to be similar in nature to those identified for the construction phase and will be managed in cognisance of the applicable legislation.

5 PROJECT ALTERNATIVES

The identification of alternatives provides a basis for demonstrating the options considered by the project team and selection of feasible or preferred option available to the decision-making authority. This is a requirement of the 2014 EIA regulations, as amended. The alternatives considered and evaluated in the BA process are the most feasible options in terms of environmental, social and technical criteria.

5.1 SITE ALTERNATIVES

The project proposes the expansion of the existing Eleventh Avenue Interchange to allow access on both sides of the road. The site has been identified by the eThekwinini as an area where existing infrastructure requires improvement to improve access and safety for communities of Berkshire and Clermont and the greater KwaDabeka. Therefore no alternative site has been identified because the proposed activity will be expanding on an existing road corridor.

5.2 LAYOUT AND DESIGN ALTERNATIVES

An initial layout assessment was undertaken by the ETA to explore the various alternatives for the proposed design of Eleventh Avenue Interchange. A major challenge with designing the most feasible layout was the potential land expropriation requirement. The proposed site is in close proximity to residential properties of Clermont and Berkshire.

There will be a need for expropriation of land parcels adjacent to the site in order to construct the interchange. The most preferred layout has been selected based on the least number of properties that need to be expropriated.

5.2.1 OPTION 1- DIAMOND INTERCHANGE

This option comprises of the conversion of the existing directional ramps into south facing on-and off-ramps, a new northbound on-ramp and southbound of-ramp. A new bridge will be constructed to replace the existing skew bridge.

This revised layout will consist of a new grade separated interchange with access to the Dinkleman Road from both KwaDabeka and Berkshire Downs. It will also accommodate a pedestrian access to Harmony Heights Station via a widened sidewalk and an elevator to access the median of the Dinkleman Road.

Advantages	Disadvantage
The stacking distance on the bridge deck for the turning lanes are adequate for the projected traffic volumes	Construction of south bound off-ramp has the following impacts on the surrounding area: <ul style="list-style-type: none"> - Relocation of Pylon as the Pylon is in the construction path - Crosses electricity servitude hence this land must be acquired - Expropriation of six properties with direct impact on established dwellings
Eliminates the substandard loop as per option 1.	No symmetry of ramps in relation to Dinkleman Road and extensive rock excavation to construct south bound off-ramp will be required.
Adequate accessibility for pedestrian movement from the neighbouring communities to Harmony Heights Station in the median of the Dinkleman Road	Access to south bound on-ramp via the slip lane restricts access to three properties on Eleventh Avenue <ul style="list-style-type: none"> - Expropriate three properties where the slip lane is located

5.2.2 OPTION 2- TIGHT DIAMOND INTERCHANGE

This option includes of the conversion of the existing directional ramps into south facing on-and off-ramps, a new northbound on-ramp and southbound of-ramp. A new bridge will replace the existing skew bridge.

This revised layout will consist of a new grade separated interchange with access to Dinkleman Road from both KwaDabeka and Berkshire Downs. It will also accommodate a pedestrian access to Harmony Heights Station via a widened sidewalk and an elevator to access the median of Dinkleman Road.

Advantages	Disadvantage
The south bound off-ramp will be constructed closer to Dinkleman Road to reduce the impact on the surrounding area by: <ul style="list-style-type: none"> - Reducing expropriation potentially by 2 properties when compared to option 1. - Avoiding the relocation of the Pylon 	The stacking distance on the bridge deck for the turning lanes are inadequate for the projected traffic volumes when compared to option 1.
Eliminates the substandard loop as per option 1.	Extensive rock excavation to construct south bound off-ramp
Creates a symmetrical diamond interchange hence a more aesthetically pleasing interchange. There is also adequate accessibility for pedestrian	Access to south bound on-ramp via the slip lane will restrict access to three properties on Eleventh Avenue. This will

movement from the neighbouring communities to Harmony Heights Station in the median of Dinkleman Road.

require the expropriation of three properties where the slip lane is located.

5.2.3 OPTION 3 - SINGLE POINT INTERCHANGE

The Single Point Interchange option entails the conversion of the existing directional ramps into south facing on-and off-ramps, a new northbound on-ramp and southbound off-ramp. A new bridge will replace the existing skew bridge.

This revised layout will consist of a new grade separated interchange with access to Dinkleman Road from both Kwadabeka and Berkshire Downs. The Single Point Interchange is a grade separated interchange that converges movement into one signalised intersection. It is a preferred alternative for high volume interchanges.

Advantages	Disadvantage
More compact layout than the diamond interchange	<p>Bridge Design and Deck</p> <ul style="list-style-type: none"> - The widening of the bridge deck to allow for traffic movement will increase from three lanes to four lanes. - Redesign of current bridge structure (as per Option 1,2 and 3) to incorporate the eight new on and off-ramps
Allows concurrent right turns for greater volumes	<p>Construction of New Ramps</p> <ul style="list-style-type: none"> - Expropriation of four properties with established dwellings and three partial properties to accommodate for the elevated south bound ramps - Construction of eight elevated ramps compared to the conventional four ramps - Extensive rock excavation will be needed to construct south bound off-ramps
Single Traffic Signal makes co-ordination at intersection simpler (three phase traffic signal)	<p>Pedestrian Mobility</p> <ul style="list-style-type: none"> - Does not cater for large pedestrian volumes which is one of the main purposes of the Interchange as it will be the only way to access Harmony Heights Station - The standard traffic signal timing does not include a phase for pedestrian crossing - Traffic signals for pedestrians need to be placed at all islands to allow pedestrian movement in between the vehicle entrance and exit phases - Pedestrians cannot cross the width of the bridge unless a separate pedestrian phase is allocated - Construct a separate pedestrian overpass to allow safe passage for pedestrians
Converges vehicle movement into one signalised intersection as opposed to two separate signalised intersections	<p>Signalised Intersection</p> <ul style="list-style-type: none"> - Longer standing time at traffic signal to allow vehicles to cross over signalised area; - Vehicle clearance time for each phase is longer;

	<ul style="list-style-type: none"> - Confusion with complex signal phases and movements at the intersection; - Low traffic volumes at Eleventh Avenue Interchange therefore phases may be too long and will cause more traffic congestion
The stacking distance on the bridge deck and the north and south off-ramp are adequate for the projected traffic volume	<p>Access to south bound on-ramp via the slip lane restricts access to three properties on Eleventh Avenue</p> <ul style="list-style-type: none"> - Expropriate three properties where the slip lane is located

5.2.4 PREFERRED OPTION - PARCLO INTERCHANGE

The ParClo has been selected as the most preferred layout because it will provide access to the North and South directions of Dinkleman Road. It will link the communities of Berkshire Downs and Clermont, providing safe pedestrian passage and easy access to the Harmony Heights Station. This option comprises of the conversion of the existing directional ramps into south facing on-and off-ramps, a new northbound on-ramp and southbound loop of-ramp. A new bridge will replace the existing skew bridge. This layout will consist of a new grade separated interchange with access to Dinkleman Road from both Kwadabeka and Berkshire Downs.

