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LIST OF ABBREVIATIONS

BOCLASA : Board of Control of Landscape Architects

CBD: Central Business Development

C-Plan: Conservation Plan

DEAT: Department of Environmental Affairs and Tourism

DFA: Development Facilitation Act

EAP: Environmental Assessment Practitioner

ECA: Environmental Conservation Act

EIA: Environmental Impact Assessment

EIAR: Environmental Impacts Assessment report

EMP: Environmental Management Plan

GDACE: Gauteng Department of Agriculture, Conservation and Environment

GSDF: Gauteng Spatial Development Framework

I&AP: Interested and affected party

IDP : Integrated Development Plan

NSBA: National Spatial Biodiversity Assessment

NEMA : National Environmental Management Act

PoS: Plan of Study

SACLAP: The South African Council of the Landscape Architects Profession

SAHRA: South African Heritage Resources Agency

SR: Scoping Report

SDF: Spatial Development framework

TIA: Traffic Impact Assessment

UNCED: United Nations Conference on Environment and Development

GLOSSARY OF TERMS

Alien species: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

Applicant: Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in the National Environmental Management Act (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006.

Biodiversity: The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are apart.

C-Plan: The GDACE's C-Plan focuses on the mapping and management of biodiversity priority areas within Gauteng. The C-plan includes protected areas, irreplaceable and important sites due to the presence of Red Data species, endemic species and potential habitat for these species to occur.

Agricultural Hub: An area identified for agricultural use by GDACE.

Ecology: The study of the inter relationships between organisms and their environments.

Environment: All physical, chemical and biological factors and conditions that influence an object and/or organism. Also defined as the surroundings within which humans exist and are made up of the land, water, atmosphere, plant and animal life (micro and macro), interrelationship between the factors and the physical or chemical conditions that influence human health and well-being.

Environmental Impact Assessment: Assessment of the effects of a development on the environment.

Environmental Management Plan: A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

Open Space: Areas free of building that provide ecological, socio-economic and place-making functions at all scales of the metropolitan area.

Study Area: Refers to the entire study area compassing the total area of the land parcels as indicated on the study area map.

Sustainable Development: Development that has integrated social, economic and environmental factors into planning, implementation and decision making, so as to ensure that it serves present and future generations.

1. INTRODUCTION, BACKGROUND AND WAY FORWARD

1.1 Introduction

The application is made for authorization of the **Route Determination and Preliminary Design Phases** of the **K220 between R21 Albertina Sisulu Freeway (Road 157-1) and Road P36-1**. Road K220 is a planned east-west provincial major arterial road located south and east of Centurion. The proposed road under consideration only represents a section of the K220 route that runs between the N1-21 (Ben Schoeman Highway), crosses P157-1 (R21 Albertina Sisulu Freeway) and originally terminated where it linked up with road K109 (east).

The Gauteng major road network is critically evaluated and adapted on a continuous basis, along with the latest land use and other developments. The eastern end of road K220 was critically re-assessed and a definite need was identified to extend the K220 approximately 6,5 km in an easterly direction, linking it up with road P36-1 (K151), rather than it flowing into road K109. This extension would provide greater east-west mobility as well as accessibility to the region. The purpose of this investigation is to evaluate this possible alignment of the eastern end of road K220 for route determination and design purposes.

The involved section of K220 is located south of the Rietvlei Dam Nature Reserve and runs from west to east between P157-1 (R21 Albertina Sisulu Freeway) and road P36-1 (K151). It is approximately **9,5 km** in length and falls within the area of jurisdiction of the Kungwini Local Municipality (*refer to Figure 1: Locality Map and Figure 2: Aerial Map*).

The application is made in terms of Government Notice No. R386 and R387 published in the Government Gazette no. 28753 of 21 April 2006 of the National Environment Management Act, 1998 (Act No. 107 of 1998). Once authorisation has been granted for the route determination and preliminary design of the road, a Basic Assessment Report (as required



Table 1: Listed activities in terms of Notice No. R 386

No. R. 386 of 21 April 2006	Activity 15	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long.
No. R. 386 of 21 April 2006	Activity 1 (m)	The construction of facilities or infrastructure, including associated structures or infrastructure, for - Any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including- (i) canals; (ii) channels; (iii) bridges; (iv) dams; and (v) weirs.
No. R. 386 of 21 April 2006	Activity 4	The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.

Table 2: Listed activities in terms of Notice No. R 387

R. 387, 21 April 2006	5	The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before the publication of this notice and which has not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006, where (a) it is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7
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		of 1998); (b) it is a road administered by a provincial authority; (c) the road reserve is wider than 30 metres; or (d) the road will cater for more than one lane of traffic in both directions.
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Any additional activities identified are during the EIA phase will be included in the EIAR.

1.2 Background

The Environmental Impact Management Guideline document published by the Department of Environmental Affairs and Tourism, in April 1998, identified the activity of the planning and construction of a provincial road numbered and administered by a provincial authority as a potentially detrimental activity that needs to be investigated. In Regulation 1182, Schedule 1 (c) and (d) of the former EIA Regulations and in Part 4 of the National Environmental Management Act (Act 107 of 1998), the construction and upgrading of transportation routes were identified as specific listed activities, which required that the EIA process be followed. However, the fact that road planning consist of various planning phases (network planning phase, route determination phase, preliminary design phase and the detail design phase) made it difficult for authorities, applicants and environmental consultants to determine the specific EIA process (scoping/ EIA) required for each planning phase. As a consequence, Gautrans and the Department of Agriculture, Conservation Environment and Land Affairs (GDACE) agreed (in a Memorandum of Understanding (MOU)¹) that an Environmental Scan be conducted for the Route Determination Stage, that a Scoping Report be conducted for the Preliminary Design Stage and that an EIA Report be compiled for the Detail Design Stage of each provincial road. Although the Scoping and EIA reports were a requirement of the former EIA Regulations, the environmental scan report required for the route determination phase of a road was not a requirement of the EIA process.

¹ According to one of the Officials at GDACE the original MOU as referred to above has been amended. We were not yet able to obtain a copy of such document. We would therefore appreciate it if GDACE could supply us with a copy of the revised MOU or with the contact details of the person/ department that could supply us with a copy of the document.

The environmental scan was however added to the road planning process to assist with the determination and identification of the most significant environmental issues and “fatal flaws” before entering into the costly preliminary and detailed design stages of roads. The MOU also required that a Road History Report, which supplies the history and background of the road applied for, be included as part of the specific road report submitted to the authorities for evaluation. The purpose of the road history report was to supply the planning history of a specific road to GDACE, because the network planning for the Gauteng Roads already commenced more than 30 years ago and all the roads on the network plan are at different planning stages and different levels of engineering² and environmental³ reports have been compiled for the various roads.

The MOU as discussed above was however compiled when the former EIA Regulations were still in place and there appears to be some confusion regarding the applicability of the MOU amongst the EIA consultants and the GDACE officials. According to some of the officials the MOU is still applicable and according to other officials, the validity of the MOU expired when the former ECA EIA Regulations were replaced by the New NEMA Regulations. We already tried to arrange several meetings with GDACE to get clarity regarding the applicability of the MOU and the level of detail required for the Scoping, EIA and Basic Assessment Reports to be compiled in line with the New NEMA Regulations (as described in item 1 above), but unfortunately this effort was unsuccessful.

1.3 Way Forward – MOU Versus The NEMA Requirements

Due to time constraints, it is not possible to wait until the above mentioned process discrepancies have been resolved. We therefore decided to take the requirements of the New NEMA Regulations as well as the above mentioned MOU into consideration and to combine the historical and new information regarding the road into one report that will

² i.e. Route Determination reports/Basic Planning Reports/Detail Design Reports

³ i.e. Environmental Evaluation Reports (prior to the EIA Process)/Environmental Scans/Scoping Reports/ EIA Reports

supply GDACE with enough information to make an informed decision at the end of the EIA process.

Ms. L. Gregory of Bokamoso has more than 15 years experience in road planning in Gauteng. She assisted the former PWV Consortium with the compilation of the MOU between GDACE and Gautrans and she compiled Road History Reports and Environmental Scans for most of the Provincial Roads in Gauteng. These reports were compiled to be in line with the report requirements of the MOU. Ms. Gregory also assisted the PWV Consortium with the compilation of the Environmental Scan *(included as Annexure B of this report)* for the Route Determination Report for the K220 between K109 and K151 and therefore the information as contained in the scan was used as basis and background for the planning of the involved section of road.

