



ETHEKWINI TRANSPORT AUTHORITY

**DM/0044/2012: INTEGRATED
RAPID PUBLIC TRANSPORT
NETWORK (IRPTN):
CORRIDOR 3**

Final Basic Assessment Report

Date: 08 April 2013
Revision no: 0.1
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Document Title:	Integrated Rapid Public Transport Network (IRPTN) (Corridor 3): Final Basic Assessment Report
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Revision Number:	0.1
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For:	Ethekwini Transport Authority

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ETHEKWINI TRANSPORT AUTHORITY
INTEGRATED RAPID PUBLIC TRANSPORT NETWORK
(IRPTN) CORRIDOR 3

REF. NO: DM/0044/2012

FINAL BASIC ASSESSMENT REPORT

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agriculture & environmental affairs

Department:
Agriculture
& Environmental Affairs
PROVINCE OF KWAZULU-NATAL

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EIA File Reference Number:
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Waste Management Licence Number:
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Date Received:

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KZN/EIA/

BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- **Environmental Authorization** subject to basic assessment for an activity that is listed in Listing Notices 1 or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- **Waste Management Licence** for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

Kindly note that:

1. This **basic assessment report** meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Agriculture & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
3. Where required, place a cross in the box you select.
4. An incomplete report will be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").

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8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
9. The KZN Department of Agriculture & Environmental Affairs may require that for specified types of activities in defined situations only parts of this report need to be completed.
10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24 O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.
11. **Please note that this report must be handed in or posted to the District Office of the KZN Department of Agriculture & Environmental Affairs to which the application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).**

DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	
File reference number (Waste Management Licence):	

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name and contact details of the EAP who prepared this report:

Business name of EAP:	SIVEST SA (Pty) Ltd.		
Physical address:	15 Lira Link Road, Richards Bay		
Postal address:	PO Box 1874, Richards Bay		
Postal code:	3900	Cell:	035-789 2070
Telephone:	035-789 2066		
E-mail:	marelizeb@sivest.co.za		

2. NAMES AND EXPERTISE OF REPRESENTATIVES OF THE EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)
Michelle Nevette	M.Sc. Env. Management	IAIA	11
Marelize Berning	Completing 2 nd last year of BA Env. Management through Unisa	IAIA	6
Mark Ryan	M.Sc. SocSci	IAIA	6
Michelle Evans	M.Sc. Environmental Science		0.5

3. NAMES AND EXPERTISE OF SPECIALISTS

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Education qualifications	Field of expertise	Section/ s contributed to in this basic assessment report	Title of specialist report/ s as attached in Appendix D
Frans Prins	MA (Archaeology)	Heritage Assessment	C 6	Ethekwini HIA Corridor 3

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Name of specialist	Education qualifications	Field of expertise	Section/ s contributed to in this basic assessment report	Title of specialist report/ s as attached in Appendix D
Stephen Burton	MSc. Zoology	Faunal Assessment	C3	IRPTN C3 Faunal Report
Greg Mullins	Pr. Sci Nat	Wetland Assessment	C4	11261 – ETA – IRPTN Corridor 3 – Wetland and Vegetation Assessment
GOBA		Traffic Impact Assessment	E3	C3 AIMSUN Model Report
GOBA		Stormwater Management Report	E2	TN-EAS-CW-1 Stormwater
Drennan, Maud and Partners – Karl Ribbink	BSc Hons Engineering Geology	Geotechnical Assessment	C3	CAD C3 1-10
Kurt Barichiev	Pr. Sci Nat	Bridge City Depot Wetland Delineation Report	C4	Rapid Transport Route Bridge City Depot Delineation Report Rev 1 1 4 December 2012

SECTION B: ACTIVITY INFORMATION

1. PROJECT TITLE

Describe the project title as provided on the application form for environmental authorization:

Integrated Rapid Public Transport Network (IRPTN): Corridor 3 Bridge City to Pinetown CBD

2. PROJECT DESCRIPTION

Provide a detailed description of the project:

The eThekweni Transport Authority (ETA) is mandated and is responsible for the planning, implementation and operations of public transport in the City. In terms of the National Public Transport Agenda, the ETA is similarly charged to deliver fully functional integrated public transport networks that respond to the needs of the users.

The ETA has just 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 ultimate IRPTN plan for the Municipality 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 trunk corridors are shown on the diagram below

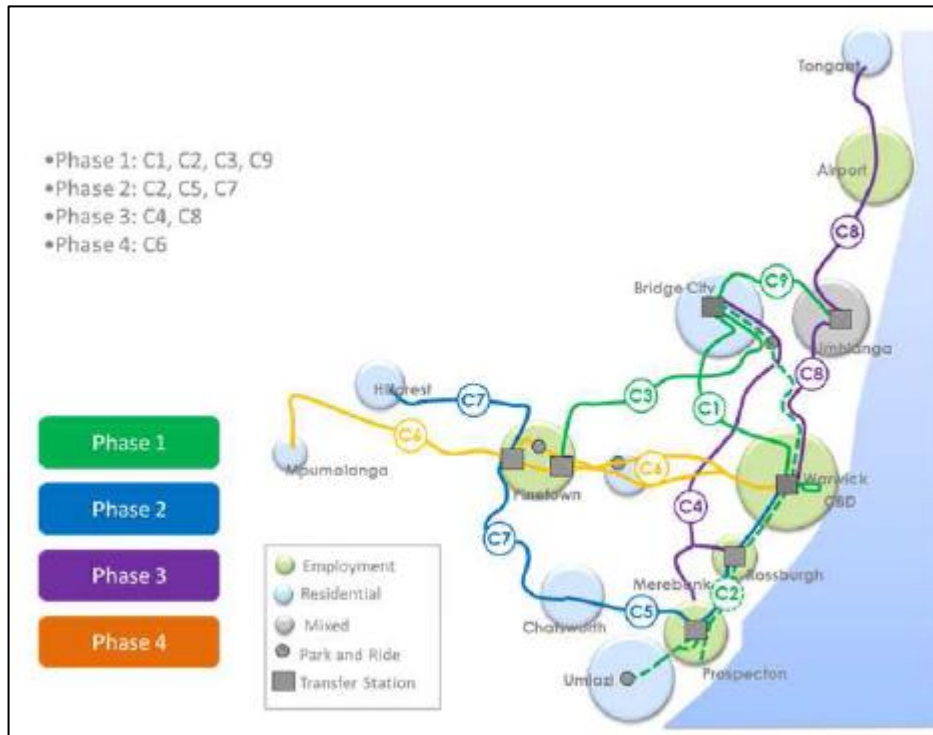


Figure 1: Trunk corridors

The network comprises of:

- One Rail Rapid Transit Corridor supported by a feeder network
- Eight Bus Rapid Transit corridors supported by feeder services
- Complementary Quality Bus Corridors that cater for demand that cannot be efficiently accommodated by the trunk feeder system

Phase 1

The IRPTN wall to wall plan has nine transport corridors of which eight are road based. Rail plays a significant role in the north-south corridor in terms of acting as the backbone of the system. Phase 1 will comprise of 3 Bus Rapid Transit (BRT) routes and 1 rail corridor. The 3 BRT routes are: C1 Bridge City to Warwick, C3 Bridge city to Pinetown, C9 Bridge City to Umhlanga Corridor and the rail corridor C2: Bridge City and KwaMashu via Berea Road to Umlazi and Isipingo.

The Phase 1 network will accommodate approximately 25 % of the Municipality's total trunk public transport demand on road based IRPTN services with a further 40 % being accommodated by the trunk rail network as part of Passenger Rail Association of South Africa (PRASA) implementation plans. This approach ensures recognisable benefit to the maximum number of users in the shortest period of time for the given level of investment required. Of the 190 km of road based trunk corridors, 60 km are planned for the Phase 1 implementation of the network by the first quarter of the 2015 financial year.

The infrastructure components of Phase 1 of the eThekweni IRPTN, which is essentially a Bus Rapid Transit service supported by road based feeder and complementary services, comprises:

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- Bus Right of Way (Dedicated bus ways and associated priority infrastructure)
- Terminal Stations
- On Route Stations and Station Precincts
- Control Centre (Transport Management Centre)
- Depots
- Vehicle fleets
- Integrated Fare Management Systems

Please refer to **Appendix A** for a map of the Station Stops, Depots and Terminal Stations

Corridor C3: Bridge City to Pinetown

C3 provides new connections between two major centres in a corridor that is not easily traversed at present. Interchange opportunities will be important both in Pinetown (with C6 and C7 or east-west movements) and at Bridge City (C1, C2, C4 and C9). C3 forms part of the Phase 1 network and is the subject of this application.

The C3 corridor is approximately 23km long, starting at Bridge City in Kwa-Mashu and traverses areas of Kwa-mashu, Ntuzuma, Kwa-Dabeka, 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.

C3 is to provide a new connection between Bridge City and Pinetown in a corridor that is not easily traversed at present. Most trips are commuter trips that have their destinations along the business and commercial areas of Pinetown CBD. Interchange opportunities will also be important both in Pinetown and at Bridge City.

Included in the C3 route is the Bridge City Depot. This depot is situated chiefly on Portion 508 of Erf 789 which can be accessed from the north using Phoenix Road. The area under assessment totals just under 6 ha. This depot site will provide a facility for busses to refuel whilst authorisation is being sought for the remainder of the depot sites. However should this site not be authorised, refuelling can take place at the existing Ntuzuma Bus Depot.

Please note that a previous ROD was issued for the development of the Bridge City Lower Platform located on Portion 529-537, 477, 486, 505, 506, 563, 564 (of 433), 538-541 (of 476), and Remainder of Portion 567, of the Melk Houe Kraal No. 789 for the construction of commercial, retail, light and service industrial uses to blend in with the surrounding developments.

For further details in respect of Corridor 1 and 9, refer to EIA applications DM/0043/2012 and DM/0042/2012 respectively.

3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June 2010), Listing Notice 3 (GNR 546, 18 June 2010) or Category A of GN 718, 3 July 2009 (Waste Management Activities) which is being applied for as per the project description:

Government Notice	Activity No	Description of Activity
GN R544, 18 June 2010	11	In routing the IRPTN from Bridge City to Pinetown, a number of watercourses will be crossed requiring upgrades to or new crossing points.
	13	Fuel will be stored on site at the depots that falls within the volumes of this activity.
	18	Construction of the IRPTN will entail the infilling and

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Government Notice	Activity No	Description of Activity
		depositing of material close to the Umgeni River.
	47	The roads will be widened to accommodate additional dedicated bus lanes.
GNR 546 of June 2010	16	Road infrastructure will be constructed in an urban area within 32m of the Umgeni River (zoned for Public Open Space).
	19	Road infrastructure will be constructed in an urban area within 32m of the Umgeni River (zoned for Public Open Space).
	24	Road infrastructure will be constructed in an urban area within 32m of the Umgeni River (zoned for Public Open Space).

4. FEASIBLE AND REASONABLE ALTERNATIVES

“**alternatives**”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

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

Describe alternatives that are considered in this report. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Layout/site Alternatives

The proposed activity will be built within the existing road reserve therefore layout alternatives have not been considered. Other than the minor deviation/alternatives mentioned within each corridor, no real alternative routes were assessed as the routing was based on the use of Class 3 arterial roads that link the main areas of homes, work, industrial, business and commerce over the whole of Ethekewini in association with the ability to install stations and the appropriate feeder drop off linkages without causing too much disruption to present mixed traffic flows. As such the routes, in their final configuration, evolved from these needs.

Clermont Deviation Proposal

A slight deviation in the route for Corridor 3 is proposed in the Clermont area. The advantages of this deviation are highlighted below:

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- The deviation would result in the IRPTN moving closer to the Claremont community and provide better walk-in accessibility.
- The positioning of a bus station between Dinkelmann and Blair Athol (Roger Sishi) is preferable and the road gradients make the station universally accessible without lifts.
- The new alignment facilitation access to a proposed feeder bus depot.