ADVANTAGES

The preferred option has the following advantages:

- This layout will minimise the impact on existing properties with expropriation limited to two full properties.
- The stacking distance on the bridge deck for the turning lanes are adequate for the projected traffic volumes
- This layout is pedestrian friendly and allows for easy movement of pedestrians from the neighbouring communities to Harmony Heights Station in the median of the MR57.

DISADVANTAGES

The preferred option is associated with the following disadvantages:

1. It will require the expropriation of two entire properties where the slip lane will be located. Portions of land will be required adjacent to the south bound on and off ramp. Access to south bound on-ramp via the slip lane will restrict access to three properties on Eleventh Avenue.
2. Substandard curve radius on south bound off-ramp loop, however this will be mitigated by implementing the following measures:
 - Increase the lane width around the loop to ensure tracking of articulated vehicles are accommodated within the roadway
 - Traffic calming measures put into place to mitigate the risk of a driver approaching the loop at high speeds
 - o Rumble strips placed on south-bound off-ramp,
 - o Changes in pavement colour & texture (similar effect to rumble strips)
 - o Signage to warn driver about the upcoming loop and to decrease speed
 - In the event of the driver misjudging the loop, a guardrail will be constructed around the loop to prevent a driver from traversing off the roadway and going into the vacant land south of the loop.
 - In the event of the driver taking the guardrail out and going into the vacant land south of the loop, this area will be filled up to the level of the roadway and a soil berm will be constructed to prevent the driver from traversing off the roadway into the area below the roadway.
3. In order to tie into the existing road (Cummor Gardens) and to limit the impact on the wetland a substandard curve on west end of Interchange was adopted. This will be mitigated by implementing the following measure increase the lane width around the curve to ensure tracking of articulated vehicles are accommodated within the roadway.

5.3 NO-GO ALTERNATIVE

The no-go alternative refers to the option of not constructing the proposed Eleventh Avenue Interchange. The 'do-nothing' scenario will result in the continuation of the status quo which is associated with high risks for both pedestrians and vehicles. The No-go alternative could have the following implications:

- Continuation of high risks for pedestrian's moving from the neighbouring communities to Harmony Heights Station in the median of the MR57.
- Continued poor access to the Harmony Heights Bus station
- There will be no link between communities of Berkshire Downs and Clermont
- Decreased pedestrian safety and poor access from both the North and South of Dinkleman Road.

6 ENVIRONMENTAL BASELINE

6.1 CLIMATE

The Durban area falls within a typically warm to hot and humid region, and may be described as a subtropical climate. This region predominantly receives summer rainfall associated with atmospheric instability as a result of surface heating during the day. Most of this region's winter rainfall is generally associated with frontal systems, moving from the southwest to the northeast (www.climate-data.org).

6.1.1 TEMPERATURE

The warmest month (Figure 7) of the year is February with an average of 22.7°C. June is the coldest month with temperatures averaging 16.6°C.

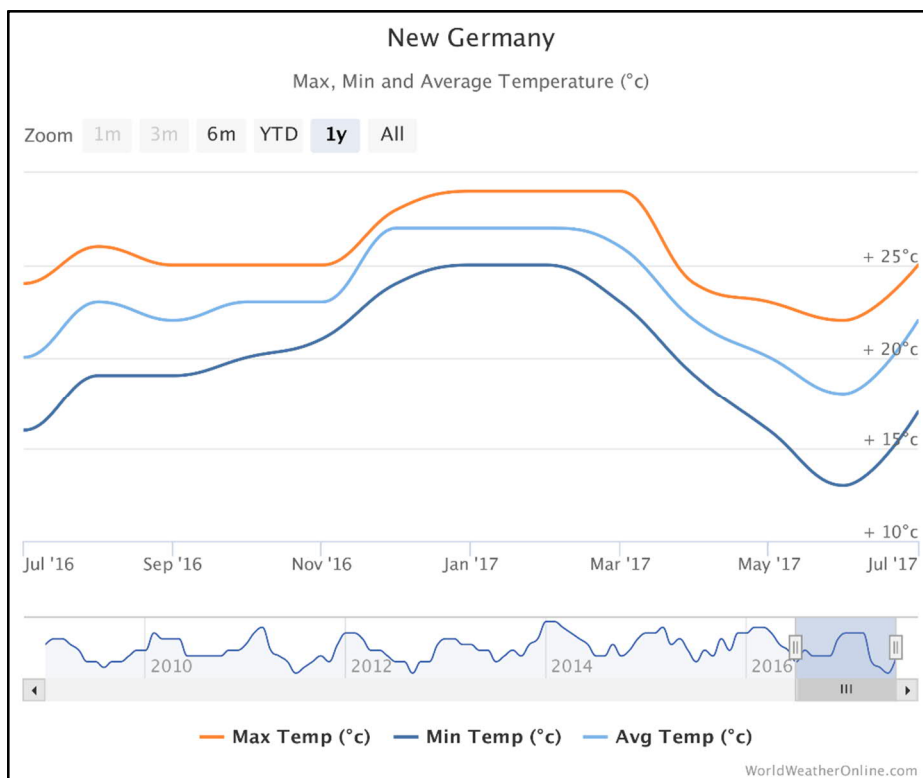


Figure 6: New Germany Temperatures (Source: www.worldweatheronline.com)

6.1.2 RAINFALL

The proposed site normally receives about 597mm of rain per year, with most rainfall occurring mainly during mid-summer (October and March). The lowest rainfall is received in June and the highest in January. The average wind direction is North to North –East with an average wind speed of 5.8 miles per hour (mph) and average gust of 8.7mph.

6.2 GEOLOGY AND SOILS

According to the 1:250 000 Geological Map (2930), the site is underlain by the Red- brown coarse-grained arkosic to subarkosic sandstone quartz arenite; micaceous sandstone; small pebble conglomerate; subordinate siltstone and mudstone of the Natal Group (Figure 8). No geological assessments have been conducted as part of this EIA application. The ETA indicated that the proposed project is a design build component within the construction contract hence the design engineers will carry out a geotechnical assessment prior to designing the structure. This will be carried out in the future before construction commences.

6.3 TOPOGRAPHY AND LANDUSE

The proposed site has an elevation of between 314 m and 321 m above mean sea level. Dinkleman Road rises up a gradual south facing slope and Eleventh Avenue travels along a ridge line in a roughly north – south direction. The eastern site of the site is steeper than the more gradual slope towards the west.

The surrounding landuse is of residential housing and Dinkleman Road. The majority of the proposed interchange footprint lies within an area zoned as Open Space, with a small portion on private property. The proposed Eleventh Avenue Interchange will form part of an existing road network.