Although the proposed road will be a provincial road, Gautrans gave Mr. Francois van Rensburg (Traffic Engineer of M & T Development) the authority to apply for the involved section of the road on behalf of the **Gautrans. Bokamoso Landscape Architects and Environmental Consultants** were therefore appointed by **M & T Development (trading as JR 209 Investments (Pty) Ltd)** as independent consultants (on behalf of **Gautrans**) to prepare the applicable environmental reports and GDACE accepted the application that was submitted on 15 July 2008 *(refer to Addendum B for a copy of the GDACE Acknowledgement Letter)*. The Reference Number issued by GDACE for the project is **Gaut: 002/08-09/N0375**.

2. DESCRIPTION OF THE PROPOSED ACTIVITY

2.1. Name of Activity

The **route determination** and **preliminary design** of route K220 between the R21, Albertina Sisulu Freeway (Road P157-1) and road P36-1 (K151). The involved section of the K220 is approximately **9,5 km** in extent.

2.2. Particulars of Applicant

Applicants Name: Mr. Francois van Rensburg
On behalf of M & T Development (trading as JR 209 Investments (Pty) Ltd)

Physical Address: Block 5
Boardwalk Office Park
Haymeadow Crescent
Faerie Glen
Pretoria

Postal Address: P.O. Box 39727
Faerie Glen
0043

Tel: (012) 991 9700
Fax: (011) 991 3038

Contact Person: Mr. Francois van Rensburg

2.3. Particulars of Activity

- ***Nature of Activity***

The function of K-routes is two-fold, namely to serve through traffic i.e., traffic having neither an origin nor a destination in the area traversed by them, as well as to provide area access from the higher order freeway system to the surrounding land. Freeways (PWV-routes) are spaced at an 8 km to 12 km grid, while major arterials (K-routes) are spaced at approximately 1,8 km to 2,4 km intervals. Minor arterials and collector roads are again

linked to the K-routes at 600m or larger intervals to complete the higher order road network.

When considering the road network of the area bordered by P157-1 in the west, planned PWV17 in the east, planned PWV5 in the south and planned PWV6 in the north, there is only one east-west K-route (K27) linking P157-1 with the planned PWV17. K27 is planned just north of and very close to PWV5 leaving the largest part of the area without any east-west major arterial links.

In the light of the above, the possibility to provide a second east-west link in the area by extending K220 towards K151 (Road P36-1) was investigated. At the same time the possibility to improve the north-south accessibility in the area was investigated. This was done by extending K147 in a southerly direction along the alignment of P36-1 between PWV6 and K220. K147 follows a southbound route south of K220 up to K27. South of K27 the route continues as K62. K151 falls away between K147 and PWV6 as a K road and reverts to a local access road. These changes will improve the accessibility of the area by establishing a grid of primary north-south and east-west routes.

The proposed activity is the **route determination** and **preliminary design** of Route K220 between R21 Albertina Sisulu Freeway (Road P157-1) and road P36-1 (K151).

- ***Location of Activity***

Refer to Figure 1 for Locality Map and Figure 7 for locality within the larger Gauteng Network System

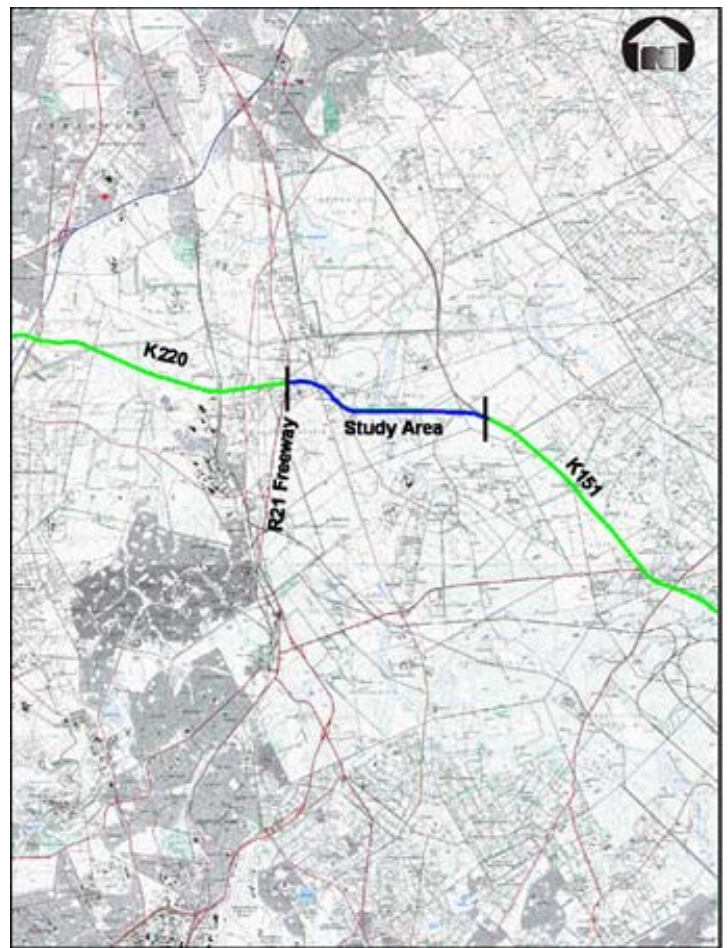
The proposed alignment of the involved section of the K220 is located south of the Rietvlei Dam Nature Reserve and runs from west to east between P157-1 (R21 Albertina Sisulu Freeway and Road P36-1 (K151)). The involved section of the K220 is approximately **9,5 km** in extent.

The route for the extension of K220 commences at a position east of the bridge where district road 781 crosses road P157-1 (R21-Albertina Sisulu Freeway) and continues in an easterly direction for approximately 9,5 km. It initially follows the alignment of district road 781 in a southeasterly direction for approximately 2,5 km before turning east to link up with road P36-1 approximately 9,5 km from the start of this planning.

- ***Delineation of the study area***

The section of the K220 investigated in this SR is only a small section (**approximately 9,5km**) of a Provincial Route which forms an important link in the Gauteng Road Network system (*refer to Figure 3*).

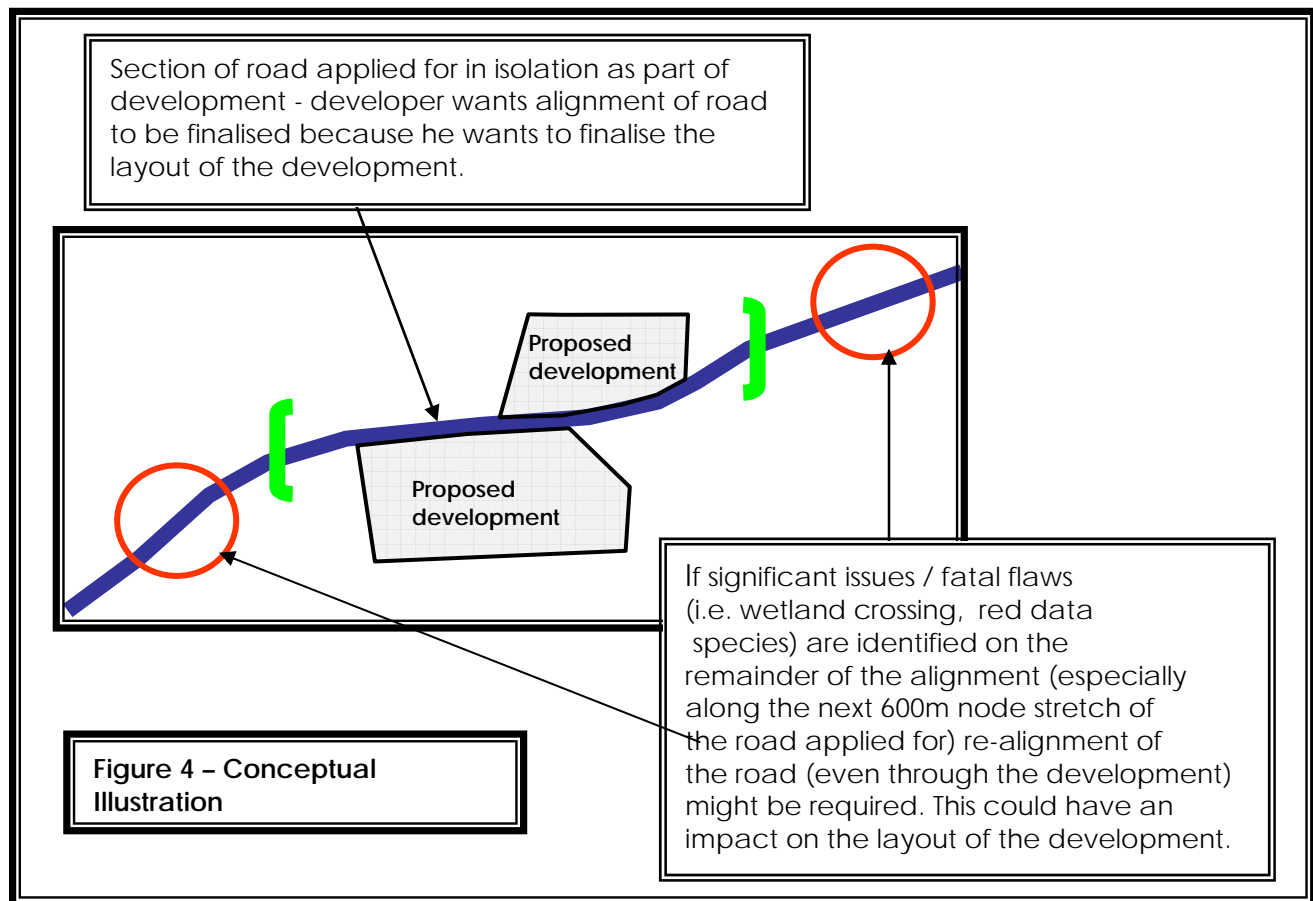
Although the Gauteng Transport Infrastructure Act, 2001, requires that all listed roads be accommodated in the layouts of new developments, EIA authorisation in terms of the new NEMA regulations must still be obtained for the roads and if any “fatal flaws” / significant environmental issues along the listed alignment are identified the regulations provides for alignment alternatives and even for the “no-go” alternative. This variable makes it difficult to finalise development layouts around such roads or only small portions of a larger road.