Please refer to **Appendix A** for a map of the proposed deviation.

Design Alternatives

Bus Based Modes

Various bus based modes have been considered including the Standard City Bus, the High Specification City Bus, the Trolley Bus as well as the Bus Rapid Transit.

The Standard City Bus as well as the High Specification City Bus can be considered together. There have been a number of recent international improvements to bus systems which include reduced engine noise, low floor chassis, introduction of low-pollutant “Euro IV” and “Euro V” engine technology as well as improved attenuation to passenger ambience with quality upholstery, large windows etc. These buses do not require special infrastructure and are designed to operate on-road with the general traffic mix and new routes can therefore be easily added.

The trolley bus is a bus that is powered by electricity from two overhead wires. Environmental considerations have been one of the main drivers behind renewed interest in trolleybus systems, providing similar levels of operational flexibility as conventional bus systems.

The Bus Rapid Transit (BRT) is a high profile rapid transit mode that combines the speed, image and performance of the light rail with the cost and flexibility of bus. The BRT is a flexible mode that uses well understood components such as dedicated busways, limited-stop and express services and bus priority measures that blends them to suit local conditions to enhance speed and reliability as well as grow public transport. This may result in a BRT corridor encompassing route segments that include buses operating in mixed traffic as well as on dedicated, grade separated alignment with stations, the only basic requirements is a road for the buses to run on.

Guidance and Power Options

Various guidance and power options were identified and discussed with regards to the design alternatives for the IRPTN. Guidance options included Unguided, Kerb Guided Bus, Fixed (Rail), Optical Guidance as well as Magnetic Guidance. The numerous Power Options identified included Bus Based Options, Clean (City) Diesel, Bio-diesel, Liquefied Petroleum Gas (LPG), Compressed Natural Gas (CNG), Electric (Trolleybus), Clean Diesel Engines, Hybrid Option, Stored Energy, Stored Energy by Batteries and Capacitors, Flywheel Stored Energy, Fuel Cells as well as Internal Combustion Trams.

The methodology for the choice of alternatives decided upon included a range of criteria, including capacity, reliability, modal efficiency, mode share, regeneration/land-use integration as well as deliverability.

Capacity is dependent on a number of factors. Buses and railed vehicles are formed of single units, single-articulated or multiple-articulated units. Each will have a different number of seats as specified by its operator and the number of standing passengers will be calculated on an average of 4 passengers per m². The capacities between bus and rail modes are increasingly getting more blurred as buses continue to get larger with longer rigid models and articulated models becoming more popular. The capacity of a standard bus is approximately 2, 500 passengers per hour per direction, increasing to 4, 000 with bus priority measures and

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6-7, 000 with a busway. Many BRT systems are based on multiple bus routes sharing a common dedicated busway to bypass congestion, especially to/from a central business district. In this form, the BRT system's passenger capacity is limited by vehicle capacity multiplied by vehicle headway of the busway. As buses can operate at headways as low as 10 seconds between vehicles, actual busway capacity can reach passenger rail capacities.

The reliability of a system is measured by the ability of the operator to enable a passenger to reach his destination on time. A number of factors can contribute to unreliable performance; amount of segregation, priority measures, interaction with congestion on the highway, pre-purchase of fares as well as age of the vehicle.

Modal Efficiency refers to the cost to transport a passenger. The costs for a bus are generally low. The higher the demand for travel on a route, the more buses need to be operated until it results in this mode becoming inefficient. Modal efficiency recognises that there is a place for all modes, and that depending on the cost needed to transport a given flow the mode will most likely change.

Modes that will make the most contribution to mode shift away from private transport need to be attractive to the consumer. Cars users who have a car at home regard it as costing nothing extra in using their car and so persuading this market to shift to public transport is difficult but achievable. Public transport users are looking for a product that offers reliability, comfort, speed and affordability. Features that have been successful in other cities include modern vehicles, segregated rights of way with priority junctions, high quality stop infrastructure, good quality passenger information and easily understandable and affordable fares systems.

Different areas have different densities of population and land use. Where concentrations of high density occur and corridors of demand can be identified, these are usually better served by a high capacity mode such as BRT or light rail. In order for mass transit to be developed, it requires city planners to focus development along identified corridors. The partnership between spatial planning and transport planning is the key to a viable transit system. It is therefore essential that appropriate rights of way are protected in masterplanning and also that transit links are built early in the development.

With regards to deliverability, it is important that the modes to be proposed can be implemented in the timescales required by the city council. In terms of cost, keeping solutions affordable is very important and developing a bus based mode fits this criterion.

The corridors have all been analysed to determine the likely level of demand. From the above information as well as the data obtained, the Bus Rapid Transport strategy was recommended for Corridor 3 Bridge City to Pinetown and is being considered further in this application. Refer to **Appendix D** Mode Choice Assessment for further information.

No-Go Alternatives

The "no-go" alternative addresses the scenario of the status-quo remaining the same, with no development. This has been assessed for the proposed development.

Sections B 5 – 15 below should be completed for each alternative.

5. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

Proposed Bridge City Depot

Alternative:

Alternative S1¹ (preferred or only site alternative)

Alternative S2 (if any)

Alternative S3 (if any)

Latitude (S):

Longitude (E):

31°	02'	56.8"	30°	12'	36.03"
0	'	"	0	'	"
0	'	"	0	'	"

In the case of linear activities:

Latitude (S):

Longitude (E):

Proposed Corridor 3

Alternative:

Alternative S1 (preferred or only route alternative)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Alternative S2 (if any)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Alternative S3 (if any)

- Starting point of the activity
- Middle point of the activity
- End point of the activity

29°	44'	05.16"	31°	00'	11.26"
0	'	"	0	'	"
29°	48'	25.58"	30°	52'	17.26"

0	'	"	0	'	"
0	'	"	0	'	"
0	'	"	0	'	"

0	'	"	0	'	"
0	'	"	0	'	"
0	'	"	0	'	"

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 500m along the route for each alternative alignment.

6. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Proposed Bridge City Depot

Alternative:

Alternative A1² (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

or, for linear activities:

Size of the activity:

60 000 m ²
m ²
m ²

¹ "Alternative S.." refer to site alternatives.

² "Alternative A.." refer to activity, process, technology or other alternatives.

Proposed Corridor 3

Alternative:

Alternative A1 (preferred activity alternative)
 Alternative A2 (if any)
 Alternative A3 (if any)

Length of the activity:

23 000 m
m
m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative A1_Corridor 3
 Alternative A2
 Alternative A3 (if any)

Size of the site/servitude:

8 m
m ²

7. SITE ACCESS

Proposed Bridge City Depot and Corridor 3

Does ready access to the site exist?

YES	

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

--

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

8. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this report.

The site or route plans must indicate the following:

- 8.1. the scale of the plan which must be at least a scale of 1:500;
- 8.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site;
- 8.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 8.4. the exact position of each element of the application as well as any other structures on the site;
- 8.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 8.6. walls and fencing including details of the height and construction material;

- 8.7. servitudes indicating the purpose of the servitude;
- 8.8. sensitive environmental elements within 100metres of the site or sites including (but not limited thereto):
 - rivers, streams, drainage lines or wetlands;
 - the 1:100 year flood line (where available or where it is required by DWA);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species);
- 8.9. for gentle slopes the 1metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
- 8.10. the positions from where photographs of the site were taken.

9. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

10. FACILITY ILLUSTRATION

A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as Appendix C. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

11. ACTIVITY MOTIVATION

11.1. Socio-economic value of the activity

What is the expected capital value of the activity on completion?

What is the expected yearly income that will be generated by or as a result of the activity?

Will the activity contribute to service infrastructure?

Is the activity a public amenity?

How many new employment opportunities will be created in the development phase of the activity?

What is the expected value of the employment opportunities during the development phase?

What percentage of this will accrue to previously disadvantaged individuals?

R 3 878 177 699
R 324, 233, 366 (average annual based on R 4, 106, 800, 389 fare revenue obtained over 12yr)
YES NO
YES NO
Unknown
R Unknown
Unknown%

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How many permanent new employment opportunities will be created during the operational phase of the activity?	1933
What is the expected current value of the employment opportunities during the first 10 years?	R 508, 650, 375
What percentage of this will accrue to previously disadvantaged individuals?	Unknown %

11.2. Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

By 2030, the eThekweni Municipality aims to be Africa's most caring and liveable city, with a safe environment in all areas of the Municipality, ease of movement and access to opportunity, as well as a clean, green city. Residents of cities need access to safe, affordable and quality scheduled public transport which enables them equal access to the opportunities available within the city. Currently, only 50 % of residents have access to scheduled services within the area, which will increase to around 85 % once the integrated rapid transport network is in place. In addition to this, a crime free, secure environment is envisaged, with extended hours of operation for increased safety. This transport network also has wheel chair access and caters for those with special needs.

As part of the integrated rapid public transport network (IRPTN) program, as many as 30 000 jobs opportunities will be available in the city, helping to reduce the high unemployment rates experienced today.

Indicate any benefits that the activity will have for society in general:

Society will have equal access to the opportunities available within the city. In addition to this, the overall impact of transport on the environment will be reduced and a more liveable city will be promoted. This transport network will also have a positive impact on the city's economy.

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.

The ETA is committed to an accessible public transport system in which disabled people have the same opportunities to travel as other members of society. In addition to disabled people, children in buggies and people with luggage need to be included. Floor-level buses and stations enable all customers, including wheelchair users, people with buggies, people with assistance dogs and people with other mobility impairments to get on and off easily.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

Job creation will be a benefit for local communities, with as many as 30 000 job opportunities available. Locals will also enjoy scheduled services in their areas, which will allow them easier access and movement.

12. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
Animals Protection Act, Act No 71 of 1962	Department of Agriculture	1962
Atmospheric Pollution Prevention Act, No 45 of 1965	DEAT	1965

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Title of legislation, policy or guideline:	Administering authority:	Date:
Conservation of Agricultural Resources Act, No 43 of 1983	Department of Agriculture	1983
Constitution of the Republic of South Africa Act 108/1996	The Constitutional Court	1996
Environmental Planning Act, Act No 88 of 1967	Development Planning and Management Unit	1967
Forest Act, No 122 of 1984	Department of Agriculture, Forestry and Fisheries	1984
Forest and Veld Conservation Act, Act No 13 of 1941	Department of Agriculture, Forestry and Fisheries	1984
Hazardous Substances Act, No 15 of 1973	Department of Health	1973
Land Survey Act, No 9 of 1921	Department of Land Affairs	1921
Minerals Act, No 50 of 1991	Department of Minerals and Energy	1991
National Environmental Management: Waste Act 59 of 2008	DWEA	2008
The National Heritage Resources Act 25 of 1999	South African Heritage Resource Agency (SAHRA)	1999
National Water Act, Act 36 of 1998	Department of Water Affairs	1998
Occupational Health and Safety Act, No 85 of 1993	Department of Labour	1993
Provincial and Local Government Ordinances and Bylaws	Department of Provincial and Local Government	
Soil Conservation Act, Act No 76 of 1969	Department of Agriculture	1969
Water Services Act No 108 of 1997	Department of Water Affairs	1997

13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

13.1. Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES [REDACTED]

If yes, what estimated quantity will be produced per month?

10 000 m³

How will the construction solid waste be disposed of? (describe)

Solid waste produced during the construction phase will be collected and be disposed of at an approved Landfill site. The recycling of waste could also be considered which would minimize the amount of material needing to be disposed of.