6.4 HYDROLOGY

The proposed project falls within the quaternary drainage region u20M which is part of the Mvoti to uMzimkhulu Water Management Area. Two small seasonal tributaries of the Aller River occurs within the study area and drains in a southerly direction (Figure 8). These watercourses are both severely impacted upon by the developments along their banks as well as stormwater discharges which impact on their natural flow regime. The water from these watercourses drain south and then southeast to flow into the UMngeni River (JG Afrika, 2017).

6.5 AMBIENT AIR QUALITY

The air quality within the New Germany region is good and has an Air Quality Index of 43. The major pollutants are ozone and particulate matter.

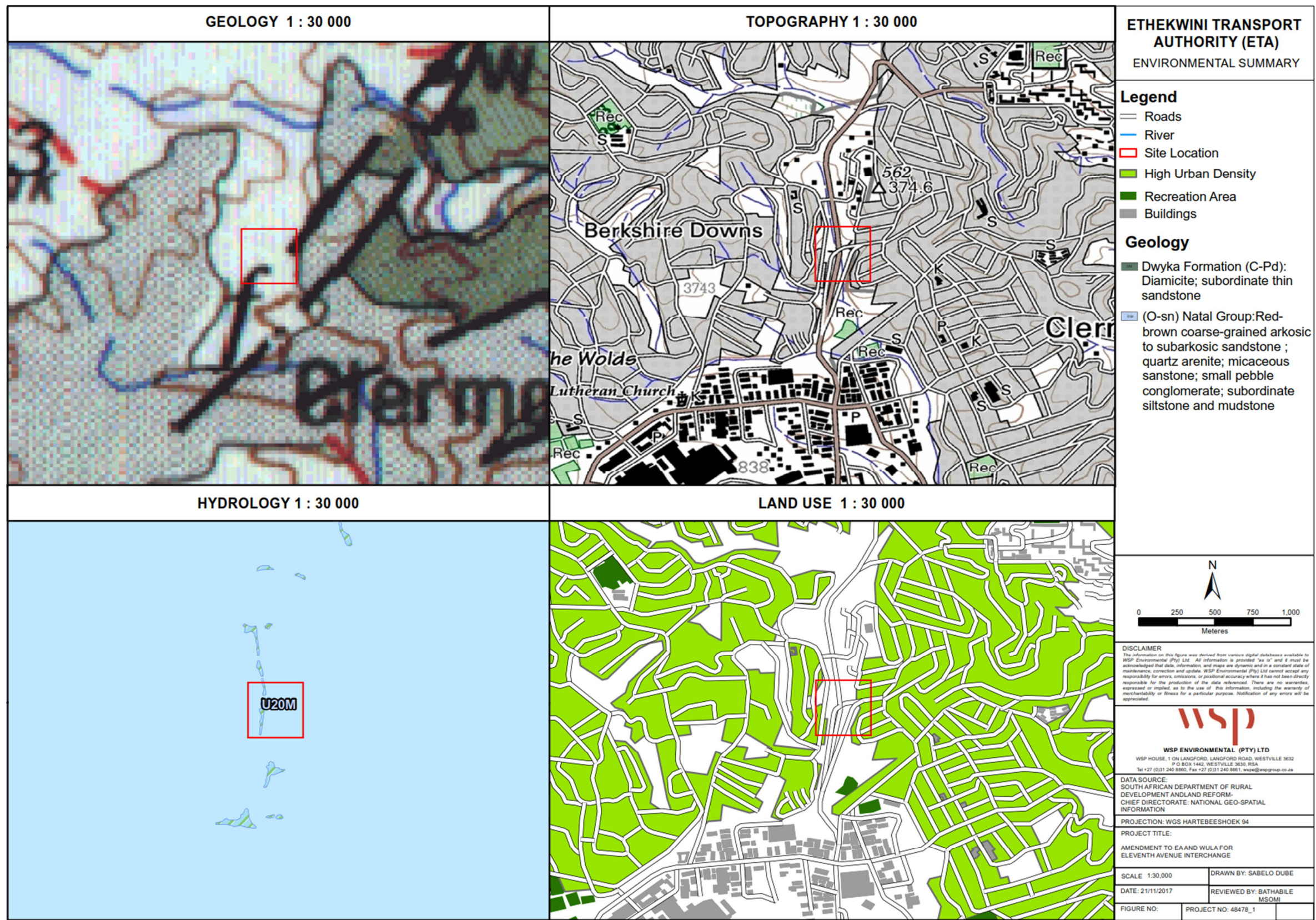


Figure 7: Environmental Summary (WSP GIS, 2017)

6.6 FLORA AND FAUNA

According to The Vegetation of South Africa, Lesotho and Swaziland, the vegetation in the study area can be classified as Indian Ocean Coastal Belt, which corresponds with the Subtropical Coastal Forest Biome, and Mucina and Rutherford (2006) classify the vegetation group as KwaZulu-Natal Coastal Belt (CB3). The KwaZulu-Natal Coastal Belt is characterised by highly dissected undulating plains, which previously may have been covered to a large extent with various types of subtropical coastal forest. Very little of the vegetation is present on site due to high levels of human disturbance such as the establishment of residential houses and associated infrastructure (roads, footpaths, pipelines, etc.).

6.6.1 WETLANDS

A Wetland Assessment was undertaken by JG Afrika (Pty) Ltd in September 2017 (Appendix D2) in support the EA and WULA (GA) applications for the proposed Eleventh Avenue Interchange. During the site visit conducted on 12 September 2017 remnants of a larger channelled valley bottom wetland were identified. These remnants are all associated with the channelled valley bottom wetland system that is associated with the two tributaries of the Aller River (Figure 8). It is believed that this wetland area was significantly larger, but has been reduced in size by the infilling through infrastructure development.

The soils in the channelled valley bottom is characterised by clayey soil with a low level of permeability and is congruent with the presence of a wetland. The functionality and ecological state of the wetland remnants has been severely impacted upon by physical disturbances to the wetland system. These disturbances include the construction of infrastructure within the wetland, clearance of large parts of the wetland to plant vegetables and the infilling of areas to create platforms.

The Ecological Importance and Sensitivity (EIS) Assessment of the remaining wetlands indicated that the wetland area has a combined PES score of E which is seriously modified. This score declares that “the change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable”. The overall findings of the Wetland Assessment confirm that the EIS of the wetland area has a low importance to local ecology. This results from large fragmentation through urban development (roads, housing), vegetation clearance and alien plants.



Figure 8: Hydrology Map (WSP GIS, 2017)

6.7 SOCIAL

6.7.1 AMBIENT NOISE

The main sources of noise in the area and surrounds are associated with vehicular movements on Dinkleman Road and human activities. Noise levels are not anticipated to be altered significantly during the proposed development based on nature of the area.

6.7.2 CULTURAL HERITAGE

No sites of cultural heritage significance have been identified near the proposed Eleventh Avenue Interchange site. An HIA was undertaken for the initial Corridor 3 EIA and no areas of concern were identified.