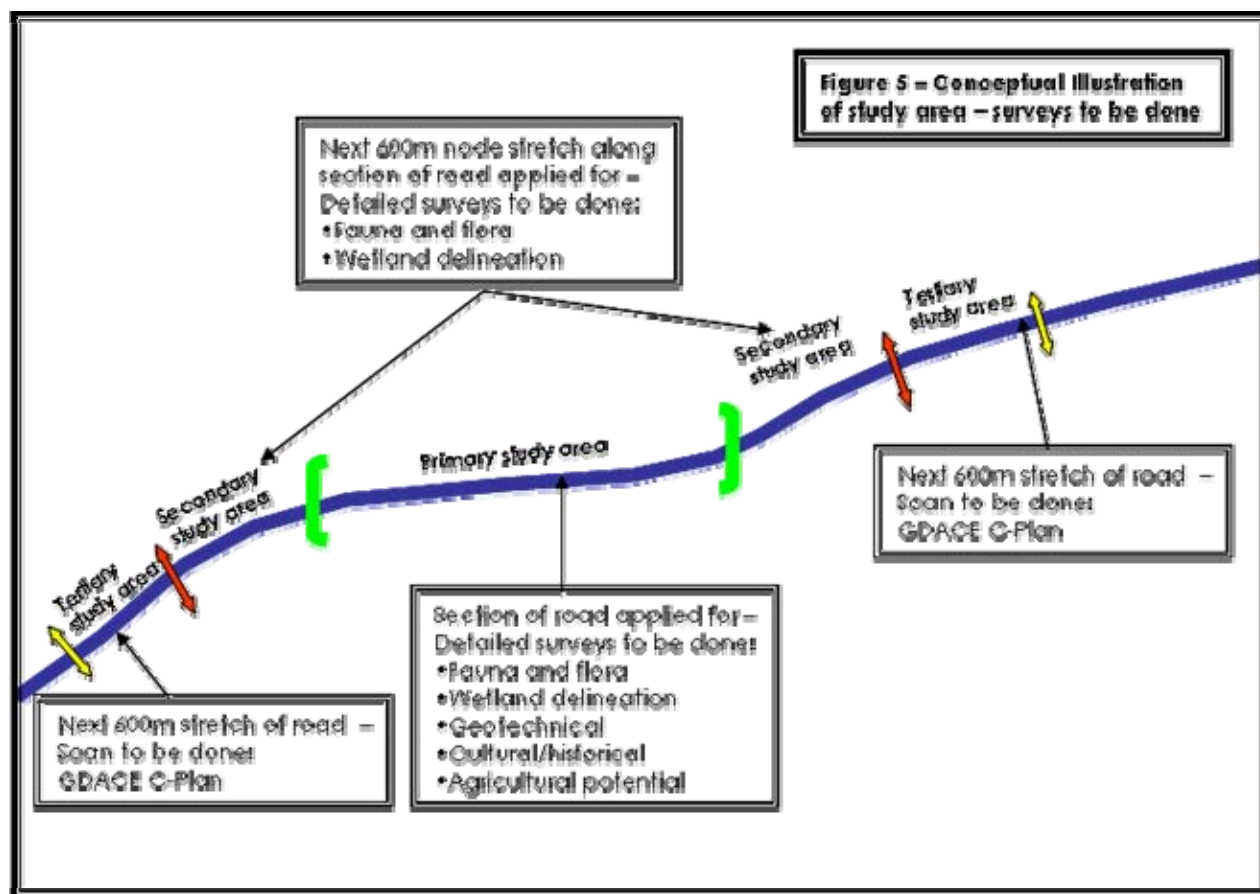
**Figure 3 – Delineation
of the Study Area**

There were cases in the past where GDACE considered and authorised only isolated sections of K-routes / Freeways to accommodate the layouts and planning of surrounding developments affected by such roads. Unfortunately, these isolated decisions compromised

the option of investigating alternative alignments if significant environmental issues / “fatal flaws” were identified along other sections of the road not applied for as part of a specific development. Refer to **Figure 4** below for a conceptual illustration.

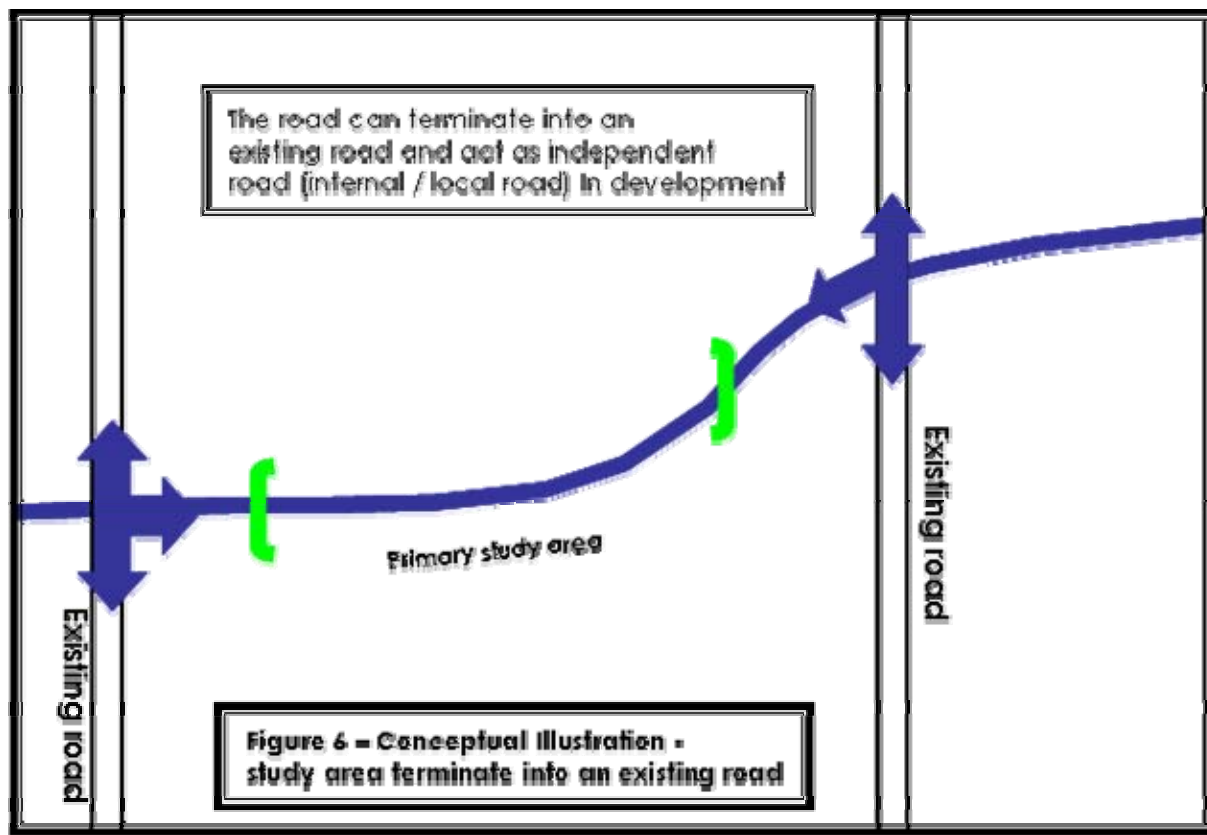


In order to prevent such cases, GDACE now requires that EAP's not only limit their environmental assessments to the portion of a road applied for, but that they also extend their investigations to incorporate a longer section of the road (to both sides of the involved portion of the road). This will allow for two options: (i) amendments in the alignment or (ii) to investigate a portion of road that can easily terminate into existing roads and act as an independent internal / local road if “fatal flaws” prevent the remainder of the route from happening. *Refer to Figure 5 and 6* for conceptual illustrations.