Where will the construction solid waste be disposed of? (provide details of landfill site)

Durban currently has 6 operational landfill sites of which 4 are general waste sites (Bisasar Road, Mariannhill, Mpumalanga and La Mercy) and 2 are low hazard co-disposal sites (Bulbul Drive and Shongweni).

Will the activity produce solid waste during its operational phase?

NO [REDACTED]

If yes, what estimated quantity will be produced per month?

m³

How will the solid waste be disposed of? (provide details of landfill site)

N/A

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

	NO
--	----

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Is the activity that is being applied for a solid waste handling or treatment facility?

	NO
--	----

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

13.2. Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

	NO
--	----

If yes, what estimated quantity will be produced per month?

	m ³
--	----------------

Will the activity produce any effluent that will be treated and/or disposed of on site?

	NO
--	----

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

	NO
--	----

If yes, provide the particulars of the facility:

Facility name:	
Contact person:	
Postal address:	
Postal code:	
Telephone:	Cell:
E-mail:	Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

13.3. Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

YES	
-----	--

If yes, is it controlled by any legislation of any sphere of government?

	NO
--	----

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

If no, describe the emissions in terms of type and concentration:

During the construction phase the construction vehicles will release emissions in the atmosphere. This will however not be significant and will be of a short term nature.

There will be an increase in emissions released into the atmosphere during the operational phase as a result of an increase in vehicles and buses on the route. However should the BRT be successful, the increase in emissions as a result of the project should be set off by the reduction in cars on the road. Alternatives have however been investigated to reduce this impact and more detail thereof is provided in **Section 15**.

13.4. Generation of noise

Will the activity generate noise?

If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

YES	<input type="checkbox"/>
<input type="checkbox"/>	NO

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Noise will be produced by construction activities but will be limited to the development footprint for the duration of the construction phase. Consequently, ambient noise levels are likely to only increase temporarily during the construction phase.

The following measures must be implemented at this site to minimise the potential noise impacts:

- Surrounding land users must be kept informed of unusually noisy activities which are planned.
- Noisy activities must take place during allocated construction hours only as per Section 25 of the Noise Control Regulations of the Environment Conservation Act, 1989 (Act no. 73 of 1989)
- Noisy activities must be kept to a minimum and conducted simultaneously at the start of construction if possible.
- Piling or other noisy activities must take place during normal working hours.
- The community must be notified prior to any planned activities that will be unusually noisy.

Noise from labour

- Noise from labourers must be controlled.
- The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport.
- No labour must be housed on site.

Noise from construction equipment

- Noise suppression measures must be applied to all construction equipment.
- Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order.
- Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site.

Consultation with surrounding land owners

- Should complaints regarding noise levels be received, as a result of construction activities on the site, these shall be recorded by the ECO, and if these noise levels are proven to be higher than acceptable levels, as laid down in the noise regulations of the Environment Conservation Act, then offending machinery or vehicle shall be identified and remedial measures implemented.

Measures to control daily noise activities during construction will be included in the Environmental Management Programme EMP (**Appendix F**) for the project.

14. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

municipal	water board	groundwater	river, stream, dam or lake	other	the activity will not use water
------------------	-------------	-------------	----------------------------	-------	---------------------------------

If water is to be extracted from groundwater, river, stream, dam, lake or any litres

other natural feature, please indicate the volume that will be extracted per month:

NO

Does the activity require a water use permit from the Department of Water Affairs?

If YES, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this report.

15. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Various Power Options have been identified for Corridor 3. These include Bus Based Options, Clean (City) Diesel, Bio-diesel, Liquefied Petroleum Gas (LPG), Compressed Natural Gas (CNG), Electric (Trolleybus), Clean Diesel Engines, Hybrid Options, Stored Energy by Batteries and Capacitors, Flywheel Stored Energy, Fuel Cells, Internal Combustion Trams as well as Ground-Level Power Supply (APS). The advantages and disadvantages of these Power Options have been identified and discussed further in the Mode Choice Assessment and is attached in **Appendix D**. There will be an increase in emissions released into the atmosphere during the operational phase as a result of an increase in vehicles and buses on the route. However should the BRT be successful, the increase in emissions as a result of the project should be set off by the reduction in cars on the road.

SECTION C: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No.
(e.g. A):

- Subsections 1 - 6 below must be completed for each alternative.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50	–	1:20	–	1:15 – 1:10	1:10	–	1:7,5 – 1:5	Steeper than
	1:20		1:15			1:7,5			1:5

Alternative S2 (if any):

Flat	1:50	–	1:20	–	1:15 – 1:10	1:10	–	1:7,5 – 1:5	Steeper than
	1:20		1:15			1:7,5			1:5

Alternative S3 (if any):

Flat	1:50	–	1:20	–	1:15 – 1:10	1:10	–	1:7,5 – 1:5	Steeper than
	1:20		1:15			1:7,5			1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site **(Please cross the appropriate box)**.

Alternative S1 (preferred site):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	
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Alternative S2 (if any):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	Dune	Sea-front
-----------	---------	-----------------------------	---------------	-------------	-------	----------------------------	------	-----------

Alternative S3 (if any):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plain/low hills	Dune	Sea-front
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3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Proposed Corridor 3

Drennan, Maud and Partners conducted a preliminary geotechnical assessment on Corridor 3 of the IRPTN. The report is attached in Appendix D. Below is a summary of the recommendations for each section of the corridor as indicated on the geological maps.

CAD C3 (1)	(Refer to Appendix D)
C3.0- C3.2 (including PRW 18)	Medium hard and hard shale and dolerite exposed at surface. Intermediate and hard excavation is expected.
C3.3 – C3.5 (including PRW19)	For new cuts, Shale excavatable to 6-8m by soft excavation, below hard excavation is expected. Well known instability area, preliminary design cut slopes of 1 in 2 recommended. For new fills, clays will need to be excavated and replaced with rockfill toes and drainage blankets.
C3.5 – C3.8	Soft through to hard shale and dolerite bedrock which may require blasting to excavate.
PFS8	Engineered fill necessary to create a level platform. Clays need to be replaced with rockfill toes
PB11	Soft to medium hard shale bedrock exposed at surface
CAD C3 (2)	(Refer to Appendix D)
C3.5 – C3.8	Minimal to no subgrade improvement necessary as road median traverses existing cuts and fills
PFS 9	
PFS10	All engineered fill necessary to create level platform. Clays excavated, replaced with rockfill toes. Subgrade improvement necessary when founding road layers.
CAD C3 (3)	(Refer to Appendix D)
C3.5 – C3.8	Route generally follows existing road median. Minimal subgrade improvement necessary.
PB12 (underpass)	Underpass will encounter hard excavation beneath central and western portions becoming soft excavation towards the east.
CAD C3 (4)	(Refer to Appendix D)
C3.5 – C3.8	Proposed route follows road median. Minimal to no subgrade improvement necessary, except where the clayey Colluvium/Residuum is encountered.
PFS11	For pavement, minor to no subgrade necessary
CAD C3 (5)	(Refer to Appendix D)
C3.8 – C3.10	Proposed route generally follows road medium, minimal to no subgrade necessary, except where the clayey Colluvium/Residuum is encountered.
C3. 10 –	Proposed route generally follows road medium, minimal to no subgrade

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C3.17	necessary, except where the clayey Colluvium/Residuum is encountered.
PB 13	Bridge Founding – spread footings on soft rock Tillite (ABP 400 kPa)
PB 14	Bridge Founding – spread footings on soft rock Tillite (ABP 400 kPa)
PFS 12	Intermediate and hard excavation is expected below 1-2m. Light and heavy structures – strip footings and pad footings on sandstone bedrock
CAD C3 (6)	(Refer to Appendix D)
C3.10- C3.17	Proposed route generally follows road medium, minimal to no subgrade necessary, except where the clayey Colluvium/Residuum is encountered. Upper sandy hillwash highly erosive, stormwater control essential.
PB 15	Bridge Founding – spread footings on Sandstone bedrock (ABP 1 MPa)
CAD C3 (7)	(Refer to Appendix D)
C3.10 – C3.17	Proposed route generally follows road medium, minimal to no subgrade necessary, except where Colluvial clays encountered in valleys. Upper sandy hillwash highly erosive, stormwater control essential.
PRW20	Retaining wall may not be necessary, depending on structures above. Requires further investigation.
CAD C3 (8)	(Refer to Appendix D)
C3.10 – C3.17	Proposed route generally follows road medium, minimal to no subgrade necessary, except where Colluvial clays encountered in valleys. Upper sandy hillwash highly erosive, stormwater control essential.
C3.18 – C3.21	Subgrade improvement necessary if sandy/clay Colluvium/Residuum is encountered beneath road level. However, majority of section likely to have existing engineered subgrade.
PB 16	Bridge Founding – Spread footings on soft rock Sandstone
CAD C3 (9)	(Refer to Appendix D)
C3. 18 – C3.21 (end)	Subgrade improvement necessary if sandy/clay Colluvium/Residuum is encountered beneath road level. However, majority of section likely to have existing engineered fill subgrade.
CAD C3 (10)	(Refer to Appendix D)
PB 20 (underpass)	Concrete retaining walls or re-enforced earth retaining walls are deemed suitable for the underpass narrowing. Very soft to soft Sandstone bedrock is expected at anticipated founding level (5-7m).

Proposed Bridge City Depot Site

Drennan, Maud and Partners conducted a preliminary geotechnical assessment on the Proposed Bridge City Depot of the IRPTN. Below is a summary of the recommendations as indicated on the geological maps attached in **Appendix D**.

The eastern portion of the site is characterised by relatively old shale derived fill platform in the order of 5.0m in vertical height which is likely to overlie thin in-situ colluvial and residual clays. The central portion of the site consists of up to 3.0m of shale derived fill as well as numerous, randomly oriented stockpiles of silty sand and sandy clay materials, which are up to 4.0m in height. There are also numerous, scattered, hard rock tillite cobbles and boulders in this area which are likely to overlie sandy alluvium. The southern portion of the site consists of isolated areas of shale derived fill overlying light brown silty sand and sandy alluvium of the gently sloping alluvial plane of the Palmiet River.

The proposed development will comprise cutting across the northern portion of the site and filling out across the southern and western portions of the site. The in-situ sandy alluvium and derived fill are likely to be prone to erosion by wind and flowing water. The proposed fills are likely to undergo settlement under its own weight, and will be a function of the thickness of the fill. In addition, there is likely to be consolidation settlement underneath the fills as a result of the underlying loose sandy alluvial soils. Retaining walls are to be installed along the entire length of the western boundary of the site adjacent to the Palmiet River course.

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Recommendations

- “Soft” excavation class material (SABS 1200D) is expected in the existing fill and alluvial materials here to in excess of 5.0m below existing ground levels.
- Groundwater seepage is likely to occur on a permanent basis at the contact of the fill and the underlying alluvium.
- For preliminary design purposes, cut and fills must be designed to a 1: 2 (26°) outer slope batter. Due to the expected height of the fills and the certainty of seepage at the base of fills, appropriately designed subsoil drainage and rock fills toes will be required.
- Where space is not available to create the required 1:2 slope batter or there are boundary constraints, cut and fills may require lateral support. In this instance drystack walls with geogrids or gabions are advocated to support cuts and terramesh gabions are recommended for fills. Careful consideration should be applied so as not to remove lateral support to Phoenix Road, Tarvale Crecent and especially the M25 during the creation of cuts. A Terramesh Gabion founded on a thick (2.0m) rockfall is likely to be necessary for the high retaining wall alongside Palmiet River.
- All structures are likely to span cut to fill or are located entirely in fill. As such, it is recommended that the less flexible structures be supported by rafts or ground beams spanning piled foundations. Due to the anticipated ground conditions and the likelihood of seepage CFA/precast piles are considered the most appropriate pile types, taken through the fill and in-situ soils to socket at least 500 mm into competent shale bedrock.
- Light flexible steel framed structures may be founded on pads in fill.
- CBR >3% and G10+ type materials are to be expected across the majority of the site, unless in-situ shale is encountered at cut level (CBR >3%, G8 to G10 material).