6.7.3 SOCIO-ECONOMIC

The eThekweni Metropolitan Municipality is located on the east coast of South Africa within the province of KwaZulu-Natal and is a Category A municipality. It covers an area of approximately 2 297km² and is home to approximately 3, 7 million people (Statistics SA, 2016).

According to Census 2011 the eThekweni population is young with 66% of the population below the age of 35 years. The economically active age group from 15 to 59 years includes 67% of the population. The population dependency ratio is 48 / 100 and this indicates that 48 persons either young or old depend on 100 persons of working age. The greatest population concentrations occur in the central and north regions. The central region is the Urban Core of the municipality and is home to approximately 1.18 million people (34.54 %) followed by the northern region which is home to approximately 1, 15 million people (33.61%) (eThekweni Municipality IDP, 2015).

In close proximity to the site are the communities of Berkshire and Clermont. The Clermont area is home to approximately 110,000 people, housed in approximately 31,600 household at an average household size of 3.5 people/household. The area is located close to Durban CBD, the industrial centres of Pinetown and New Germany (EThekweni Municipality Township Regeneration Plan, 2010).

7 ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

7.1 SOCIAL ENVIRONMENT

7.1.1 LOCAL ECONOMY AND EMPLOYMENT OPPORTUNITIES

CONSTRUCTION AND DECOMMISSIONING PHASE

The construction and decommissioning phase will result in the generation of temporary employment opportunities. Potential jobs include building contractors and labourers (semi-skilled and unskilled workers). The construction of the Eleventh Avenue Interchange will not be undertaken in isolation of the broader Corridor 3 project. As such, there are unlikely to be any additional employment opportunities over and above those identified in the original assessment of Corridor 3. Employment opportunities associated with the Eleventh Avenue Interchange are therefore considered negligible.

OPERATIONAL PHASE

No direct employment will be generated during the operational phase of the proposed interchange. However the interchange will form part of the broader project by generating indirect employment opportunities attributed directly to the interchange itself. Improved regional connectivity will result in better and cheaper access to external economic opportunities and will also promote investment in the area. Investment opportunities in the area will be improved as a result of the enhanced urban environment. Increased and improved economic space will enable and promote investment and local economic activity.

7.1.2 LOSS OF LAND

PRE-CONSTRUCTION PHASE

The planning phase of the proposed Eleventh Avenue Interchange will result in expropriation of two entire private properties and a portion of two (erf 600 and Erf 618). Some of the properties are occupied by and tenants who will be displaced with the acquisition of the properties. There will be loss of income and livelihoods for landowners with tenants on businesses on their property. This is a negative impact of medium significance that requires early implementation of mitigation measures. Consultation with affected parties is required to ensure that they are aware of the proposed development and are provided with clear information on the implications on their properties and the intended expropriation process. The land expropriation process will need to be undertaken in accordance with the relevant SA laws.

CONSTRUCTION AND DECOMMISSIONING PHASE

No impacts are anticipated with the operational phase.

OPERATIONAL PHASE

No impacts are anticipated with the operational phase.

7.1.3 VISUAL IMPACTS

CONSTRUCTION AND DECOMMISSIONING PHASE

There is a possibility of change in the nature of the area surrounding the Eleventh Avenue Interchange during the construction and decommissioning phase. Visual impacts associated with the presence of machinery and construction activities will be of low significance post mitigation. Early communication is required with neighbouring properties and land occupiers where construction activities (Cunmor Gardens residents) are anticipated to impact significantly on. The impacts will be temporary in nature and implementation of the Draft EMP (Appendix F) will minimise the severity of impacts.

OPERATIONAL PHASE

The proposed interchange will result in nuisance factor (visual) for the residents immediately adjacent to the site. The south bound on ramp encroaches on three properties. Visual impacts for the broader area will not be significant for this reason, but that for those residents immediately adjacent to the road the impact may be somewhat greater. This may impact on the aesthetics of the area however this impact is anticipated to be of low significance with the implementation of mitigation measures outlined in Draft EMP (Appendix F).

7.1.4 NOISE IMPACTS

CONSTRUCTION AND DECOMMISSIONING PHASE

Noise emissions are likely to be generated from typical construction sources, such as construction vehicles, excavators, compactors and labourers. Elevated noise levels have the potential to disrupt the local residents, however as this will be short term and limited to the construction phase, it is not likely to have a significant impact. Recommendations contained within the EMPr should be followed in order to ensure the impact is of low significance.

Acceptable levels are prescribed by SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication). It is the most relevant code of practice for environmental noise impact assessment in South Africa. Typical rating levels for noise in different types of districts are presented in Table 15 below. Rating levels for urban areas are applicable to this project. These values should be viewed as guidelines of typical noise levels that should not be exceeded outdoors in the various district levels.

The proposed site is situated within residential settlements and the nearest receptors are less than 50 metres away. These receptors are more sensitive to disturbance caused by increased ambient noise levels. Attempts should be made to limit activities to normal working hours (i.e. Monday to Friday 7:30am to 5pm). Some construction activities may need to be carried out at night. The relevant local authority must be consulted with where important work needs to be carried out at night, such as erecting bridge beams.

Construction activities will need to comply with mitigation measures outlined in the Draft EMPr (Appendix F) in order to avoid noise guidelines. Should consistent complaints be received during construction and decommissioning as, a monitoring network may be required to assess impacts and associated mitigation as per Table 16.

Table 14: Typical rating levels for noise in districts (adapted from SANS 10103:2008)

Type of District	1. Equivalent Continuous Rating Level for Noise ($L_{Req,T}$) (dBA)		
	2. Outdoors		
	Day-Night ($L_{R,dn}$)	Daytime ($L_{req,d}$)	Night-time ($L_{req,n}$)
a) Rural	45	45	35
b) Suburban (with little road traffic)	50	50	40
c) Urban	55	55	45
d) Urban (with one or more of the following: workshops; business premises; and main roads)	60	60	50
e) Central Business Districts	65	65	55
f) Industrial District	70	70	60

Table 15: Categories of community/ group response (adapted from SANS 10103:2008)

<ul style="list-style-type: none"> Excess $(\Delta L_{Req,T})^a$ dBA 	<ul style="list-style-type: none"> Estimated Community Group Response 	
	Category	Description
0 – 10	Little	Sporadic Complaints
5 – 15	Medium	Widespread Complaints
10 – 20	Strong	Threats of community or group action
>15	Very Strong	Vigorous community or group action

7.1.5 TRAFFIC, ACCESS AND SAFETY

PRE-CONSTRUCTION PHASE

The interchange will however restrict access on three landowners who are adjacent to the south bound portion. Access to south bound on-ramp via the slip lane will restrict access to the two properties located on Eleventh Avenue. Alternative access must be provided for these landowners by the applicant.