According to a traffic engineer an acceptable distance which would allow for an amendment in the alignment is 600m from a node (distance from one intersection to the next potential intersection)⁴. It is therefore recommended that detailed surveys also be done for the next 600m node extensions of the section of road applied for and that a scan (GDACE C-plan) be done for the adjacent 600m extensions of the road in question.

⁴ Provincial / national roads are divided into 600m nodes which allows for intersections or termination of a road.



In the case of this application the EAP investigated the 600m node extensions of the involved section of the K220 and identified no possible issues that could result in a "fatal flaw". During the EIA process of the western extension of the involved section of the K220 no significant issues were identified⁵ while the eastern extension follows the alignment of an exiting provincial road, P36-1, known as K151.

No detailed surveys for the 600m node extensions of the involved section of the K220 are therefore regarded as necessary.

⁵ The Scoping Report for the K220 between the R21 Freeway and the K109 had already been approved by GDACE and the EIA Report is currently being compiled by Bokamoso Environmental Consultants.

- *The role of route K220 in the in the Gauteng Road Network and the importance of the proposed road for the Kungwini Local Municipality.*

Refer to Figure 7 for locality of the proposed K220 within the larger Gauteng Road Network System

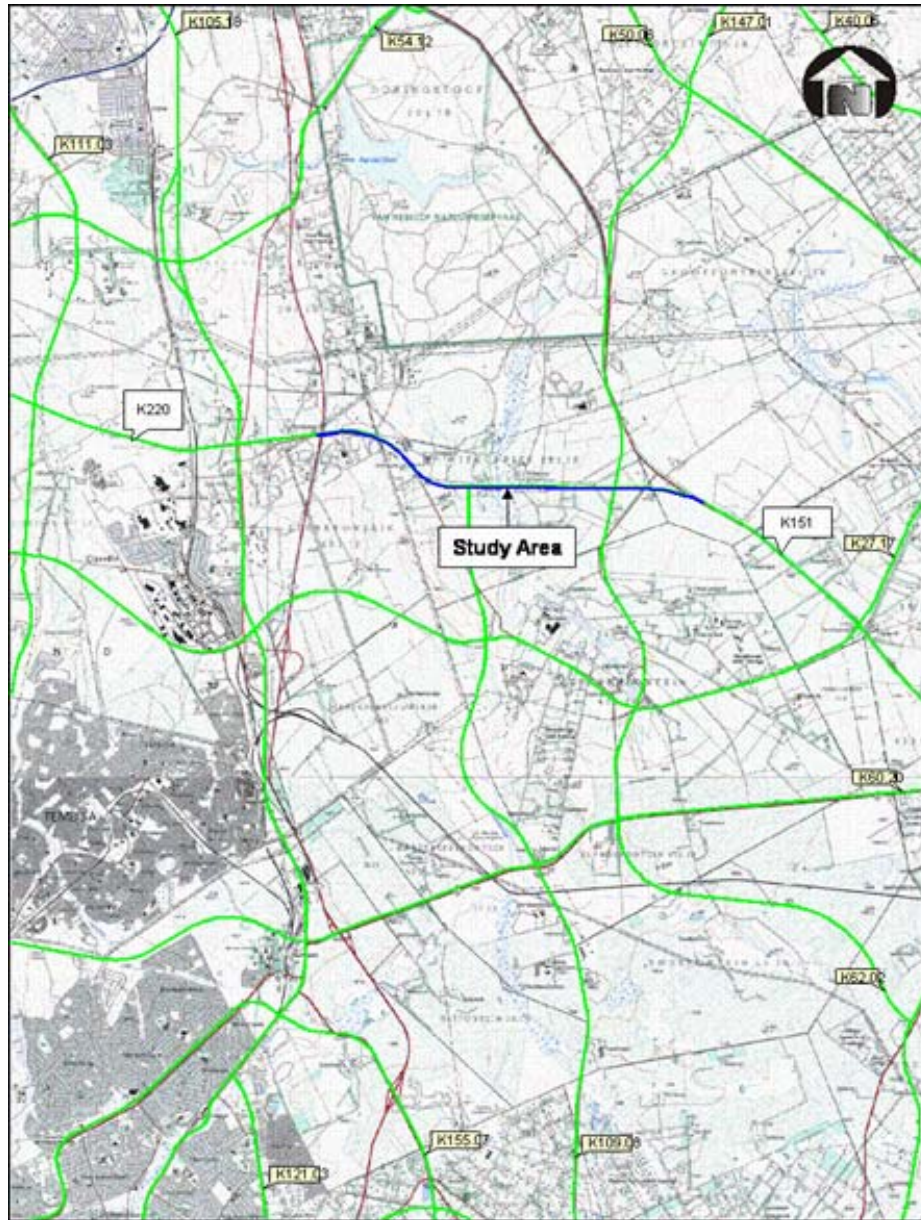


Figure 7 - Locality of the involved section of the K220 within the larger Gauteng Road Network System

The road network in Gauteng is under increasing pressure due to a number of factors, including:

- The economic growth of the province which currently stand at almost double the national growth rate;
- Increased need for the movement of goods and people;
- Increased urbanization towards the major cities; and
- Increased job opportunities resulting in more people entering the business market thereby increasing their personal wealth through property and car ownership.

Amongst others this has resulted in increased demand for road capacity in general in Gauteng. The current system has over the last couple of years become notorious for the lack of capacity, with great congestion, huge delays, and severe safety concerns raised by various sectors, including the public, all spheres of government, and other institutions. Due to the lack of building new infrastructure to create a balanced road network or transport system the system has also resulted in increased pollution due to the congestion on the network.

The main reason for the eastern extension of K220, together with changes to the routes of roads K151, K147 and K109, is to improve the provincial road network in the area bordered by P157-1 in the west and PWV17 in the east and by PWV6 in the north and PWV5 in the south. The extension of K220 creates a new west to east link between P157-1 and PWV17. Previously only K27, situated just north of PWV5 provided such a link resulting in very poor east west access in the area.