Has a specialist been consulted for the completion of this section?

YES

If YES, please complete the following:

Name of the specialist:	Drennan, Maud and Partners – Karl Ribbink		
Qualification(s) of the specialist:	BSc (Hons) Engineering Geology		
Postal address:	68 Ridge Road, Tollgate, Durban		
Postal code:	4001		
Telephone:	031 201 8992	Cell:	083 775 2321
E-mail:	karl@dmpconsulting.co.za	Fax:	031 201 7920
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?	<input checked="" type="checkbox"/>		NO
If YES, specify and explain:	Refer below		
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?	<input checked="" type="checkbox"/>	YES	NO
If YES, specify and explain:			
Are any further specialist studies recommended by the specialist?	<input type="checkbox"/>	YES	NO
If YES, specify:	Refer below		
If YES, is such a report(s) attached in <u>Appendix D</u> ?	<input type="checkbox"/>	YES	NO
Signature of specialist:	Refer to attachment in <u>Appendix D</u>	Date:	13/09/2012

A Faunal Assessment was undertaken by Stephen Burton from SiVEST. The development of dedicated bus and taxi lanes within the centre median of the existing MR577 road will not significantly impact upon the fauna of the proposed corridor. However, a number of recommendations have been made to mitigate any impact that construction may impart to the receiving environment:

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- Alien clearing must be undertaken within the entire development zone;
- No hunting, or poaching will be tolerated by the contractors' staff during construction;
- All riparian zone crossings should be carefully planned, and should bridge widening be needed, the ECO must approve all method statements to ensure minimal impact on these riparian systems.
- Should it be found that the Black-headed Dwarf Chameleon are present, any specimens of the Black-headed Dwarf Chameleon need to be removed carefully before clearing of any area for construction, and relocated to an identified release site. The release site should be identified in consultation with Ezemvelo KZN Wildlife and eThekweni Environmental Management Division.

The numerous riparian zones along the proposed development corridor pose the greatest concern, as some of these areas may contain amphibian species. Where possible, these zones should be avoided. However, where bridges require widening, appropriate method statements must be approved by the appointed ECO.

From a faunal perspective, the proposed construction of the IRPTN will not significantly affect the fauna of the area, as long as the recommendations above are adhered to.

Is the site(s) located on any of the following (cross the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	YES	YES	YES
Dolomite, sinkhole or doline areas	NO	NO	NO
Seasonally wet soils (often close to water bodies)	YES	YES	YES
Unstable rocky slopes or steep slopes with loose soil	YES	YES	YES
Dispersive soils (soils that dissolve in water)	NO	YES	YES
Soils with high clay content (clay fraction more than 40%)	YES	YES	YES
Any other unstable soil or geological feature	YES	YES	YES
An area sensitive to erosion	YES	YES	YES

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Has a specialist been consulted for the completion of this section?

YES

If YES, please complete the following:

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Name of the specialist:	Greg Mullins		
Qualification(s) of the specialist:	Pr. Sci.Nat		
Postal address:	4 Pencarrow Crescent, La Lucia Ridge Office Estate, PO Box 1899 Umhlanga Rocks		
Postal code:	4320		
Telephone:	(031) 581 1500	Cell:	
E-mail:	info@sivest.co.za	Fax:	(031) 566 2371
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?			
			NO
If YES, specify and explain:			
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?			
			NO
If YES, specify and explain:			
Are any further specialist studies recommended by the specialist?			
			NO
If YES, specify:			
If YES, is such a report(s) attached in <u>Appendix D</u> ?			YES NO

Signature of specialist: _____ Date: _____

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E
Sport field	Cultivated land	Paved surface	Building or other structure Bare soil

If any of the boxes marked with an "E" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

Greg Mullins from SiVEST conducted a Wetland and Vegetation Assessment on Corridor 3 of the IRPTN. The report is attached in Appendix D. Below is a summary of the findings.

Corridor 3 will run for almost its entire length within the central median of the P577 and similar existing roads. As such, many of the wetlands and watercourses have already been highly modified during the construction activities for the original roads. The portion of the route between Bridge City and the P577, along the M25 is perhaps the only segment where the road will run in close proximity to a watercourse. The portion of the route through Pinetown may require the removal of some trees along the road edges. Most of these trees are exotic or locally common indigenous species.

For the assessment of the entire corridor, the route has been broken up into sections for detailed study.

Route Portion 1 – Bridge City to P577 Intersection

This portion of the route runs from Bridge City around the southern and western edge of the M25.

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Wetlands

Two wetland areas were identified along this portion of the route. The road will need to cross the Piesang River at existing culvert points. The floodplain was found to be very narrow at these points and largely modified, with a fairly incised channel and narrow flood benches either side of the stream. The second wetland system includes a portion of the floodplain and possible hillslope seepage that lies to the west of the M25.

Vegetation

Vegetation along this portion of the route was found to be highly disturbed. Large stands of alien weeds were found as well as indigenous species limited to pioneer grasses on the road verges. In general, the vegetation was in poor condition and almost entirely secondary and alien in makeup.

Overall Assessment

This portion of the route remains one of the most sensitive given that the alignment is along the edge of the current road. The route runs in close proximity to the Piesang River floodplain. Extensive historic disturbance and ongoing impacts to the system have greatly reduced the biodiversity value of this portion of the system. With the correct management of the construction activities, the widening of the M25 as well as the inclusion of the bus lanes will have a limited impact on the receiving system. Disturbance is likely to be limited to the current road fill banks and bed. An ECO is recommended on site during construction to ensure that strict control of site contractors and their activities is maintained.

Route Portion 2 – P577: M25 to M21

This portion of the route runs between the M25 bridge and the M21 Highway. The entire IRPTN proposed within this section will run within the existing central median of the P577 road. A number of drainage lines were crossed as part of the construction of the original P577 road, however, in many cases the new lanes will be more than 32 metres away from the parts of these systems that still exhibit natural systems.

Wetlands

Along this section of the IRPTN it was found that seven modified watercourses will need to be crossed by the new lanes. In infilling the drainage lines to create a level road surface, large fill banks have been created within each of the waterways. Flow is captured upstream, piped under the road and then discharged back into the system. As such the new lanes will have very little direct impact on these highly modified systems.

Vegetation

Vegetation communities along this section were found to be predominantly grass dominated. The disturbance created by the construction activities has allowed alien invasive species to infiltrate.

Overall Assessment

The new lanes will not impact any further on these systems. The vegetation found along this section is not considered to be of any biodiversity significance and potential impacts associated with road development are negligible.

Route Portion 3 – P577: M21 to Mgeni River Bridge

This portion of the planned route runs between the M21 bridge and the new bridge over the Mgeni River to the east of KwaDebeka. A number of drainage lines were crossed as part of

Basic Assessment Report

the construction of the original P577 road. However, in many cases the new lanes will be more than 32 metres away from the parts of these systems that still exhibit natural features.

Wetlands

Along this section of the IRPTN it was found that six modified watercourses will need to be crossed by the new lanes. In infilling the drainage lines to create a level road surface, large fill banks have been created within each of the waterways. Flow is captured upstream, piped under the road and then discharged back into the system. As such the new lanes will have very little direct impact on these highly modified systems.

Vegetation

Vegetation communities along this section were found to be predominantly grass dominated. The disturbance created by the construction activities has allowed alien invasive species to infiltrate.

Overall Assessment

The new lanes will not impact any further on these systems. The vegetation found along this section is not considered to be of any biodiversity significance and potential impacts associated with road development are negligible.

Route Portion 4 – P577: Mgeni River Bridge to Dinkleman Rd

This portion of the planned route runs from the Mgeni Bridge to Dinkleman Rd, through KwaDabeka. As with the above section, the proposed new lanes will run within the existing central median of the P577 road. Much of the vegetation along this portion is secondary and heavily invaded with alien species.

Wetlands

Along this section of the IRPTN it was found that six modified watercourses will need to be crossed by the new lanes. In infilling the drainage lines to create a level road surface, large fill banks have been created within each of the waterways. Flow is captured upstream, piped under the road and then discharged back into the system. As such the new lanes will have very little direct impact on these highly modified systems.

Vegetation

This portion of the P577 is still under construction and the entire route has effectively been scrubbed and is being benched to accommodate the road. Indigenous vegetation linked with the new lanes is all but non-existent for 50 to 100m either side of the planned route.

Overall Assessment

This section runs exclusively within the central median of the existing P577 road, through a highly settled landscape. The wetlands have been highly modified and captured within pipes to direct flow under the road. The new lands will not impact any further on these systems.

Route Portion 5 – Dinkleman Road and Pinetown CBD Loop

The final portion of the route runs through the Pinetown CBD. The planned road will cross a number of canalised and modified watercourses. Vegetation is limited to individual trees lining the road edges and grass verges.

Wetlands

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Impacts associated with the new lanes will have little additional impact on these systems as each of these systems is already crossed by the existing road network and the planned construction will be limited to upgrading of the culverts in these sections.

Vegetation

Vegetation elements identified were limited to grassed verges and individual trees. The trees are largely exotic, with fig trees between the Civic Centre and Library being the only indigenous species likely to be impacted. These trees should be retained if possible, however are not protected or of major ecological value

Overall Assessment

This portion runs exclusively through Pinetown and as such little sensitive environment will be encountered. Impacts on the vegetation along this section are also likely to be very limited and highly localised.

Conclusion

As the planned IRPTN route will run largely within the central median of the existing P577 road, impacts to watercourses and vegetation have already occurred in the construction of the original road. Limited and localised impact on water and vegetation resources will occur. The EMP should however include steps to ensure that the construction activities do not impact further on the watercourses, wetlands and remaining areas of natural vegetation.

Bridge City Depot

Groundcover

Has a specialist been consulted for the completion of this section?

YES

If YES, please complete the following:

Name of the specialist:	Kurt Barichievy		
Qualification(s) of the specialist:	Pr. Sci.Nat		
Postal address:	170 Peter Brown Drive, Bush Shrike Clse, Montrose		
Postal code:	3201		
Telephone:	(033) 347 1600	Cell:	
	kurtb@sivest.co.za	Fax:	(033) 347 5762
E-mail:			

Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites? NO

If YES, specify and explain: NO

Are there any special or sensitive habitats or other natural features present on any of the alternative sites? NO

If YES, specify and explain: NO

Are any further specialist studies recommended by the specialist? NO

If YES, specify: NO

If YES, is such a report(s) attached in Appendix D? NO

Signature of specialist: _____ Date: _____

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The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

Bridge City Depot Site

Kurt Barichievy from SiVEST conducted a Wetland Assessment on the Depot site on Corridor 3 of the IRPTN. The report is attached in Appendix D. Below is a summary of the findings.

The development site falls within the U20M quaternary catchment and supplements the Piesang River, which forms the western and southern borders of the site. Overall the site has been greatly disturbed and transformed by various anthropogenic impacts including platform creation, road construction and dumping. A road, servicing the Curnick Ndlovu Highway runs along the eastern edge of the site and ultimately drains into the Piesang River.

The proposed depot site has been divided into 3 distinct areas. Area 1 is dominated by a newly created platform created from shale, gravel, construction waste and soil. The platform is relatively even but small depressions have formed in which pools of water collect. A small amount of erosion was evident on the steep sided platform.

Area 2 has been greatly disturbed and appears to be an artificially created valley/depression between two elevated land platforms. Due to the large amount of dumping evident on site the surface condition of the soil has been rendered relatively impermeable and therefore obtaining an undisturbed sample was virtually impossible. Standing water was also noted due to the topographical position of the site, poor drainage as well as the disturbed nature of the soils. Although area 2 was not classified as a wetland, proper drainage and site management will need to be employed to ensure future erosion and land degradation does not occur.