CONSTRUCTION AND DECOMMISSIONING PHASE

An increase in traffic associated with the construction and decommissioning phase activities (trucks transporting materials, equipment and labour) is anticipated during the construction of the Eleventh Avenue Interchange. This may include large equipment such as excavators, dozers, tip or waste removal trucks. An increased traffic volume has the potential to result in increased congestion on Dinkleman Road. There is likely to be a disruption caused to landowners of the properties adjacent to the site, road users and pedestrians in the vicinity. This includes potential travel delays and restricted access issues caused by road closures and the presence of construction vehicles. Traffic moving past the site, particularly where there is no formalised pavement, poses a safety hazard to pedestrians. The relatively high volume of pedestrians as well as informal taxi stopping points along the route of the proposed interchange means that there will be people moving through or around the site exposing them to potentially injury. Public access to the site must be restricted and the walkways for pedestrians moving past the site must be clearly delineated. There are a number of existing businesses in the New Germany area, which is located approximately 15km from the site. Access to these businesses will not be affected by the proposed development

Due to traffic management restrictions, safety and operational controls, some construction activities may need to be carried out at night. The relevant local authority will be consulted with where important work needs to be carried out at night, such as erecting bridge beams. Liaison with the local community and other key stakeholders will need to be conducted if night work is to be carried out. However, all impacts will be temporary, limited to the construction phase, and will be of medium significance with the implementation of mitigation measures outlined in Draft EMPr (Appendix F).

OPERATIONAL PHASE

The operational phase of the proposed Eleventh Avenue Interchange will improve access to the main corridor, improve traffic flow of vehicles and improve the safety of pedestrians. Overall, this is positive impact of a medium significance. No mitigation measures are required for this impact.

7.2 PHYSICAL ENVIRONMENT

7.2.1 AIR QUALITY

CONSTRUCTION AND DECOMMISSIONING PHASE

During construction and decommissioning, localised air quality may be affected as particulate matter will potentially be released into the air because of the movement of construction vehicles, excavations and compactors. Dust emissions have the potential to deteriorate local air quality that may result in a nuisance factor to the local residents located less than 50m away from the site (particularly during dry and windy conditions). Potential impacts will be short term (i.e. limited to the construction period), and provided that dust control measures are implemented, it is unlikely that there will be significant impacts. While vehicular emissions from trucks transporting materials and labour may have an impact on local air quality, this is not anticipated given the anticipated traffic volumes of 15 -20 trucks. The mitigation measures contained with the Draft EMPr (Appendix F) to address potential air quality aspects are considered adequate. Air quality impacts are anticipated to be of low significance post mitigation.

Air quality guidelines are provided by the ambient dust concentration limits prescribed by SANS 1929:2005. Whilst these guidelines are currently not enforceable they do serve as recommendations for good practice (Table 13). SANS 1929:2005 sets out dust deposition rates, expressed in units of $\text{mg.m}^{-2}.\text{day}^{-1}$ over a typical 30-day averaging period. Dust deposition is evaluated against the four-band evaluation criteria as below. Rating levels for industrial district are applicable to this project. Should consistent complaints be received during construction and decommissioning, a monitoring network may be required to assess impacts and associated mitigation as per Table 14.

Table 16: Air Quality Guidelines for Dust Generation

Band Description Label	Dust Fallout Rate, D ($\text{mg.m}^{-2}.\text{day}^{-1}$)	Comment
Residential	$D < 600$	Permissible for residential and light commercial
Industrial	$600 < D < 1\ 200$	Permissible for heavy commercial and industrial
Action	$1\ 200 < D < 2\ 400$	Requires investigation and remediation if two sequential months lie in this band, or more than three occur in a year
Alert	$2\ 400 < D$	Immediate action and remediation required following the first incidence of dust fall rate being exceeded. Incident report to be submitted to relevant authority

Emissions from vehicles transporting materials and labour may have an impact on local air quality. Transportation of construction materials is not considered to significantly increase the volumes of traffic, and as a result is unlikely to impact on the current ambient air quality of the Berkshire and New Germany.

OPERATIONAL PHASE

No air quality impacts are associated with the operational phase of the proposed Eleventh Avenue Interchange.

7.2.2 HAZARDOUS SUBSTANCES AND WASTE MANAGEMENT

CONSTRUCTION AND DECOMMISSIONING PHASE

Solid waste will be generated during the construction and decommissioning phase and will include general waste such as food containers and plastics, as well as general construction waste (i.e. aggregate materials including excavated soil / rubble). Any excavated soil will be used for landscaping of the area or disposed of at an appropriate landfill site. General domestic waste will be temporarily stored in on-site waste receptacles before being removed by the contractor when necessary.

Small quantities of hazardous waste may be generated due to accidental spills of fuels or oils. Should any spills or leakage occur, the potential for soil, groundwater and surface water contamination exists. It is the potentially contaminated

soil, or materials used to clean up spills (such as rags or containers) that constitute a hazardous waste. Such material must be stored separately in sealed containers and collected by a hazardous waste service provider for safe disposal.

Waste generated in the contractors' camp will be the responsibility of the contractor. Facilities for solid waste collection are to be provided by the appointed contractor on site. The construction solid waste must be collected in skips and removed regularly off site. Solid waste containers must be made available where and when required along the construction site. Provided that control measures are implemented as per the EMPr (Appendix F) (e.g. providing an adequate number of waste receptacles / ensuring that correct disposal procedures are followed) it is unlikely that there will be any significant impacts as a result of waste generation.

7.2.3 SOILS, SURFACE AND GROUNDWATER QUALITY

CONSTRUCTION AND DECOMMISSIONING PHASE

Earth moving activities will increase the potential for localised soil erosion to occur. There is the potential for erosion of wetland soils as a result of uncontrolled stormwater runoff. In addition, sediment laden surface water / stormwater contamination has the potential to lead to the deterioration of the Aller River and wetland systems due to increased turbidity. High rainfall events could increase the probability and extent of the impact downstream of the construction site. Stormwater run-off should be appropriately managed so as not to alter the timing and intensity of flows entering the wetland under the natural condition. Appropriate mitigation in the form of spill management and sediment traps, as contained in the Draft EMPr (Appendix F) must be implemented to ensure that no offsite entrainment of sediment occurs.

During the construction phase, the storage and handling of hazardous substances (such as fuel and oil) can result in accidental or negligent small-scale spills. There is also the potential for the spillage of concrete during the construction of the culvert which will lead to soils, surface and groundwater contamination. Accidental spillages will have direct impacts on the stream.

The Aller River is a drainage line and should have water during construction. Temporary in stream diversion will occur in order to allow for the construction of the box culvert over the Aller River. The diversion of the stream has the potential to impact on the flow or discharge downstream. It is anticipated that construction activities will not result in any water quantity impacts such as reducing the amount of water that reaches downstream users.

An application for GA has been initiated in order to address the WUL requirements associated with the construction of a culvert over the Aller River, in compliance with the National Water Act (Act No.36 of 1998).