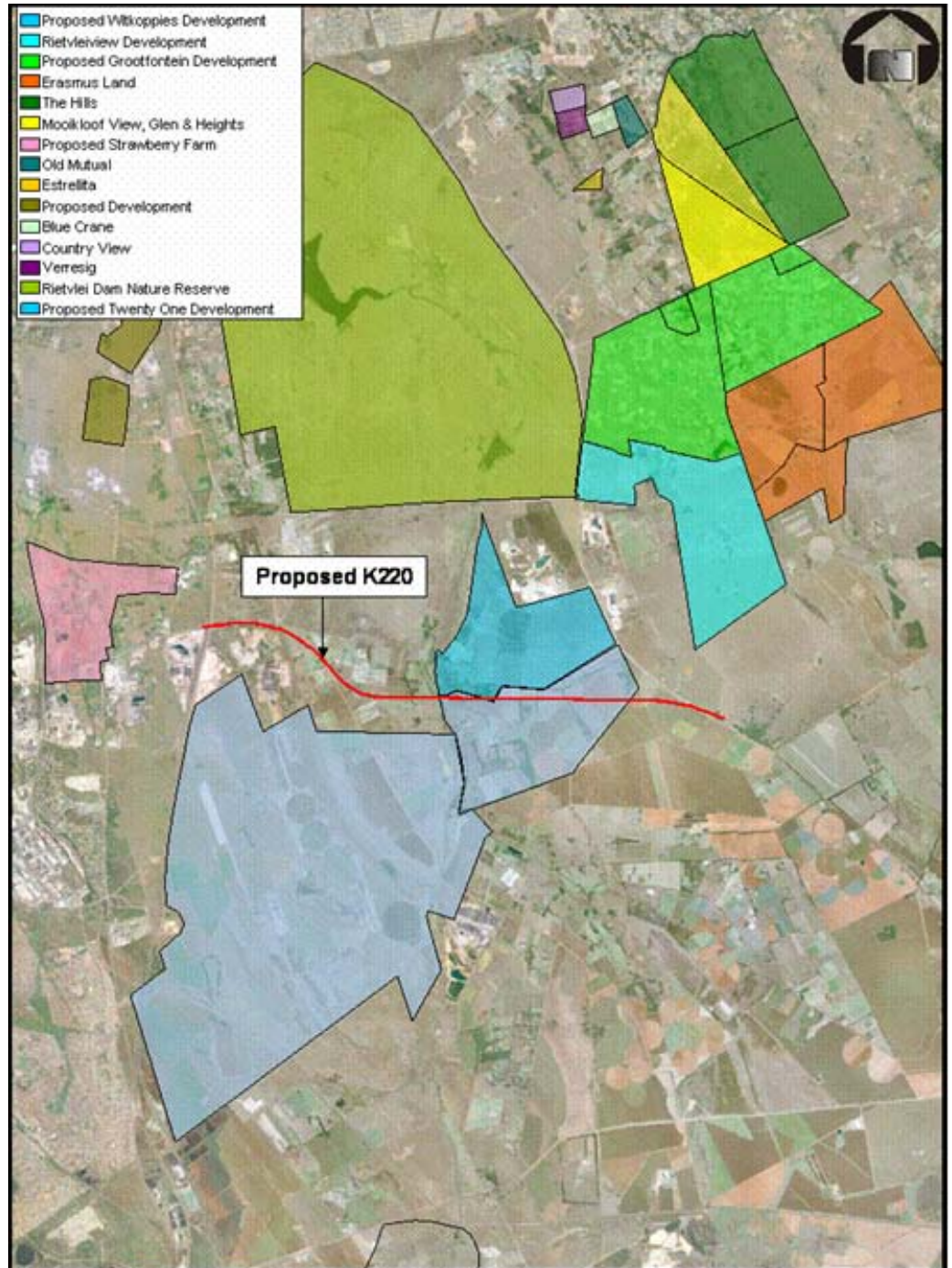
This road link will establish another element to facilitate a more balanced road network and is also part of the Local Authority and Provincial Government's road network planning for the larger areas.

- ***The Need For Route K220***

Refer to Figure 8 for Surrounding Development Map

A reassessment of the major road network in the area and its development potential has indicated the need to strengthen the regional network.

The proposed road network link will divert traffic from existing road network links and thereby alleviate congestion on the existing road network system. As already mentioned it will improve the provincial road network in the area bordered by P157-1 in the west and PWV17 in the east and by PWV6 in the north and PWV5 in the south.



- ***Intersecting roads***

The involved section of route K220 intersects existing provincial road P157-1 (Albertina Sisulu Freeway) at approximately km 12,2, proposed road K109 at approximately km 15,56 and proposed K147 at approximately km 19,15. It also follows the alignment of existing district road 781 for approximately 2,5 km and joins that of existing provincial road P36-1.

District road 781 (proposed K220) crosses road P157-1 with an existing bridge (bridge No. 2738). It is proposed to retain this bridge for the one carriageway of K220, but a second bridge will have to be constructed for the second carriageway, when required⁶. An interchange is proposed at this point which will allow access onto the P157-1 (R21 Albertina Sisulu) freeway. This interchange forms part of the route determination of K220 to the west of P157-1 (R 21).

An at-grade intersection will be provided between K220 and K147 and a T-junction where K109 ends on K220. The involved section of the K220 follows the alignment of district road 781 in a southeasterly direction for approximately 2,5 km before turning east to link up with road P36-1 (K151) approximately 9,5 km from the start of this planning.

- ***End Points And Length***

The section of the K220 to be constructed is proposed to be from the R21 Albertina Sisulu Freeway) (km 12,2) in the west and P36-1 in the east (km 21).

The proposed section has a total length of approximately **9.5 km**.

⁶ The bridge across the R21 Freeway will be constructed during the construction of the section of the K220 from K109 (west) to R21 Freeway. The EIA process for the construction of this section of the K220 is currently in process (Bokamoso Environmental Consultants).

- ***Design Standards Of The Proposed Route***

According to the involved engineers the standards laid down by the Department of Public Transport, Roads and Works of the Gauteng Provincial Government have been applied in the report book stage planning of this route. ***Refer to Engineering Drawings attached as Annexure C.***

Geometric design standards

Table 3 below shows the desirable prescribed standards together with the lowest standards applied for the various elements of geometric design.

Table 3: Geometric design standards

Design element	Desirable standard	Applied standard
Design speed (km/h)	100	100
Horizontal alignment:		
Minimum radius (m)	1000	1500
Maximum super elevation (%)	6,0	6,0
Vertical alignment:		
Maximum gradient (%)	6,0	4,34
Design element	Desirable standard	Applied standard
Vertical curves:		
Minimum length (m)	180	180
K-value:		
Minimum crest	62	82
Minimum sag	37	78

Road cross section

The proposed typical cross section for this road is for an urban dual carriageway road in a 48,4 m road reserve.

According to the involved engineers the proposed cross section is in agreement with the cross section previously proposed for the route determination of the section of K220 between K101 and P157-1.

The three cross sectional standards primarily in use for K-routes are:

- 48,4 m for urban conditions
- 62,0 m for rural conditions
- 62,0 m for urban K-roads serving also as primary public transport routes.

In the long-term, this area is not seen to be serving rural conditions. K220 is not envisaged to have a primary public transport function either. Bearing in mind the need to maximize land use development density, preference is given to the 48,4 m cross section. This can also accommodate public transport facilities if needed in future.

- ***Design speed***

The involved section of Route K220 has a design speed of 100km/h.

- **Major Structures**

- Two bridges, one per carriageway, will be required over the Rietvlei Spruit between km 16,5 and km 16,7.
- Two road over road bridges will be required at the interchanges on P157-1 (R21).

2.4 The Gautrans Network Planning And The Gautrans Road Planning Stages

- **Network Planning at 1:50 000 scale.**

During the mid seventies a grid network covering the traditional PWV area compiled by GAUTRANS was planned on a 1: 50 000 scale and maintained ever since. The grid network concept was based on a road hierarchy system comprising of a range of mobility and access routes.

- **Route Determination at 1: 10 000 scale.**

During the Route Determination phase each route is investigated in more detail. Amongst others, the following aspects receive attention:

- The purpose of the route;
- Delineation of study area;
- Collection and interpretation of environmental information;
- Site visit;
- Literature study;
- The description, analyses and interpretation of physical, biotic, socio-economic and environmental procedures; and
- Consultation with major landowners, local and other affected authorities.

- **Preliminary Design Phase - (Basic Planning).**

During this stage of planning, the issues addressed during the preceding stage are re-evaluated. Normally a long time period has passed between the above two stages and therefore revision is required.

The main purpose of Preliminary Design is to establish the road reserve and to conduct a cost framework. This phase includes also detail regarding bridge structures, culverts road fillings and road reserve boundaries. The commencement of this phase is normally

dependant on either/ both the traffic demand and land use development pressure within the area.

Traffic congestion problems are currently experienced on the existing road network system and even more traffic congestion and accessibility problems will be experienced when more developments in the area take place. The construction of the K220 will divert traffic from existing road network links and thereby alleviate congestion. It will provide regional access to properties along the route.

- **Detail Design And Construction.**

During this phase all physical, environmental and socio-economic issues are integrated with the road planning. Land will be expropriated and detailed design of the road will depend on the priority of the route and the available funding.

- **The Design Phase Of This Application**

As already mentioned this application is for the Route Determination and Preliminary Design phase of the involved section of the K220.

3. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) [*Regulation 29(a) (i), (ii)*]

The new Environmental Regulations require that relevant details of the Environmental Assessment Practitioner be included as part of the Scoping Report. In this regard, attached as **Annexure D**, is a copy of the CV of Lizelle Gregory from Bokamoso Landscape Architects and Environmental Consultants. In summary details of the EAP are indicated below:

- **Name:** Lizelle Gregory
- **Company:** Bokamoso Landscape Architects and Environmental Consultants.
- **Qualifications:** Registered Landscape Architect and Environmental Consultant

(degree obtained at the University of Pretoria) with 15 years experience in the following fields:

- o Environmental Planning and Management;
- o Compilation of Environmental Impact Assessments;
- o Landscape Architecture; and
- o Landscape Contracting

Me. L. Gregory also lectured at the Technicon of South Africa and the University of Pretoria. She is a registered member at the Board of Control of Landscape Architects (BOCLASA), the South African Council of the Landscape Architects Profession (SACLAP) and at the International Association of Impact Assessments (IAIA).