Area 3 is characterised by a flat, grassed area which appears to be part of an older platform development. The western and southern edges of this area fall sharply away towards the Piesang River. Area 3 is underlain by materials such as building rubble, road aggregate and soil material. This area has been significantly transformed and much of the natural vegetation has been cleared or degraded by grazing and burning.

A channelled valley bottom wetland was identified on site. This system runs along the western and southern borders of the site. Steep platform and river embankments generally form the wetland boundary and typical hydric soil characteristics do not persist away from the riparian cordon.

The soils within the lowest lying portions of the valley bottom comprised moist sandy material, which appears to be alluvial. A gleyed matrix was noted, which contained moderate numbers of orange/brown mottles. These soils are indicative of hydric soils experiencing seasonal to semi-permanent saturation. Moving upslope from the outer temporary wetland edge, the soils comprised dark, silty clay with limited evidence of distinct mottling occurring.

Two primary potential impacts have been identified for the proposed Bridge City Depot Site. These impacts relate to the stormwater management and potential water resource contamination.

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With regards to the stormwater management impacts, large portions of the site will be completely cleared for the development area. This will increase the surface runoff throughout the construction site, as well as increase the erosion potential of the soils on site. If measures are not put in place to control this, the exposure of the bare soils to the elements will likely lead to the erosion of the soils on site during heavy rainfall events. This could also have negative effects on the wetland system and could result in the lowering of the water table within the wetland and the drying out of the wetland soils. In addition, the vegetation communities within the wetland system could be removed and washed down the gully, making way for the colonisation of alien and indigenous invasive and pioneer plant species.

The proposed development will result in an increase in the amount of hardened surfaces, which will in turn increase the amount of surface runoff generated by the development. The wetland units will therefore experience an increase in the volume of surface flow relative to subsurface flow and increased flood peaks within the wetland. This increases the risk of erosion within the wetlands, particularly where knick-points and head-cuts are already present.

Conversely, the hardening of large areas will reduce soil infiltration across the site and therefore reduce the subsurface flow inputs that feed the wetlands.

Recommended mitigation measures have been included in the report and full details of these can be found in Appendix D.

With regards to water resource contamination, the proposed development includes a refuelling station as well as a bus wash bay and these could have the potential to have serious implications on nearby ground and surface water resources via contamination. Fuel leaks and the contamination of surface water runoff from hydro-carbons needs to be minimised, or ideally, eliminated. The primary mitigation measures for the refuelling station will be jacketed, buried fuel tanks. These fuel tanks will also need to be installed with leak detection equipment. Every precaution must be taken to ensure that any hydrocarbons, chemical or hazardous substances do not contaminate unprotected soil resources or rivers or wetland areas.

Due to the site and wetland characteristics, a 10 m buffer has been assigned to the top of the platform and river embankments. It is recommended that mitigation measures outlined in this report are actioned, if the various activities are authorised.

To reduce the risk of water resource contamination and flood inundation it is highly recommended that the proposed refuelling station, maintenance shed and wash bays are positioned as far as possible from the platform edge and site specific flood lines. The on-site containment, attenuation and treatment of runoff water emanating from the refuelling area, maintenance area and wash bays is also highly recommended.

If the proposed development and associated activities are authorised then the following studies are recommended:

- A site specific flood line study of the Piesang River
- The compilation of a storm water and soil management plan; and
- A geohydrological study and associated borehole survey study needs to be commissioned.

5. LAND USE CHARACTER OF SURROUNDING AREA

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

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Land use character			Description
Natural area	YES		
Low density residential	YES		
Medium density residential	YES		
High density residential	YES		
Informal residential	YES		Much of the area is under low cost or informal housing
Retail commercial & warehousing	YES		
Light industrial	YES		
Medium industrial	YES		This is where the route passes through New Germany Industrial Park.
Heavy industrial		NO	
Power station		NO	
Office/consulting room	YES		
Military or police base/station/compound	YES		Pinetown SAPS, Old Main Road, Pinetown
Spoil heap or slimes dam		NO	
Quarry, sand or borrow pit		NO	
Dam or reservoir		NO	
Hospital/medical centre	YES		Crompton Hospital, Crompton Street, Pinetown New Germany Clinic, Coventary Avenue, New Germany KwaDabeka Provincial Community Health Centre, Khululeka Drive, KwaDabeka Bester Sizanempilo, 109551 Street, KwaMashu M
School/ creche	YES		
Tertiary education facility		NO	
Church	YES		Old New Germany Lutheran Church, Corner of Blair Atholl Road and Shepstone Road
Old age home		NO	
Sewage treatment plant		NO	
Train station or shunting yard	YES		Pinetown Station 29° 49' 4.58" S, 30° 51' 28.30" E. Duff's Road Station 29° 44' 35.67" S, 30° 00' 16.36" E
Railway line	YES		
Major road (4 lanes or more)	YES		Mandela Highway 29.74197° S, 30.98856°E
Airport		NO	
Harbour		NO	
Sport facilities	YES		
Golf course		NO	
Polo fields		NO	
Filling station	YES		
Landfill or waste treatment site		NO	
Plantation		NO	

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Agriculture		NO	
River, stream or wetland	YES		
Nature conservation area		NO	
Mountain, hill or ridge		NO	
Museum	YES		Pinetown, 60 Kings Road
Historical building	YES		Old New Germany Lutheran Church, Corner of Blair Atholl Road and Shepstone Road
Protected Area		NO	
Graveyard	YES		KwaDabeka E
Archaeological site	YES		
Other land uses (describe)		NO	

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?

NO

If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

Briefly explain the recommendations of the specialist:

A heritage survey 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. There is no archaeological reason why the proposed corridor may not be constructed as planned. However, according to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act No 4 of 2008) operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

Will any building or structure older than 60 years be affected in any way?

NO

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

NO

If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

SECTION D: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

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- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the local and district municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
 - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or
 - (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that an application for environmental authorization has been submitted to the KZN Department of Agriculture & Environmental Affairs in terms of the EIA Regulations, 2010; (ii)
 - (iii) a brief project description that includes the nature and location of the activity to which the application relates;

- (iv) where further information on the application can be obtained; and
- (iv) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE PROCESS

The EAP must ensure that the public participation processes according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of subregulation 54(2) in the manner agreed by the KZN Department of Agriculture & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as Appendix E to this report.

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

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Has any comment been received from the district municipality?

YES

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

- 1) Coastal, Stormwater and Catchment Management
 - No objection from Coastal, Stormwater and Catchment Management
- 2) Ethekewini Water and Sanitation: Pollution and Environmental Branch
 - Fuel and other chemicals stored in bunded area's
 - No washing vehicles and machinery in stormwater system
- 3) Ethekewini Electricity
 - High voltage infrastructure must be considered when IRPTN project designs done
- 4) Durban Solid Waste
 - No comment at this time, will need to understand routes to confirm whether they affect any of our assets or functions
- 5) Wastewater Network Operations: West
 - No objections. All sewer crossings have been identified and designs agreed with consultant
- 6) Environmental Planning and Climate Protection Department
 - Requests that all potential impacts on biodiversity and stream crossings along the proposed route and depot sites be addressed in Basic Assessment Report
 - Shapefiles and layout plans of the proposed route be provided
 - EMP needs to be prepared
- 7) Geotechnical Engineering
 - No geotechnical objections at this early stage
 - Geotechnical investigations of routes and depot sites will pick up any specific constraints

For details on the feedback received, refer to **Appendix E**

Has any comment been received from the local municipality?

NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Has any comment been received from a traditional authority?

NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

7. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

KZN Wildlife

- Requested shape files of all corridors to be sent so that the team could get onto processing the applications when the hard copies arrive. Shape files of all corridors emailed on 3/9/2012.

SANRAL (South African National Roads Agency Limited)

- Noted that the route does not affect them directly.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

None to date

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

None to date

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

2.1 IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Alternative S1 (preferred alternative)

Stormwater

Reference is made to the Stormwater Design Parameters for Quality and Quantity of Stormwater Control prepared by Goba and attached in Appendix D.

Common impacts to the hydrologic regime resulting from development typically include:

- Increased runoff volume and velocity
- Reduced infiltration

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- Increased flow frequency, duration and peaks
- Faster time to reach peak flow and
- Water quality degradation.

These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime would be considered a condition of concern if the change were to impact downstream channels and habitat integrity. The stormwater system within the confines of the various sites will in all likelihood also inadvertently receive some non-storm generated water and contaminants as a result of spillages and poor housekeeping practices. The Stormwater Pollution Prevention Plan (SWPPP) therefore aims firstly to identify and eliminate all non-storm generated water, and secondly prescribe preventative measures in the form of BMP's (Best Management Practices).

Alternative S2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1

Alternative S2

The recommendations provided in the Stormwater Design Parameters for Quality and Quantity of Stormwater Control prepared by Goba and attached in Appendix D need to be adhered to.

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Alternative A2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1:

Alternative A2:

2.2 IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the construction phase:

Alternative S1 (preferred site)

Direct impacts:

Corridor 3

Biophysical Impacts

The potential direct impacts that may occur during the construction phase include: **Ecological Impacts**

- Impacts on faunal communities**

The impact of the proposed development on faunal communities is considered to be minimal. The majority of the area traversed by the proposed development is highly transformed, and much of the area is currently under low cost or informal housing. While minimal impact is expected upon the fauna of the proposed corridor, efforts to reduce the impacts are recommended.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	1	Low	1	Low
Environmental Value	1		1	
Disturbance	1	Low	1	Low
Extent	1	Site	1	Site
Duration	4	Long-term	4	Long-term
Probability	3	Possible	2	Fairly Unlikely
Impact Magnitude	9	Medium-low	8	Medium-low
Significance	9	Very low	8	Very low
Acceptability	Acceptable		Acceptable	

Mitigation:

- Alien clearing must be undertaken within the entire development.
- No hunting or poaching will be tolerated during construction.
- All riparian zone crossings should be carefully planned and the ECO must approve all method statements to ensure minimal impact on riparian systems.
- Should it be found that Black-headed Dwarf Chameleon are present, and specimens of the Black-headed Dwarf Chameleon need to be removed carefully during clearing of any area for construction, and relocated to an identified release site. The release site should be identified in consultation with Ezemvelo KZN Wildlife and eThekweni Environmental Management Division.

Impacts on Wetlands

- **Degeneration in the health of the wetlands and riparian areas as a result of direct construction related disturbances and alien vegetation encroachment during the construction phase.**

Accidental disturbance of the soils in and around the wetlands, riparian areas and buffers may lead to the clearing of wetland/riparian vegetation and/or alien invasive encroachment into the wetlands and riparian areas. In addition, alien encroachment will occur if the construction sites are not properly rehabilitated and managed during and after construction. However, according to the Wetland and Vegetation Assessment, the vegetation along Route Portion 1 and Route Portion 3 was found to be highly disturbed with the vegetation in poor condition and almost entirely secondary and alien in makeup. In this case, the wetlands and riparian zones are already impacted upon by alien encroachment and as such the disturbance impact would be medium-low. However, in light of future opportunities for rehabilitation and alien eradication, these impacts can be costly and counterproductive in the long-term.