OPERATIONAL PHASE

An increase in hardened surfaces will increase runoff which will result in increased erosion and sedimentation of the Aller River. There will be an overall increase in surface run-off, an increase in the speed of run-off and peak flow rates. Regular maintenance of stormwater drainage is an important part of the proposed interchange. Stormwater management measures have been included in the Draft EMPr (Appendix F).

7.2.4 FAUNA AND FLORA

CONSTRUCTION AND DECOMMISSIONING PHASE

Direct impacts on terrestrial flora and fauna (e.g. habitat loss) associated with removal of vegetation during ground clearing and excavation is anticipated during the construction phase. The project area has vegetation along both sides of Dinkleman Road in the areas where the off ramps are proposed. The site does not fall under a critical biodiversity area. Impacts on vegetation and faunal communities is anticipated to be low with the implementation of mitigation measures.

OPERATIONAL PHASE

The operational phase may result in the proliferation of alien invasive species as a result of vegetation disturbance within the project development area. Rehabilitation of the site with indigenous species and ongoing alien plant control will be required to reduce impacts.

7.2.5 LOSS OF WETLAND FUNCTIONALITY

CONSTRUCTION AND DECOMMISSIONING PHASE

There will be wetland loss as a result of infilling for the construction platforms. A large portion of the proposed Eleventh Avenue Interchange will be located within the wetland area (Figure 9). The construction activities will have impacts on the hydrology, geomorphology and biodiversity of the wetland. A box culvert will be constructed over the Aller River. The construction of the proposed interchange will impact on the remnants associated with the channelled valley bottom wetland system. The removal of vegetation from the construction footprint located within the identified wetland area poses a risk to the biodiversity within the wetland.

Findings from the specialist study (Appendix D 1) indicates the wetland ecosystem services provided by the wetland remnants have been severely impacted. The fragmentation of the larger wetland area has resulted in these services to be limited to the storing of nitrates, phosphates and other toxicants within the wetland. The impacted ecosystem service as well as the low PES class has resulted in the EIS of the wetland to be low.

The area defined as the construction footprint occurring within the wetland boundaries must be determined and clearly demarcated before commencement of activities. The demarcation of this area must be done by a qualified Wetland Specialist and monitored by the Contractor's and audited on a monthly basis by the Environmental Control Officer (ECO). All recommendations made by the wetland specialist for the assessment have been included in the Draft EMP (Appendix F).

OPERATIONAL PHASE

An increase in hardened surfaces is expected to increase flow volumes into the wetland. Any increase in flow from the roads has the potential to lead to an increased potential for erosion and increase suspended solids load into wetland/s. This will result both in a reduction in the storage capacity of the wetland/s, as well as a reduction in water quality due to an increase in turbidity. The new stormwater management system should be designed to minimise impacts onto the environment. Stormwater discharge must be at rates and volumes that are equal to that of the natural condition.

7.3 NO GO ALTERNATIVE

The no-go alternative refers to the option of not constructing the proposed Eleventh Avenue Interchange. The 'do-nothing' scenario will result in the continuation of the status quo which is associated with high risks for both pedestrians and vehicles. The No-go alternative could have the following implications:

- Continuation of high risks for pedestrian's moving from the neighbouring communities to Harmony Heights Station in the median of the MR57.
- Continued poor access to the Harmony Heights Bus station.
- There will be no link between communities of Berkshire Downs and Clermont.
- Decreased pedestrian safety and poor access from both the North and South of Dinkleman Road.

7.4 IMPACT ASSESSMENT MATRIX

Table 17 and Table 18 outlines a summary of the impact assessment.

Table 17: Pre-Construction, Construction and Decommissioning Phase Impact Assessment Table

PRIOR TO MITIGATION									POST MITIGATION							
Aspect	Impact Description	Intensity	Extent	Duration	Consequence of Impact	Probability	Status	Significance of Impact	Mitigation Measures	Intensity	Extent	Duration	Consequence of Impact	Probability	Status	Significance of Impact
Social Environment																
Expropriation of Properties	Loss of land	High	Low	High	High	High	Negative	High	<ul style="list-style-type: none"> - Further engagement with affected landowners will need to be carried out by eThekweni Real Estate Unit. - Undertake expropriation process in accordance with South African legislation and ensure that landowners are adequately compensated for their loss 	Medium	Low	High	Medium	High	Negative	Medium
	Loss of income and livelihoods	High	Low	High	High	High	Negative	High		Medium	Low	High	Medium	High	Negative	Medium
Visual Aesthetics	Visual disturbance to the adjacent land occupiers (Cumnor Gardens and KwaDabeka Clermont)	Medium	Medium	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Minimise clearing and grading where possible. The contractor(s) should maintain good housekeeping on site to avoid litter and minimise waste. - Litter and rubble should be timeously removed from the construction site and disposed at a licenced landfill facility. - The construction site boundary must be demarcated and visual screening provided where appropriate. 	Low	Low	Medium	Low	Low	Negative	Low
Noise	Elevated noise levels have the potential to cause disruption to sensitive receptors (adjacent residents) where an increase in ambient noise is discernible.	Medium	Medium	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Maintain vehicles and machinery in good working order. Equipment with a lower noise output should be selected where practical. - No sirens, loud halers or hooters are to be used on site except in emergencies. - Undertake all noisy construction activities during normal working hours i.e. 08h00 – 17h00 during weekdays. 	Low	Low	Medium	Low	Low	Negative	Low
Cultural and Heritage Resources	Excavations and earthworks may uncover cultural heritage resources	Low	Low	Medium	Low	Low	Negative	Low	<ul style="list-style-type: none"> - Ensure that employees and contractors are aware of requirements for heritage resource protection and communicate any findings immediately. - In the event that items of potential heritage or archaeological importance are discovered, activities should be halted, AMAFA should be notified and a HIA undertaken to determine the necessary mitigation measures. - Should the contractor be unsure of the any of the above aspects, the ECO should be contacted immediately. 	Low	Low	Medium	Low	Low	Negative	Low