4. TERMS OF REFERENCE

The following terms of reference have been set:

- Determine if the proposed site is a suitable site for the proposed alignment from an environmental point of view.
- Prepare such an Environmental Scoping Report, taking into consideration the biophysical and social environment.
- Assess the attitude of the surrounding landowners to the proposed road construction and alignment.

5. SCOPE OF WORK AND APPROACH TO THE STUDY

5.1. Scope of Work

An application form for environmental authorisation of the relevant activity must be submitted to GDACE. The scope of work includes the necessary investigations, to assess the suitability of the study area and the surrounding environment for the proposed

activities. The scoping exercise describes the status quo of the bio-physical, social, economical and institutional environment and identifies the anticipated environmental aspects associated with the proposed development in the form of a basic issues matrix. The significance of the anticipated impacts, the assessment of the alternatives identified, the assessment of the possible impacts and the mitigation of the impacts identified will be addressed in the Environmental Impacts Assessment (EIA) report for the proposed development that will be submitted after we (Bokamoso) received acknowledgement of receipt and acceptance of the Scoping Report and the approval of the Plan of Study for EIA, which is also included as part of this report.

All available material and literature were collected and used for the purpose of this study and it was further supplemented with discussions with provincial authorities, local authorities, other interested and affected parties, as well as by site surveys and photographic recording.

5.2. Approach to the Study

An investigative approach was followed and the relevant physical, social and economic environmental aspects were assessed.

This Scoping Report takes into consideration the environment that may be affected by the proposed activity. Therefore, the physical, biological, social, economical and cultural aspects are considered. A description of the property on which the activity is to be undertaken and the location of the activity on the property are described. A description of the need and desirability of the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have (on the environment and community that may be affected) are also included.

An identification of all legislation and guidelines that we are currently aware of is considered in the preparation of this Scoping Report. Furthermore a description of

environmental issues and potential impacts, including cumulative impacts, are identified and discussed. Information on the methodology that will be adopted in assessing the potential impacts is furthermore identified, including any specialist studies or specialised processes that were/must still be undertaken. In addition reference will be made to the mitigation of identified impacts or for further studies that may be necessary to facilitate the design and construction of an environmentally acceptable facility.

Details of the Public Participation process are included: (i) the steps that were taken to notify potentially interested and affected parties of the application; (ii) proof that the notice boards, advertisements and notices, notifying potentially interested and affected parties of the application, have been displayed, placed or given; (iii) a list of all persons or organisations that were identified and registered; (iv) a summary of the issues raised by the interested and affected parties; (v) the date of receipt of and the response of the EAP to those issues.






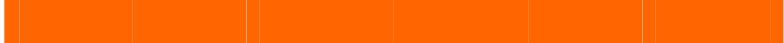
6. ALTERNATIVES IDENTIFIED *[Regulation 29(b)]*

6.1 The “No-Go” Alternative

The proposed route K220 traverses an area with high development potential and Gautrans have identified the necessity to establish the road infrastructure to direct and facilitate development. There is a high need for east west routes in the area and a link between the R21-Albertina Sisulu freeway and the PWV 17 is essential for access into the area. The “No-Go” alternative is therefore not considered as a viable alternative.


To follow now are tables that represent a preliminary comparison between the “No-Go” alternative and the development alternative.

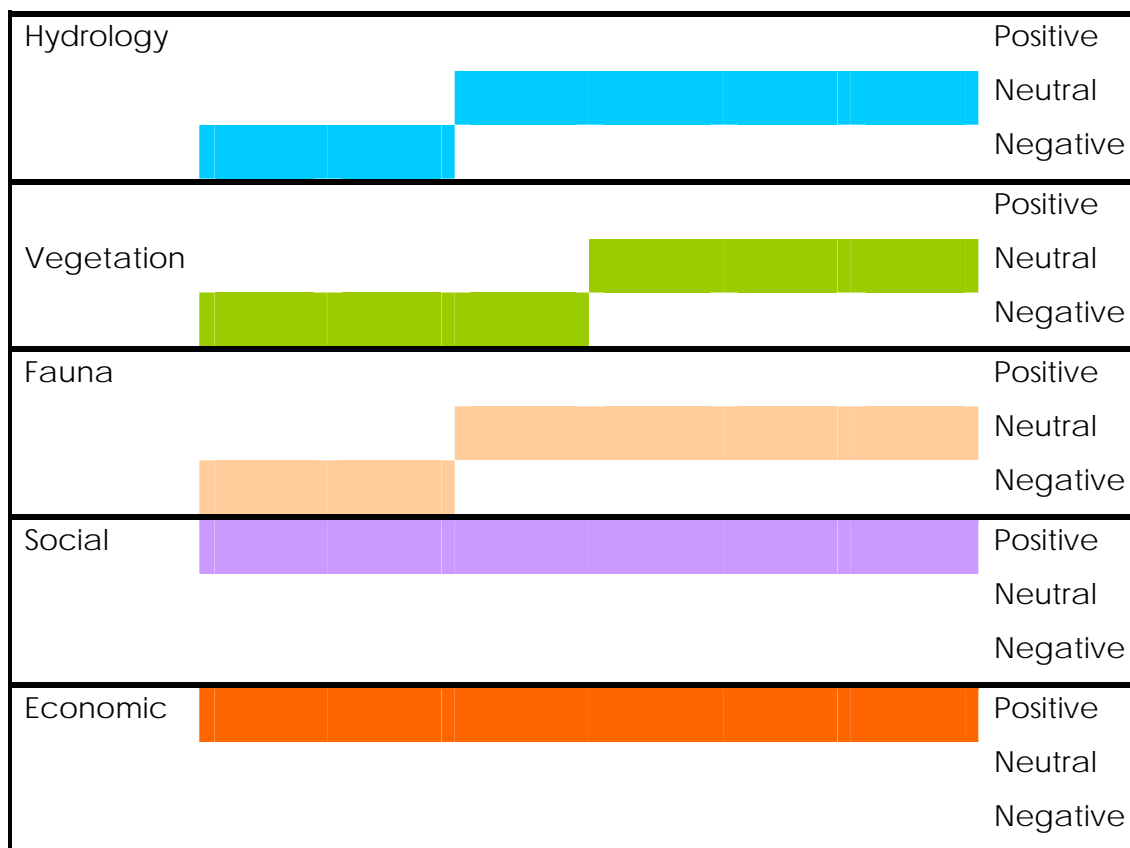
Diagram 1: Preliminary Environmental issues - "No-Go" Option.

Issue	Short term	Medium term	Long Term	Impact
Geology and soils				Positive
				Neutral
				Negative
Hydrology				Positive
				Neutral
				Negative
Vegetation				Positive
				Neutral
				Negative
Fauna				Positive
				Neutral
				Negative
Social				Positive
				Neutral
				Negative
Economic				Positive
				Neutral
				Negative

Note: The "no-go" option is predominantly neutral in the short and medium term, and turns negative in the long term.

Diagram 2: Preliminary Environmental issues of the proposed section of the K220.

Issue	Short term	Medium term	Long Term	Impact
Geology and soils				Positive
				Neutral
				Negative



Note: It is anticipated that the proposed section of the K220 is predominantly negative in the short term, but turns neutral in the medium term and long term. The Social and Economic issues will be positive from the short term to the long term.

6.2 Alignment Alternatives

Refer to Figure 9 for Alternative Alignments

Two alternative routes for the eastbound extension of K220 were investigated:

- A northern route along the southern boundary of the Rietvlei Dam Nature Reserve (**Alternative 1 and Alternative 3**)
- A southern route (**Alternative 2 – proposal**).

Refer to Figure 9 for alignment alternatives.

As already mentioned an Environmental Scan for Route Determination was done by Plan Associates in March 2002 (*refer to Annexure B*). **Alternative 2 (proposal)** was identified as the preferred alternative because both Alternative 1 and Alternative 3 run along the southern boundary of the Rietvlei Dam Nature Reserve. Refer to **section 9.3** for a detailed comparison between Alternative 1 and Alternative 2.