For most of the route, the project will have minimal impact on the wetlands and is therefore not considered further. However, route portion 1 is considered more sensitive due to the close proximity to the watercourse and is therefore further discussed below.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high
Environmental Value	3		3	
Disturbance	2	Medium-low	2	Medium-low
Extent	2	Surrounding Area	2	Surrounding Area
Duration	3	Medium-term	3	Medium-term
Probability	3	Possible	3	Possible
Impact Magnitude	10	Medium-low	10	Medium-low
Significance	40	Medium-low	40	Medium-low
Acceptability	Acceptable but undesirable		Acceptable but undesirable	

Mitigation:

- All alien vegetation starting to colonize disturbed areas during construction must be removed immediately.
- The Environmental Control Officer (ECO) should be contacted with regards to the method of removal.
- An ECO is recommended on site during construction to ensure that strict control of site contractors and their activities is maintained.
- Should bridge widening be needed, the ECO must approve all method statements to ensure minimal impact on the riparian systems.

Social and Economic Impacts

The potential direct impacts that may occur during the construction phase include:

Employment Impacts

- **Creation of temporary/short-term jobs for the unemployed during the construction phase**

The creation of temporary employment for the unemployed in the area would improve their economic wellbeing during the construction period, and enable those unemployed and struggling to make ends meet.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Social Value	3	Medium	3	Medium
Social Value	3		3	
Disturbance	3	Medium	3	Medium
Extent	4	Medium-high	4	Medium-high
Duration	2	Medium-short	2	Medium-short
Probability	4	Probable	4	Probable
Impact Magnitude	13	Medium	13	Medium
Significance	39	Medium-low	39	Medium-low
Acceptability	Moderately Important/Beneficial		Moderately Important/Beneficial	

Air pollution impacts

- **Air pollution during the construction phase which may reduce the quality of life of local residents**

Air pollution may occur in the vicinity of the existing route as well as the route still under construction as a result of exhaust fumes from heavy vehicles as well as dust from exposed surfaces and soil stockpiles. Exposure of bare soils that are exposed to the elements will generate some dust during the construction phase. The driving of vehicles along bare tracks will also generate some dust pollution during the dry periods. It is important that the dust impacts be minimized and that impact on the local resident quality of life is minimized.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Social Value	4	Medium-high	4	Medium-high
Social Value	4		4	
Disturbance	2	Medium-low	1	Low Medium-low
Extent	2	Medium	2	Medium
Duration	1	Short-term	1	Short-term
Probability	3	Possible	3	Possible
Impact Magnitude	8	Medium-low	7	Low

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Significance	32	Medium-low	28	Low
Acceptability	Acceptable		Acceptable	

Mitigation:

- Ensure compliance with the Atmospheric Pollution Act and the Air Quality Bill.
- Dust control measures must be addressed in the EMP for the construction phase.
- Dust control measures should be avoided during strong winds.
- Soil loads in transit should be kept covered or wetted.

Noise Impacts

- **Noise pollution during the construction phase which may reduce the quality of life of local residents**

The generation of noise (from earth moving machinery, piling works etc.) during the construction phase may result in the disturbance to the neighbouring residents, especially those working from home. Disturbance may also be caused by construction starting too early or finishing too late. This disturbance may result in stress which could impact an individual's quality of life. However, this impact is likely to be sporadic and relatively short. Therefore, although the impact on the quality of life may be high during noise events, the duration is likely to be short.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Social Value	4	Medium-high	4	Medium-high
Social Value	4		4	
Disturbance	2	Medium-low	1	Low
Extent	3	Medium	3	Medium
Duration	1	Short-term	1	Short-term
Probability	3	Possible	3	Possible
Impact Magnitude	9	Medium-low	8	Medium-low
Significance	36	Medium-low	32	Medium-low
Acceptability	Acceptable		Acceptable	

Mitigation:

- Construction activities should only take place within agreed working hours.
- Surrounding residents should be warned of particularly noisy activities by way of flyers and letters.
- A complaints register must be kept at all times.
- Construction staff should be provided with training regarding noise prevention and antisocial behaviour/conduct.

Traffic Impacts

- Traffic

Traffic congestion and time delays may occur in the vicinity of the access points and associated intersections during the construction phase as a result of an increase in the number of heavy vehicles. Traffic congestion and time delays during peak hours are known to increase the stress and nuisance levels of regular users.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Social Value	4	Medium	4	Medium
Social Value	4			
Disturbance	5	High	4	Medium-high
Extent	3	Local	3	Local
Duration	1	Short-term	1	Short-term
Probability	5	Definite	5	Definite
Impact Magnitude	14	Medium	13	Medium
Significance	56	Medium	52	Medium
Acceptability	Generally Unacceptable		Generally Unacceptable	

Mitigation:

- Construction signs must be established warning traffic of the construction activities.
- If necessary speed limits must be reduced and alternative routes provided.

Indirect impacts:

Biophysical Impacts

The potential indirect impacts that may occur during the construction phase include:

General Construction Impacts

- **Erosion from vegetation removal and/or compaction of sand**

Potential erosion problems as a result of the removal of vegetation and the compaction of sand during the construction phase. Construction in the existing road reserve will result in the removal/clearing of vegetation onsite and the subsequent compaction of soil. The stabilizing vegetation cover of soils will be removed from certain areas in order to facilitate construction. According to the Wetland and Vegetation Assessment Report, a portion of the route through Pinetown may require the removal of some trees along the edges to accommodate the widening required. Soils may also be compacted by heavy vehicles and equipment used for construction. Once disturbed, soils become more susceptible to erosion.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	2	Medium-low	2	Medium-low

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Environmental Value	2		2	
Disturbance	2	Medium-Low	2	Medium-low
Extent	2	Surrounding Area	2	Surrounding Area
Duration	1	Short-term	1	Short-term
Probability	4	Probable	4	Probable
Impact Magnitude	9	Medium-low	9	Medium-low
Significance	18	Low	18	Low
Acceptability	Acceptable		Acceptable	

Mitigation:

- The removal of vegetation will need to occur as the widening of the road is inevitable; however steps can be taken to minimize erosion.
- Clearing activities should occur during agreed weather conditions to minimize runoff and therefore erosion.
- Silt fences and sandbags should be established within and around the development area to control soil erosion.

Impacts on wetlands

- **Erosion and sedimentation of wetlands & their associated buffer as a result of uncontrolled storm water runoff.**

The removal of vegetation will increase surface runoff throughout the construction site as well as increase the erosion potential of the soils on site. According to the Wetland and Vegetation Assessment Report, a portion of the route through Pinetown may require the removal of some trees along the edges to accommodate the widening required. If stormwater runoff and erosion control measures are not implemented during the construction phase, the exposure of the bare soils to the elements will lead to the erosion of the soils on site during heavy rainfall events and the formation of rills and dongas which will concentrate flow down-slope.

For wetlands, the negative effects of erosion and scouring include increased concentration and canalisation of flow within the wetland, the reduction in diffuse flow and the extent of wetness within the wetland, and ultimately the reduction in the wetland's functionality and ability to provide ecosystem services. Erosion of the wetlands on site also has a number of downstream effects that includes the erosion and/or sedimentation of downstream watercourses. Like erosion, sedimentation will likely disturb the wetland vegetation and increase the wetland's sensitivity to erosion, further acting to reduce the wetland's functionality and ability to provide ecosystem services.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high

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Environmental Value	4		4	
Disturbance	3	Medium	2	Medium-Low
Extent	2	Surrounding area	2	Surrounding Area
Duration	2	Medium-short	2	Medium-short
Probability	3	Possible	3	Possible
Impact Magnitude	10	Medium-low	9	Medium-Low
Significance	40	Medium-Low	36	Medium-Low
Acceptability	Acceptable but Undesirable		Acceptable	

Mitigation:

- Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.
- Construction activities should be scheduled to minimise the duration of exposure to bare soils on site, especially steep slopes. The full length of works shall NOT be stripped of vegetation prior to commencing other activities. In this regard, the contractor must submit a clearing and earthworks plan to the ECO for approval prior to construction commencing. This plan must indicate how clearing and earthworks are going to progress through the site in a phased manner.
- The unnecessary removal of groundcover vegetation from slopes must be prevented, especially on steep slopes.
- Once shaped, all exposed surfaces and fill embankments must be vegetated immediately. Embankments steeper than 1:3 must be vegetated using strip sods established at regular intervals (50-100cm) down the bank and hydro-seeding in between. Embankments with a slope less than 1:3 must be hydroseeded. In the winter months, the grassing must be watered daily until re-colonisation is successful. During the wet months, the grassed surfaces must be monitored for erosion until re-colonisation is successful.
- If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, rows of straw, hay or cut bundles of vegetation should be dug into the soil in contours and/or sand bags or silt fences must be established along the contours at regular intervals to slow runoff and capture eroded soil.
- Effort must be made to ensure that the stormwater system including pipes, drains, headwalls and Reno-mattresses are not silted up during the construction phase.
- After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gulleys must be filled-in with appropriate material and silt fences or fascine work must be established along the gully for additional protection until grass has re-colonised the rehabilitated area.
- It is important that all of the above-listed mitigation measures are costed for in the construction phase financial planning and budget so that the contractor and/or developer cannot give financial budget constraints as reasons for non-compliance. Proof of financial provision of these mitigation measures must be submitted to the ECO prior to construction commencing.

- **Degeneration in the health of the wetlands and riparian areas as a result of the contamination of the groundwater and/or runoff entering the wetlands and streams during the construction phase.**

Groundwater and surface runoff contamination may occur during the construction phase as a result of negligence, inappropriate planning, lack of supervision and general handling errors. Pollutants include hydrocarbons i.e. diesel or hydraulic oils from construction machinery, stored fuels, bitumen based substances and cement in solution. In the event of the contamination of the groundwater and surface runoff upslope of the wetlands and streams on site, the contaminated groundwater will likely drain downslope and ends up in the wetland and riparian areas area. The degree of contamination depends on the extent of the chemical spill or cumulative effects of a number of chemical spills.

Substantial contamination of the wetlands on site can result in significant disturbances to the floral and faunal communities within the wetlands. Disturbances include the domination of a particular species as a result of the competitive advantage created by pollutants or the dieback of floral and faunal species and the resultant loss of biodiversity.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high
Environmental Value	4		4	
Disturbance	4	Medium-high	3	Medium
Extent	3	Local	2	Surrounding Area
Duration	2	Medium-short	2	Medium-short
Probability	3	Possible	3	Possible
Impact Magnitude	12	Medium	10	Medium-low
Significance	48	Medium	40	Medium-low
Acceptability	Generally Unacceptable		Acceptable but Undesirable	

Mitigation:

- Hazardous storage and refuelling areas must be bunded prior to their use on site during the construction period. The number of bunds and their location and their construction should occur during the site setup phase.
- Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater.
- No vehicles transporting concrete, asphalt or any other bituminous product may be washed on site.
- Vehicle maintenance should not take place on site unless a specific bunded area is constructed for such a purpose.
- Ensure correct location of construction camps, equipment yards, concrete batching

plants, etc. to avoid areas susceptible to soil and water contamination.

- Ensure that transport, storage, handling and disposal of hazardous substances is adequately controlled and managed. Correct emergency procedures and cleaning up operations should be implemented in the event of accidental spillage.
- Implement appropriate operation and maintenance of construction equipment to avoid petrochemical products from polluting the soil.
- A spill contingency plan for both the construction phase must be drawn up and incorporated into the EMP. This should include procedures to guide the clean-up of accidental spillages and its disposal.
- Bins should be provided to all areas that generate waste e.g. worker eating and resting areas and the camp site. General refuse and construction material refuse should not be mixed.