Traffic, Accessibility and Safety	Increase in vehicular traffic from delivery of materials and movement of contractors.	Medium	Medium	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Compliance with applicable road regulations and any permit issued in terms of the National Road Traffic Regulations (2000). - The movement of vehicles into and out of the site must be managed to ensure the impact on roads is minimised. - Vehicle drivers must be aware of the local residents, commuters and schoolchildren using the existing roads. - Signage must be placed at relevant points along access roads to caution pedestrians of the movement of construction vehicles and machinery into the site. 	Low	Low	Medium	Low	Medium	Negative	Medium
	Increase in construction vehicular traffic on road will increase public safety risks in the Berkshire and Clermont communities.	Medium	Medium	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Project manager to notify surrounding landowners of project and associated increased vehicular activity. - Employees regulating the flow of traffic must be provided with the necessary training and safety awareness. 	Low	Low	Medium	Low	Medium	Negative	Medium
Physical Environment																
Air Quality	Deterioration of ambient air quality within the construction area and immediate surrounds (Berkshire and Clermont)	Medium	Medium	Medium	Medium	High	Negative	Medium	<ul style="list-style-type: none"> - Dust suppression measures (e.g. water suppression or physical barriers) on active and stockpile, excavated, and cleared areas of the site as necessary. - Reduction of unnecessary traffic and vehicles travelling on unpaved roads; and strict adherence to speed limits to ensure minimal dust entrainment. - Cover trucks hauling loose material - Wherever possible, avoid dust-generating activities (i.e. excavations, grading and moving of soil) during windy periods. 	Low	Low	Medium	Low	Low	Negative	Low
Waste Management	Generation of general waste has the potential to lead to visual issues and litter if not managed correctly on site.	Low	Medium	Medium	Low	High	Negative	Medium	<ul style="list-style-type: none"> - General waste should be stored within waste skips within designated area. - Working areas are to be cleared of litter on a daily basis. - Management measures within EMPr for reduction in generation, reuse and recycling. - Waste receptacles should be located with consideration to stormwater management and covered to prevent windblown waste. 	Low	Low	Medium	Low	Low	Negative	Low
	Waste generation from the construction activities (e.g. waste water, construction material, hydrocarbons and hydrocarbon contaminated material)	Medium	Medium	Medium	Medium	High	Negative	Medium	<ul style="list-style-type: none"> - Building waste must be disposed of at a licensed landfill site. - Minimise construction waste that requires disposal by minimising materials brought to site. - Return excess construction materials which are suitable for re-use. - Collected by a licensed contractor for disposal. - Proof of disposal. - Recycle or disposal options. 	Low	Low	Medium	Low	Low	Negative	Low

Hazardous Substances	Accidental spillage of hazardous substances and waste (outside of contained area and loss of primary containment) resulting in contamination of surface water, groundwater.	Medium	Medium	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Storage of all hazardous materials (oils, fuels etc.) should be done within impermeable, bunded, ventilated and covered storage areas, capable of containing 110% of total volume of the largest storage vessel within the storage area. All storage containers are to be labelled, sealed and stored in accordance with SDS requirements. - No mixing of cement or concrete may occur within 50 m of a stream channel. - Any mixing of concrete must take place on an impermeable surface in a contained area. - Use drip trays on vehicles and machinery. Contaminated soil removed as soon as possible and deposited in a designated area for disposal. - Spill and response equipment must be accessible on-site. Method statements and contingency / emergency response plans should be prepared for management of hazardous materials on-site. - Adequate spill response training. - Contaminated soil polluted by fuel, oils and other hydrocarbon pollutants should be removed as soon as possible and disposed of safely as hazardous waste. - Implementation of Spill and Incident Management as outlined in the Draft EMP (Appendix F) 	Low	Low	Medium	Low	Low	Negative	Low
Soils, Surface and Groundwater	Earth moving activities will increase the potential for localised soil erosion to occur. Potential indirect impacts relate to sediment laden surface water / stormwater contamination.	Medium	Medium	Medium	Medium	High	Negative	Medium	<ul style="list-style-type: none"> - Implement soil control erosion measures including limiting the extent of work areas, management of stormwater runoff, and sediment containment structures. - Excavated areas to be rehabilitated as much as possible. - Store topsoil from construction area in stockpiles not more than 2m in height to avoid compaction. The working area should be clearly designated and demarcated to minimise the footprint of the activity - Should heavy rainfall events start during construction, work must stop to avoid increased sedimentation. 	Low	Low	Medium	Low	Low	Negative	Low
	Excavations for laying of culvert foundation and construction has the potential to impact on soils, surface and groundwater quality.	Medium	Medium	Medium	Medium	High	Negative	Medium	<ul style="list-style-type: none"> - Geotechnical assessment to be conducted prior to construction. - Geotechnical engineer to inspect the foundation excavations prior to the placement of the culvert footings. - All habitats that occur outside of the working area (other instream habitats and riparian habitats) must be avoided. - Should heavy rainfall events start during construction, work must stop to avoid increased sedimentation. - Stormwater attenuation during construction is important to control the velocity of runoff towards the stream. - Water diversions must be monitored, with only one diversion made at a time and the natural flow of the stream must be maintained at all time. 	Low	Low	Medium	Low	Low	Negative	Low

	Deterioration of water quality because of the temporary diversion.	Medium	Medium	Medium	Medium	High	Negative	Medium	<ul style="list-style-type: none"> - Protection of the stream banks during the construction phase and ensuring that the banks are not pushed, or allowed to slump, into the stream channel. - The water conduits, whether pipes, box culverts, or bridges, must be large enough to both allow debris to pass through and to cope with high storm flows. - The temporary diversion of the stream requires a general authorisation from the Department of Water and Sanitation. 	Low	Low	Medium	Low	Low	Negative	Low
Biotic Environment																
Wetlands	Potential impacts on hydrology of the wetland	Medium	Low	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Location of the site camp must be identified further than 40m from the edged of the identified wetland boundaries. - No mixing of concrete mixing will be allowed to take place within the footprint area of the wetland. - All plant and equipment will be checked on a daily basis for leaks, any plant that is found to be leaking will be removed off site for maintenance. - Portable chemical toilets that must be serviced by registered service providers on a regular basis to be made available. 	Low	Low	Medium	Low	Low	Negative	Low
	Removal of vegetation from construction footprint will impact on the biodiversity of the wetland.	Medium	Low	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - The area that is defined as the construction footprint occurring within the wetland boundaries must be determined before any construction commences and clearly demarcated for the duration of the construction phase. - Demarcation must be conducted by the Resident Engineer, a Wetland Specialist and the Contractor so that an agreement can be reached with regards to the practicality of the demarcated area. - All construction and construction related operations must be limited to this area. Only the vegetation within this demarcated area is to be removed. - Provision must be made in the Environmental 	Low	Low	Medium	Low	Low	Negative	Low
	Increase in localised soil erosion will increase sedimentation and will impact on wetland	Medium	Low	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Management Programme for the rehabilitation of the cleared areas with indigenous vegetation. - Activities directly affecting wetlands and watercourse must occur during the dry winter months. <p>Measures must be implemented to control soil erosion including limiting the extent of work areas, management of stormwater runoff, and sediment containment structures.</p>	Low	Low	Medium	Low	Low	Negative	Low
Flora and Fauna	Excavations and clearance of vegetation have the potential to impact on vegetation on site.	Medium	Low	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - The clearing of vegetation should be kept to a minimum and should be limited to the areas where infrastructure will be established - Cleared vegetation must be disposed of appropriately and not burned - Use of endemic and indigenous species to rehabilitate and landscape affected areas - Alien plant control measures to be implemented within the development footprint. 	Low	Low	Medium	Low	Low	Negative	Low
	Proliferation of alien invasive vegetation	Medium	Low	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Disturbed areas must be rehabilitated immediately after completion. - Ensure that contractor laydown areas are included in the initial areas demarcated for clearing in order to minimise vegetation loss. 	Low	Low	Medium	Low	Low	Negative	Low