Alternative 2 (proposal) starts just west of P157-1 at km 12,0 and follows the alignment of district road 781 over P157-1. It continues in a southeasterly direction on the alignment of road 781 for approximately 2,5 km to km 14,5 before deviating from this route to follow an eastbound alignment. The position where the route of K220 turns away from the road 781 alignment was chosen to avoid a flower farm as far as possible. It was, however, not possible to totally avoid the farm because a second and more important control point namely the most suitable position to cross the environmentally sensitive Rietvlei

Spruit, also affected the position where the K220 alignment deviates from the road 781 alignment. The

recommended K220 route crosses the Rietvlei Spruit at its narrowest point at approximately km 16,6 where another road previously crossed the vlei. The remains of pipe culverts and headwalls are still visible at the recommended crossing point. This road was apparently closed and removed by the local land owners to discourage unwanted visitors to the area.

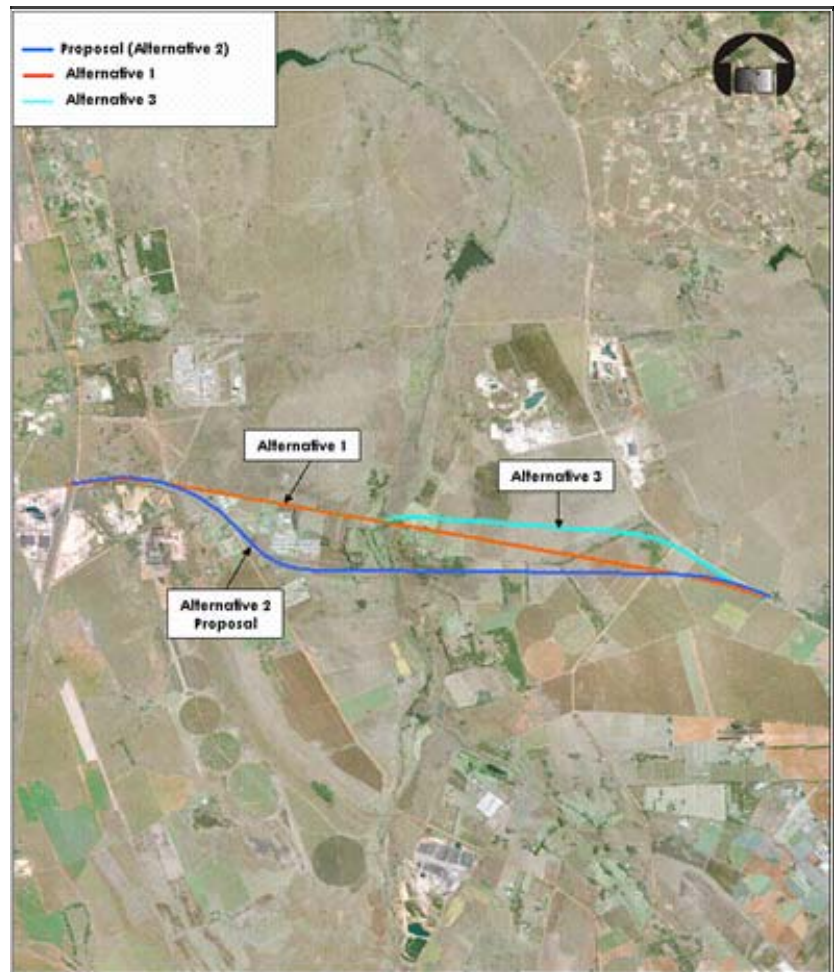


Figure 9
Alignment Alternatives

From the Rietvlei Spruit the route continues on an eastbound alignment until it ties into the existing road P36-1 alignment at approximately km 21,0.

7. THE DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT *[Regulation 29(c) (d)]*

This section briefly describes the biophysical environment of the study area.

7.1. The Physical Environment

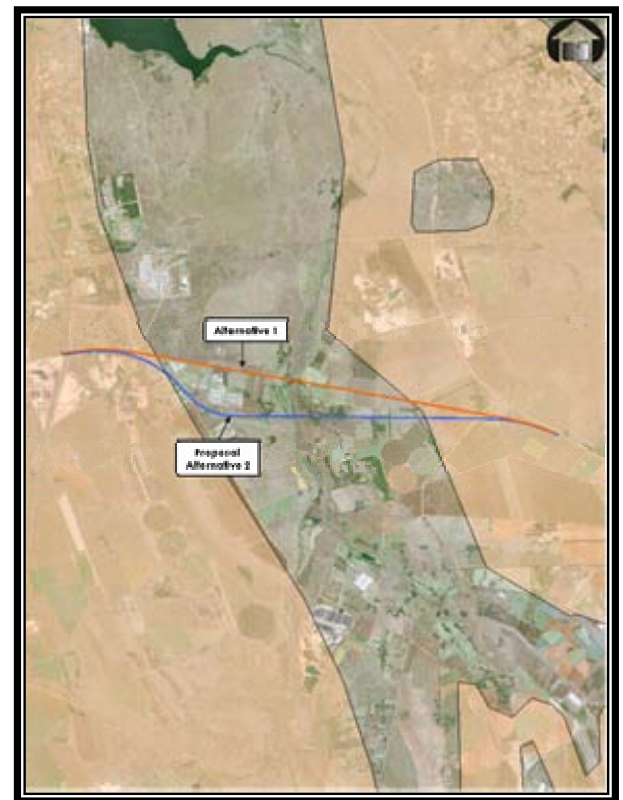
7.1.1. Geology and Soils

A desk study was done by obtaining and studying available information and compiling the information onto a single plan, which shows engineering geological properties for specific zones. A walk over survey was done afterwards to visually confirm the information. Possible problematic areas were also identified.

Geology

The results of the desktop study indicated that the route transects from west to east the following lithologies i.e. Eccca Group mudrock, Timeball Hill mudrock and quartzite with pre-Karoo dolerite (diabase) intrusions occurring.

The Hekpoort Andesite is very prominent along the route. A large portion of the route is underlain by chert-rich dolomite of the Eccles Formation. Along the Rietvlei Spruit, alluvial deposits consisting of clayey and gravelly materials are present. ***Refer to Figure 10, Geology Map (GDACE C-Plan)***



**Figure 10 –
Geology Map**

Soils

The soils reflect the underlying geology.

- The mudrock of the Eccca Group and the Timeball Hill Formation will weather generally to a clayey material. The Eccca Group mudrocks are used in the brick making industry.
- Soil cover over the quartzite is expected to be thin and hard material can be expected from a shallow depth in excavations.
- Often the Andesite cannot be distinguished from mudrock (shale). The soils are expected to be clayey or silty and only limited excavation problems are foreseen.
- Pre-Karoo dolerite (diabase) will also weather to a clayey or silty material and typical spheroidal weathering can also be expected. Limited excavation problems are foreseen.
- The alluvial deposits along the Rietvlei Spruit consist mainly of clayey and gravelly materials. Soft clay may cause settlement of structures if not taken into consideration during the design.

Geological engineering properties

Various engineering geological problems are related to the different geological materials e.g. collapsible sands, expansive clays, excavability, etc. Refer to **Table 4** for a description of the *Engineering Geological Properties*.

Table 4: Engineering Geological Properties

ZONE	km DISTANCE	DESCRIPTION
A	12,25 – 12,70	Eccca Group mudrock. The mudrock overlies the dolomite and has a very positive effect on dolomite stability. Mudrock generally weathers to a clay material with a medium to low activity.
B		

	12,70 – 13,30 13,75 – 13,80 14,15 – 14,25 14,30 – 15,30	Timeball Hill Formation mudrock. The Malmani Subgroup, (dolomite) dips underneath the Timeball Hill Formation. Mudrock generally weathers to a clayey material which shows a medium to low activity.
C	13,30 – 13,75 13,9 – 14,15 15,3 – 15,50	Timeball Hill Formation Quartzite. The quartzite is generally resistant to weathering and causes ridges. Shallow bedrock can be expected with associated excavability problems. Blasting will probably be required in cuttings.
D	13,80 – 13,90 14,25 – 14,30 18,25 – 18,35	Pre-Karoo dolerite (diabase). The diabase will generally weather to a silty or clayey material with typical spheroidal weathering patterns. Possible heave and slight excavation problems may be expected.
E	15,5 – 16,05	Hekpoort Andesite. This lava weathers irregular. Deeply weathered areas are prone to heave and differential movement. Some excavation problems can also be expected.
F	16,05 – 16,45 16,65 – 18,25 18,35 – 21,50	Eccles Formation Dolomite. Chert rich dolomite generally show deeper bedrock. Chert boulders are generally present. Poor stability conditions can be expected and medium (2 m – 5 m in diameter) to large (5 m to 15 m in diameter) sinkholes can develop.
G	16,45 – 16,65	Alluvial deposits. Mainly clayey and gravelly materials. Soft clays are present which will cause settlement of structures. The alluvium overlies dolomite and the dolomite stability must be determined.