Bridge City Depot Site

- **Erosion and sedimentation of wetlands as a result of the increased surface runoff throughout the site during construction**

During the construction phase, large portions of the site will be completely cleared for the development area. The removal of vegetation will increase surface runoff throughout the construction site, as well as increase the erosion potential of the soils on site. If stormwater runoff and erosion control measures are not effectively implemented during the construction phase, the exposure of the bare soils to the elements will likely lead to the erosion of the soils on site during heavy rainfall events, resulting in the formation of rills and gullies on steep slopes and embankments. The negative effect of this erosion on the wetlands includes the increased concentration and canalisation of flow resulting from the formation and/or incision of gullies. This results in the lowering of the water table within the wetland, the reduction in diffuse flow and the drying out of wetland soils within the vicinity of the gullies.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high
Environmental Value	4		4	
Disturbance	3	Medium	2	Medium-low
Extent	2	Surrounding Area	2	Surrounding Area
Duration	2	Medium-short	2	Medium-short
Probability	3	Possible	3	Possible
Impact Magnitude	10	Medium-low	9	Medium-low
Significance	40	Medium-low	30	Medium-low
Acceptability	Acceptable but undesirable		Acceptable	

Mitigation:

- Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.
- Construction activities should be scheduled to minimise the duration of exposure to

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bare soils on site, especially on steep slopes.

- The full length of works must NOT be stripped of vegetation prior to commencing with other activities. The contractor must submit a clearing and earthworks plan to the appointed Environmental Control Officer (ECO) for approval prior to construction commencing. This plan must indicate how clearing and earthworks are going to progress across the site in a phased manner.
- The contractor must submit a construction stormwater management plan to the ECO for approval prior to construction commencing.
- The unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes.
- A combination of sandbags and silt fences must be established along the edge of all bare and exposed surfaces above the wetland buffers and un-kerbed roads.
- The berms, sandbags and/or silt fences must be monitored for the duration of the construction phase and repaired immediately when damaged. The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the embankments.
- Once shaped, all exposed/bare surfaces and fill embankments must be vegetated immediately. Embankments steeper than 1:4 must be vegetated using strip sods established at regular intervals (50-100 cm) down the bank and hydro-seeding in between. Embankments with a slope less than 1:3 must be hydro-seeded and the temporary erosion control measures removed only once re-colonisation is successful. In the winter months, the newly grassed areas must be watered daily until re-colonisation is successful. During the wet months, the grassed surfaces must be monitored for erosion until re-colonisation is successful.
- If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, rows of straw, hay or cut bundles of vegetation should be dug into the soil in contours and/or sand bags or silt fences must be established along the contours at regular intervals to show runoff and capture eroded soil.
- All platforms above buffer zones must have a slight back-fall to divert runoff away from the fill embankments. Platform runoff must be diverted away from the platforms via some sort of diversion structure, preferably an open drain. This runoff must be diverted into the formal stormwater network where possible. However, sediment must be removed from the runoff before being discharged into the formal system. This can be achieved by using temporary sediment capture ponds. If no formal stormwater system is possible, the diverted runoff must be diverted to a temporary detention pond or temporary outlets armoured against erosion with energy dissipation measures.
- Efforts must be made to ensure that the stormwater system including pipes, drains, headwalls and Reno-mattresses are not silted up during the construction phase. Siltation will be minimised by ensuring that the roads and paths remain clear of sediment. Sediment on the roads from erosion or construction traffic must be cleared at the end of every day between September and March and at the end of every week between April and August. The need to clear will be minimal if all bare slopes (sediment sources) are re-vegetated as soon as possible and adequate erosion protection and silt control applied where grassing is not feasible.
- After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gulleys must be filled-in with appropriate materials and silt fences or fascine work must be established along the gully for additional protection until grass has re-colonised the rehabilitated area.
- It is important that all of the above-listed mitigation measures are costed for in the construction phase financial budget constraints as reasons for non-compliance. Proof

of financial provision of these mitigation measures must be submitted to the ECO prior to construction commencing.

Cumulative impacts:

Alternative S2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Municipality Budget

- Additional funds will be available for other service delivery projects.

eThekweni Municipality will fail in their mandate as follows

- To fulfil the National requirements of the improved service delivery and infrastructure development for the benefit of all citizens, and improve the access of scheduled services from 50 % to 85 %.
- To contribute to job creation initiation through infrastructure development projects.

Site Vegetation

- The ecological health of the system may deteriorate as all alien vegetation that would have been cleared during construction will remain and possibly extend into other areas.

Employment

- If the development does not go ahead, no employment opportunities will be available for local people during construction.

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1

Alternative S2

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the construction phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Alternative A2

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1:

Alternative A2:

2.3 IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the operational phase:

Alternative S1 (preferred alternative)

Direct impacts:

Corridor 3

Biophysical Impacts

- **Erosion and sedimentation of the wetlands and associated buffers as a result of the discharge of storm water from the formal storm water system.**

With the increase in hardened surfaces within the wetland catchment as a result of the construction within the road reserve, the volume and velocity of storm water runoff will increase and with it the risk of erosion.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium High
Environmental Value	4		4	
Disturbance	2	Medium-low	1	Low
Extent	1	Site	1	Site
Duration	3	Medium-term	4	Medium-term
Probability	2	Possible	2	Possible
Impact Magnitude	9	Medium-low	8	Medium-low
Significance	36	Medium-low	32	Medium-low

Acceptability	Acceptable	Acceptable
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Mitigation:

The following recommendations with regard to stormwater have been provided by Goba. Refer to their report attached in Appendix D.

- Floods exceeding 1:50 will be mitigated by emergency overflow systems and will pass over developed areas as sheet flow and will discharge into infiltration systems such as swales and other permeable areas.
- In the event that rainwater harvesting does become a priority on particular sites, first flush separation is to be considered. An allowance for 10 min for the first flush shall be made.
- All sites earmarked for future development that fall within the 1:50 and 1:100 year flood plains shall require flood protection measures to be incorporated into their design. Such measures may include combinations of the following:
 - Construction of flood protection berms
 - De-silting/excavation of natural water courses (if permitted)
 - Construction of additional channels
 - Construction of platforms above flood levels with engineered gabion retaining walls to protect banks against flood
- It is recommended that the above mentioned control measures be used in combination with one another so as to ensure effective flood protection at all sites.
- An integrated stormwater management plan needs to be prepared for the overall area and needs to be approved by the authorities and specialists. That will address not only the runoff generated by the development itself but also the runoff currently being discharged on to the site as well. This will assist in reducing the impacts of poor catchment management. Stormwater must be handled on site since the wetlands are not able to handle any additional velocity or volume (i.e. no discharge into the wetlands or associated buffers. Furthermore no development or artificial straitening may occur within the wetland or buffer zones.
- **Degeneration in wetland health as a result of the contamination of the runoff entering the wetland during operation.**

It is highly likely that the surface runoff and storm water generated on site, particularly runoff generated from the roads and parking areas will pick up a number of urban pollutants before being discharged into the onsite storm water system. Without appropriate mitigation, this will result in the accumulation of pollutants within the storm water system and ultimately the pollution of the watercourses into which the storm water drains. This, in turn, has a number of downstream water quality effects both indirect and cumulative depending on the ability of the watercourses to assimilate and/or trap the pollutants.

Substantial contamination of the wetlands on site can result in significant disturbances to the floral and faunal communities within the wetlands. Disturbances include the domination of a particular species as a result of the competitive advantage created by pollutants or the dieback of floral and faunal species and the resultant loss of biodiversity.

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Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high
Environmental Value	4		4	
Disturbance	4	Medium-high	3	Medium-high
Extent	3	Local	2	Surrounding Area
Duration	4	Long-term	4	Long-term
Probability	3	Possible	3	Possible
Impact Magnitude	14	Medium	12	Medium
Significance	56	Medium-high	48	Medium
Acceptability	Generally Unacceptable		Generally Unacceptable	

Mitigation:

The following recommendations with regard to stormwater have been provided by Goba. Refer to their report attached in Appendix D.

- Floods exceeding 1:50 will be mitigated by emergency overflow systems and will pass over developed areas as sheet flow and will discharge into infiltration systems such as swales and other permeable areas.
- In the event that rainwater harvesting does become a priority on particular sites, first flush separation is to be considered. An allowance for 10 min for the first flush shall be made.
- All sites earmarked for future development that fall within the 1:50 and 1:100 year flood plains shall require flood protection measures to be incorporated into their design. Such measures may include combinations of the following:
 - Construction of flood protection berms
 - De-silting/excavation of natural water courses (if permitted)
 - Construction of additional channels
 - Construction of platforms above flood levels with engineered gabion retaining walls to protect banks against flood
- It is recommended that the above mentioned control measures be used in combination with one another so as to ensure effective flood protection at all sites.
- Best management practices for effective prevention of contamination of stormwater runoff include:
 - Overhead coverage
 - Alternative Secondary containment – in the event that rainwater harvesting for reuse on site becomes a necessity
 - Mud/Oil and grease separators
 - Disconnected impervious areas – bunded areas
 - Rehabilitation of on-site wetlands
 - Attenuation tanks
- An integrated stormwater management plan needs to be prepared for the overall area and needs to be approved by the authorities and specialists. That will address not only the runoff generated by the development itself but also the runoff currently being

discharged on to the site as well. This will assist in reducing the impacts of poor catchment management. Stormwater must be handled on site since the wetlands are not able to handle any additional velocity or volume (i.e. no discharge into the wetlands or associated buffers. Furthermore no development or artificial straitening may occur within the wetland or buffer zones.

Bridge City Depot

- **Erosion and sedimentation of the wetlands and associated buffers as a result of the increase in hardened surfaces resulting in an increase in stormwater runoff**

The proposed development will result in an increase in the amount of hardened surfaces, which in turn results in an increase in the amount of surface (stormwater) runoff generated by the development. The result will be an increase in the volume of surface flow relative to subsurface flow and increased flood peaks within the wetland. This will result in the increase in soil saturation within the wetland and an increase in the velocity of surface runoff through the wetland during the wet season. This will increase the risk of erosion within the wetlands, particularly where knick-points and head-cuts are already present.

Conversely the hardening of large areas will reduce soil infiltration across the site and ultimately reduce the subsurface flow inputs that feed the wetlands. As a result, the wetland will experience decreased water inputs during low flows, which will result in the reduction of natural soil saturation rates and plant stress and vulnerability to invasion and erosion. The negative effects of erosion and scouring on wetlands include increased concentration and canalisation of flow within the wetland, the reduction in diffuse flow and the extent of wetness within the wetland.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high
Environmental Value	4		4	
Disturbance	3	Medium	2	Medium-low
Extent	2	Surrounding Area	2	Surrounding Area
Duration	2	Medium-short	2	Medium-short
Probability	3	Possible	3	Possible
Impact Magnitude	10	Medium-low	9	Medium-low
Significance	40	Medium-low	30	Medium-low
Acceptability	Acceptable but undesirable		Acceptable	

Mitigation:

- All stormwater runoff onsite should be directed into open, grass-lined channels/swales and stone-filled infiltration ditches rather than into underground piped systems or concrete V-channels. This will encourage infiltration across the site, provide for the infiltration and removal of urban pollutants (e.g. hydrocarbons), make

the potential litter pollution visible to the residents, provide some attenuation by increasing the time runoff takes to reach low points, and reducing the energy of stormwater flows within the stormwater systems through increased roughness when compared with pipes and concrete V-drains.

- Unless unfeasible for substantiated technical reasons, runoff from individual erven should be directed into the buffers and other open spaces rather than onto roads
- Stormwater should be attenuated locally at critical points across the site through the use of detention ponds and/swales. Unless unfeasible for substantiated technical reasons, all detention and attenuation structures must be located outside of the wetland units, but may occur within the buffers.
- Many smaller stormwater outlets must be favoured over a few large outlets. The storm water outlets must be constructed at regular intervals to spread out surface flow and avoid flow concentration. The outlets should be aligned along the contours instead of bisecting them.
- Reno-mattresses should be installed below all stormwater outlets.
- All stormwater outlet structures must be located outside of the wetland buffers. Where this is not feasible for substantiated technical reasons, outlet structures must be located on the upper edge of all buffers in the vicinity of the buffer boundary.
- The onsite stormwater system will need maintenance (silt and litter clearing) over time to function adequately, and such maintenance should be budgeted for.