Table 18: Operational Phase Impact Assessment Table

PRIOR TO MITIGATION									POST MITIGATION							
Aspect	Impact Description	Intensity	Extent	Duration	Consequence of Impact	Probability	Status	of Significance Impact	Mitigation Measures	Intensity	Extent	Duration	Consequence of Impact	Probability	Status	of Significance Impact
Social Environment																
Visual and Aesthetics	Proximity of interchange may result in visual disturbances to surrounding land users	Low	Low	Low	Low	Low	Negative	Low	- Planting of trees to minimise visual impacts.	Low	Low	Medium	Low	Low	Negative	Low
Traffic	Improved public transport system in the area and surrounds	Medium	Medium	Medium	Medium	High	Positive	Medium	- Interchange must be inspected once every six months for the first 3 years and thereafter once a year to ensure faults are reported and repaired. - Culvert and interchange maintenance to be conducted. - Any reports on deterioration of the culvert and interchange must be addressed as practicably as possible.	Medium	Medium	Medium	Medium	High	Positive	Medium
	Improved safety for pedestrians and commuters utilising roads	High	Medium	High	High	High	Positive	High		High	Medium	High	High	High	High	Positive
Physical Environment																
Soils, Surface and Groundwater	Increased sedimentation and turbidity from increase stormwater runoff.	Medium	Low	Medium	Medium	Medium	Negative	Medium	- Water must be diverted away to minimise the amount of water running directly from the culvert into wetlands. - Regular maintenance of culvert and drainage infrastructure. - Stormwater outlets to be inspected of litter regularly. - All disturbed soils must be rehabilitated with local plant species to ensure that alien vegetation does not invade the area. - Litter traps must be installed at all storm water outlets to minimise litter from entering the stream.	Low	Low	Low	Low	Low	Negative	Low
	Accumulation of waste material / litter in the culvert impact on water quality of the Aller River.	Medium	Low	Medium	Medium	Medium	Negative	Medium		Low	Low	Low	Low	Low	Low	Negative
Biotic Environment																
Wetlands	Potential for erosion of wetland due to increased run-off entering the wetland during peak flows	Low	Low	Low	Low	Low	Negative	Low	- Rehabilitation of disturbed wetland areas. - Water must be diverted away to minimise the amount of water running directly from the culvert into wetlands. - Regular maintenance of culvert and drainage infrastructure. - Stormwater outlets to be inspected of litter regularly. - Ensure the stream banks are well maintained and vegetated to prevent any scouring of the supporting structures	Low	Low	Low	Low	Low	Negative	Low

Flora and Fauna	Proliferation of alien invasive vegetation	Medium	Low	Medium	Medium	Medium	Negative	Medium	<ul style="list-style-type: none"> - Revegetation of disturbed areas. - Alien clearing must be undertaken regularly. - Ongoing maintenance of interchange - An alien invasive management plan. 	Low	Low	Low	Low	Low	Negative	Low
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Table 19: No-go Alternative

Aspect	Impact Description	Severity	Extent	Duration	Consequence of Impact	Probability	Status	Significance of Impact
Land	There will be no expropriation of land parcels to accommodate the south bound on-ramp.	Medium	Low	High	High	High	Positive	Medium
Access	Poor access from both the North and South of Dinkleman Road.	Medium	Low	Medium	Medium	High	Negative	Medium
Traffic and safety	Continuation of increased risks for pedestrian movement from the neighbouring communities (Clermont and Berkshire) to Harmony Heights Station.	Medium	Medium	Medium	Medium	High	Negative	Medium

7.5 SUMMARY OF IMPACT ASSESSEMENT

A brief summary of the impact assessment undertaken for the proposed Eleventh Avenue Interchanges is provided below:

A significant social impact of the project is the loss of land through expropriation which is anticipated to be of high significance without mitigation. The expropriation process must be undertaken in accordance with the relevant laws post this BA process. Adequate engagement with affected stakeholders is required and appropriate compensation for the loss of will mitigate the loss of land.

The construction and decommissioning phase will have negative and positive impacts on the biophysical and social environment. Majority of the physical impacts such as air emissions, soil erosion, and general waste and handling hazardous substances (negative) are deemed to be of medium significance pre-mitigation and low significance post mitigation.

Biotic impacts (negative) associated with the proposed interchange relate to the disturbance of the wetland remnants and flora and fauna on site. The identified impacts are anticipated to be medium pre-mitigation and low post mitigation. The wetland area has been highly transformed and has a low EIS. Mitigation measures recommended by the Wetland Specialist (Draft EMPr) must be implemented.

Social impacts (negative) such as increased local traffic, visual and aesthetics access restriction will be reduced from medium (pre mitigation) to low significance with the implementation of mitigation measures. Traffic management (placement of signage at relevant points) and monitoring of pedestrians along construction route will mitigate negative impacts.

The operational phase is associated with positive social impacts of medium significance and negative biophysical impacts of low significance post mitigation. The proposed interchange will improve access for vehicles and pedestrian safety for communities of Berkshire and Clermont and the greater KwaDabeka.

The no-go option will result in continuation of high risks for pedestrian's moving from the neighbouring communities. The existing interchange currently has poor access from both KwaDabeka and Berkshire Downs and this status quo will remain if the no-go alternative is implemented.

8 CONCLUSION AND RECOMMENDATIONS

The overall objective of the BA process is to provide sufficient transparent and technically-robust information to enable informed decision-making by the authorities. This has been undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures. Mitigation measures have been developed where applicable for the above aspects and are presented within the Draft EMPr (Appendix F). Specialist input is required to mitigate impacts associated with wetlands.

It is the opinion of WSP that the information contained in this document is sufficient for the EDTEA to make an informed decision for the EA being applied for in respect of this project. It is further recommended that the EA should be issued in accordance with the current legal requirements under the NEMA and subject to adherence to mitigation measures outlined in this report and the accompanying EMPr (Appendix F).

APPENDIX

A

CV'S



APPENDIX

B

EDTEA PRE-CONSULTATION MEETING
MINUTES



APPENDIX

C

LAYOUTS



C-1

APPROVED CORRIDOR 3 LAYOUT

APPENDIX

C-2 PROPOSED ELEVENTH AVENUE INTERCHANGE

C-3

TRAFFIC MANAGEMENT PLAN

APPENDIX

C-4 STORMWATER MANAGEMENT PLAN

APPENDIX

D

SPECIALIST STUDIES



D-1 WETLAND DELINEATION

APPENDIX

D-2 HERITAGE IMPACT ASSESSMENT

APPENDIX

E PUBLIC PARTICIPATION PROCESS



APPENDIX

E-1 STAKEHOLDER ENGAGEMENT REPORT

APPENDIX

E-2 ETHEKWINI STAKEHOLDER ENGAGEMENT

APPENDIX

F

ENVIRONMENTAL MANAGEMENT
PROGRAMME



APPENDIX

G

EAP DECLARATION



APPENDIX