• **Degeneration in the health of wetlands as a result of the contamination of groundwater and/or runoff entering wetlands**

The proposed development includes a refuelling station and bus wash bay and both have the potential to have serious implications on nearby ground and surface water resources via contamination. Fuel leaks and the contamination of surface water runoff from hydro-carbons need to be minimised, or ideally, eliminated.

Assessment Criteria	Pre-mitigation		Post-mitigation	
	Score	Rating	Score	Rating
Ecosystem Value	4	Medium-high	4	Medium-high
Environmental Value	4		4	
Disturbance	4	Medium-high	2	Medium-low
Extent	3	Local	2	Surrounding Area
Duration	4	Long-term	1	Short-term
Probability	3	Possible	2	Fairly Unlikely
Impact Magnitude	14	Medium	7	Low
Significance	56	Medium-high	28	Low
Acceptability	Generally Unacceptable		Acceptable	

Mitigation:

- Primary mitigation measures for refuelling station will be jacketed, buried fuel tanks.
- Must be installed with leak detection equipment which would greatly reduce the risk of downstream contamination.

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- Fuel or contaminated water must not be released onto unprotected soil surfaces/natural areas.
- Ground and fuel tanks must be continually monitored for leakage.
- Adequate techniques must be used to regularly test for groundwater contamination and the results/reports must be kept on site for monitoring and compliance inspections.
- On-site systems must also allow separation of stormwater originating from other sites to ensure no contamination takes place.
- Areas surrounding the fuel station must be separated from other stormwater and treated prior to release.
- Every precaution must be taken to ensure that any hydrocarbons, chemicals or hazardous substances do not contaminate unprotected soil resources or rivers or wetland areas.
- Ensure that the mixing/decanting of all chemicals and hazardous materials should take place on a tray or impermeable surface.
- Waste generated from these should then be disposed of at a registered landfill site.
- Ensure all storage tanks are designated and managed in order to prevent pollution of drains, groundwater and soils.
- Construct separate stormwater collection areas and interceptors at storage tanks, and other associated potential pollution activities.

Corridor 3 and Depot Site

Social and Economic Impacts

Employment Impacts

- **Creation of permanent jobs**

The proposed development will generate a number of job opportunities as shown below. Permanent work will have a positive effect on the quality of life of the previously unemployed residents and their families.

Permanent employees:

1) Depots

- Phase 1: 125 at the Bus Depot and 236 bus drivers (2 shifts).
- Phase 2: 150 at the Bus Depot and 279 bus drivers (two shifts)
- Phase 3: 175 at the Bus Depot and 325 bus drivers (2 shifts)
- Phase 4: 200 at the Bus Depot and 368 bus drivers (2 shifts)

2) Terminals

- Bridge City - 20 permanent
- Bram Fischer - 25 permanent

3) Stations

- 1 Ticket Office attendant
- 1 Ambassador/information/security person
- 1 Station assistant (indicating bus departure and arrival).

Contract workers Terminals

- Bridge City – 10
- Bram Fischer – 15

Contract workers:

Terminals

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- Bridge City – 10
 - Bram Fischer – 15
- Stations
2 cleaning staff

	Pre-mitigation	
Assessment Criteria	Score	Rating
Social Value	4	Medium-high
Social Value	4	
Disturbance	5	High
Extent	4	Medium-high
Duration	4	Long-term
Probability	5	Near definite to definite
Impact Magnitude	18	High
Significance	72	High
Acceptability	Highly Important/Beneficial	

- **Improved accessibility to places of employment, recreation, social services**

Society will have equal access to the opportunities available within the city which stems from the increased mobility in using the Integrated Rapid Public Transport Network. Currently, only 50 % of residents have access to scheduled services within the area, which will increase to around 85 % once the integrated rapid transport network is in place.

	Pre-mitigation	
Assessment Criteria	Score	Rating
Social Value	4	Medium-high
Social Value	4	
Disturbance	5	High
Extent	5	High
Duration	4	Long-term
Probability	5	Near definite to definite
Impact Magnitude	19	High
Significance	76	High
Acceptability	Highly Important/Beneficial	

Indirect impacts:

Cumulative impacts:

Alternative S2 (if any)

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Municipality Budget

- Additional funds will be available for other service delivery projects.

eThekweni Municipality will fail in their mandate as follows

- To fulfil the National requirements of the improved service delivery and infrastructure development for the benefit of all citizens, and improve the access of scheduled services from 50 % to 85 %.
- To contribute to job creation initiation through infrastructure development projects.

Site Vegetation

- The ecological health of the system may deteriorate as all alien vegetation that would have been cleared during construction will remain and possibly extend into other areas.

Traffic

- Traffic impacts may continue with people still using private vehicles as opposed to using the scheduled services of the IRPTN. The municipality will therefore not fulfil its aims of densification, mixed-use and transit orientated development to reduce the need for travel.
- In addition to this, the Universal Accessibility that was planned to afford the same opportunities to disable people will not be available to them should the IRPTN not go ahead.
- People without access to cars will also not benefit from the increase in accessibility that the IRPTN would have provided.

Employment

- If the development does not go ahead, no employment opportunities will be available for local people during operation.

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1

Refer to mitigation measures indicated above.

Alternative S2

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Alternative A2

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1

Alternative A2

2.4 IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the decommissioning or closure phase:

Alternative S1 (preferred alternative)

It is difficult to quantify the impacts that would likely result in the future should the proposed development be decommissioned.

The applicant will therefore need to assess the impacts that may result from the decommissioning or closure phase in terms of applicable legislation at the time of decommissioning.

Alternative S2

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1

Alternative S2

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the decommissioning or closure phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Alternative A2

Direct impacts:

Indirect impacts:

Cumulative impacts:

No-go alternative (compulsory)

Direct impacts:

Indirect impacts:

Cumulative impacts:

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1

Alternative A2

2.5 PROPOSED MONITORING AND AUDITING

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

Alternative S1 (preferred site)

Alternative S2

- The EMPr (**Appendix G**) setting out procedures and mitigation measures will need to be adhered to during the planning, construction and operational phases.
- The EMPr must be approved by the relevant authority before construction commences.
- The contractor must sign that he has read and understands the EMPr.
- Should bridge widening be needed, the ECO must approve all method statements to ensure minimal impact on the riparian systems.
- A qualified Environmental Control Officer must be appointed to conduct monthly audits and submit a monthly report to the contractor and relevant authority during construction.

Alternative A1 (preferred alternative)

Alternative A2

3 ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative S1 (preferred site)

The C3 corridor is approximately 23km long, starting at Bridge City in Kwa-Mashu and traverses areas of Kwa-mashu, Ntuzuma, Kwa-Dabeka, New Germany and ends in Pinetown. Since the proposed development occurs mainly within the existing road servitude, no site

alternatives have been considered.

Design alternatives were previously considered and included various bus based modes, guidance options as well as power options. Based on the assessment, the BRT (Bus Rapid Transport) system is the municipality's preferred option. Modelling shows that the BRT buses will run smoothly along the corridor and will have important benefits to transport-dependent people in terms of journey time savings and a safe, reliable system.

The proposed development will benefit society and local communities in numerous ways. Equal access to the opportunities available within the city will be available. Access to scheduled services should increase from only 50 % to around 85 % once the corridors are in place. In addition to this, many jobs will be available which will aid in reducing the high unemployment rates. A crime free, secure environment is envisaged, with an increase in public safety.

With regards to the traffic assessment, it was found that the C3 transport corridor is a significant investment in infrastructure by the eThekweni Municipality. The modelling shows that the BRT buses will run smoothly along the corridor and will have important benefits to transport-dependent people in terms of journey time savings and a safe, reliable system.

The Wetland and Vegetation Assessment undertaken by SiVEST concluded that, as the planned IRPTN route will run largely within the central median of the existing P577 road, impacts to watercourses and vegetation have already occurred in the construction of the original road. The new lanes will have very limited and localised impact on water and vegetation resources along the planned alignment. However, the environmental management plan should include steps to ensure that the construction activities do not impact further on the watercourses, wetlands and remaining areas of natural vegetation.

A faunal assessment was undertaken by SiVEST which indicated that the development of dedicated bus and taxi lanes within the centre median of the existing MR577 road will not significantly impact upon the fauna of the proposed corridor. However, it was recommended that alien clearing must be undertaken within the entire development zone, that poaching and hunting will not be tolerated, and that all riparian crossings should be carefully planned. In addition to this, it was noted that should bridge widening be needed, the ECO must approve all method statements to ensure minimal impact on the riparian systems. These riparian systems pose the greatest concern, as some areas may contain amphibian species and should be avoided where possible.

The heritage assessment indicated that no heritage sites or features within the road reserve and within 30m on either side of the proposed corridor were found. There is no archaeological reason why the proposed corridor may not be constructed as planned. However, according to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act No 4 of 2008) operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

A channelled valley bottom wetland occurs on site along the western and southern borders of the site. The delineation of the Bridge City Depot indicated that two primary potential impacts have been identified for the site including impacts related to storm water management and potential water resource contamination. Due to the site and wetland characteristics, a 10 m buffer has been assigned to the top of the platform and river embankments. Provided the mitigation measures are implemented, the construction of the Bridge City Depot site is

unlikely to have a significant impact.

Alternative S2

Alternative A1 (preferred alternative)

Alternative A2

No-go alternative (compulsory)

A detailed description of the need and desirability of the proposed project is outlined in Section 11.2. The no-go option will therefore not address the underlying problems of the need for the IRPTN to go ahead, such as increased safety for travellers, the need for affordable and quality scheduled services, access to opportunity, job creation and a clean, green city.

Should the proposed project not go ahead, the biophysical characteristics of the site and surrounding land uses, including noise and air quality, stormwater drainage and public transport operations would remain unchanged. The most significant impacts would be the current situation of passenger safety, the need for affordable and quality scheduled services as well as access to opportunity which would, without the IRPTN, remain unchanged.

With respect to the Bridge City Depot site, should this not be authorised, refuelling of the busses can occur at Ntuzuma Bus Depot until such time as the other depot sites are online.

SECTION F. RECOMMENDATION OF EAP

Is the information contained in this report and the documentation attached hereto in the view of the EAPr sufficient to make a decision in respect of this report?

YES	

If "NO", please contact the KZN Department of Agriculture & Environmental Affairs regarding the further requirements for your report.

If "YES", please attach the draft EMPr as Appendix F to this report and list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

- Recommendations contained within the Geotechnical Report prepared by Drennan, Maud & Partners (dated 23 July 2012) must be followed.
- Recommendations contained within the Wetland Assessment Report prepared by SiVEST (dated 24th September 2012) must be followed.
- Recommendations contained within the Faunal Assessment prepared by SiVEST (dated 10 September 2012) must be followed.
- Recommendations contained within the Heritage Assessment Report prepared by Frans Prins (dated 9 September 2012) must be followed.
- Recommendations contained in the Traffic Impact Assessment prepared by GOBA Pty Ltd (dated 24 August 2012) must be followed.

Basic Assessment Report

- Recommendations contained in the Stormwater Report prepared by GOBA Pty Ltd (dated 28 August 2012) must be followed.
- Recommendations contained in the Bridge City Depot Wetland Delineation Report prepared by Kurt Barichievy (4 December 2012) must be followed.
- An Environmental Management Programme has been prepared setting out procedures and mitigation measures. The EMP must be approved by the relevant authority before construction commences.
- A qualified Environmental Control Officer must be appointed to conduct monthly audits and submit a monthly report to the contractor and relevant authority.

SECTION G: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Impact Assessment Methodology

Appendix G: Draft Environmental Management Programme