Preliminary Issues Identified

- **Dolomite**

Dolomite is present over a large portion of the proposed route. The formation of sinkholes and dolines are associated with dolomite areas and generally develops due to the accumulation of stormwater and/or leaking wet services. No sinkhole or doline features were identified during the investigation along the proposed route.

- **Collapsible sands**

Transported material with a grain structure covers much of the area and may have to be pre-collapsed, possibly by impact rolling if the collapse potential is too high. Colluvium and residual material on the dolomitic areas may also be collapsible.

- **Expansive clay**

The materials are generally not expansive although weathered mudrock may be slightly expansive. The only area where expansive clays would be problematic is along the vleis areas.

- **Excavatibility**

Excavation problems are expected on the areas underlain by quartzite. Large excavators and blasting will be required to make excavations.

- **Perched water table**

A perched water table may be locally present on the mudrock areas, especially during wet seasons.

- **Embankment stability**

Embankments will only be required where structures such as bridges and culverts are constructed. These structures must be investigated separately in detail and comments regarding the embankment stability can be given then. In the dolomitic areas, a dolomite stability investigation should be done for the structure and the embankment. The embankment will act effectively as a soil raft if constructed as such.

- **Mining activities**

Only limited mining activities are present in this area.

Fire clay and brick clay occur on the Karoo outliers in the western portion of the route and are economically mined. Some of the new and/or old quarries may have an influence on road construction. Controlled backfilling or bridging may be required.

- **Natural subgrade conditions**

In general the sub grade conditions are favorable and it is likely that the in situ chert gravels in the dolomite areas will be suitable for use in the lower pavement layers. Problematic sub grade conditions are present along the vleis areas due to the presence of clay and possibly on portions of the mudrock where it is more weathered.

- **Corrosivity**

It is known that the subsurface conditions are often particularly corrosive in dolomitic terrain and any metallic elements placed underground must be galvanized or protected by some other means.

Additional Information or Studies Required for the EIA Phase

- The Desktop Study for the involved section of Route K220 should be included in the EIA report;
- According to the involved geotechnical engineers the contacts between the various geological materials are not clear and also not considered necessary to determine accurately for the purposes of road construction although very detailed mapping, test pits and drilling will be required to delineate these contacts accurately;
- The dolomite stability along the dolomitic sections of the route should be investigated in more detail during the detail design of the road by conducting the necessary surveys such as a gravity survey and drilling percussion boreholes; and

- More detailed investigations should be conducted for structures such as bridges and culverts. This information should be included as part of the EIA document for the Construction phase of the road.

7.1.2 Hydrology

(Refer To Figure 11: Hydrology Map).

7.1.2.1 Surface Hydrology

The first section of the route slopes towards the Rietvlei Spruit and the last section slopes towards the south-east. The route crosses the Rietvlei Spruit and associated wetland at a narrow point.

Floodlines

Both alignment alternatives of the involved section of K220 cross the Rietvlei Spruit and are therefore influenced by 1:100 year floodlines.

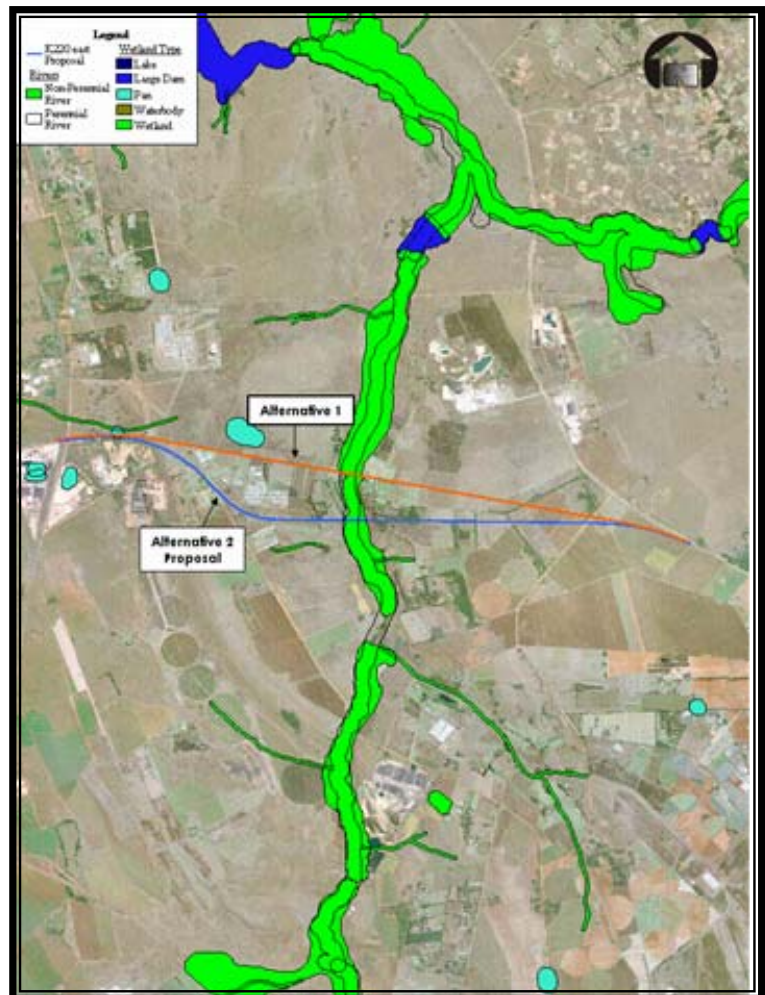


Figure 11: Hydrology Map

Preliminary Issues Identified

- Pollution, erosion and siltation problems may take place in the Rietvlei Spruit and associated wetland as well as systems lower down should a lack of suitable storm water management measures during construction and operational phases occur;
- More impermeable surfaces will lead to an increase in the speed, quantity and quality of the storm water; and
- Erosion at discharge points of storm water systems.

7.1.2.2 Sub-Surface Hydrology

A large section of the study area is underlain by dolomite, which is regarded as a valuable aquifer that must be protected. The dolomitic formation is regarded as the best aquifer in South Africa and ground water pollution risks in dolomitic areas are high. Dolomite has very high yielding and storage capacity. It also has high recharge potential estimated at 10 to 20% of the annual rainfall. When development takes place in and around dolomitic areas, ground water pollution management plays an important role in the planning, construction and operational phases;

It is known that karst features develop in the dolomites and the occurrence of sinkholes and dolines are mainly due to disturbance in the natural surface drainage. This occurs especially in areas where the overburden is relatively thin.

Preliminary Issues Identified

- During the wet season a perched water table can develop on the mudrock; and
- The ground water pollution potential of the dolomitic areas adjacent to the study area is regarded as moderate to high and if not planned and managed correctly, the construction and operational phases of the proposed road could cause sub-surface and surface water pollution, again if not properly managed.

Additional Information or Studies Required for the EIA Phase

- It is recommended that a detailed storm water management plan be submitted for assessment and inclusion during the EIA phase of the Construction Phase of the road;

The storm water management plan must be designed to:

- Reduce and/or prevent siltation, erosion and water pollution.
- Contain mitigation measures for speed, quantity and quality of stormwater.

- The 1:100 year floodlines of the Rietvlei Spruit must be clearly indicated on a topographical map and included in the EIA report for the Construction Phase of the road;
- A wetland delineation study must be conducted and be included as part of the EIA report. Mitigation measures must be included;
- Authorisation for the river/wetland crossing must be obtained from DWAF (Section 21 Water Use license applications/General Authorisations) during the EIA Phase of the Construction Phase of the road;
- Details of the bridge structures to be included in the EIA report of the Construction Phase of the involved section of the K220.

7.1.3 Topography

The first section of the route slopes towards the Rietvlei Spruit and the final section slopes towards Road P36-1, as indicated on the *3-Dimensional illustration, Figure 13*.

According to the GDACE C-plan version 2 the proposed route is not located on a ridge (*refer to Figure 12*). Due to the gently undulating topography only sections of the proposed road will be visible from the various view sheds that surround the study area. It will be partially visible from the proposed Twenty One Development situated to the south. *Refer to Figure 18, Preliminary Visual Assessment*.

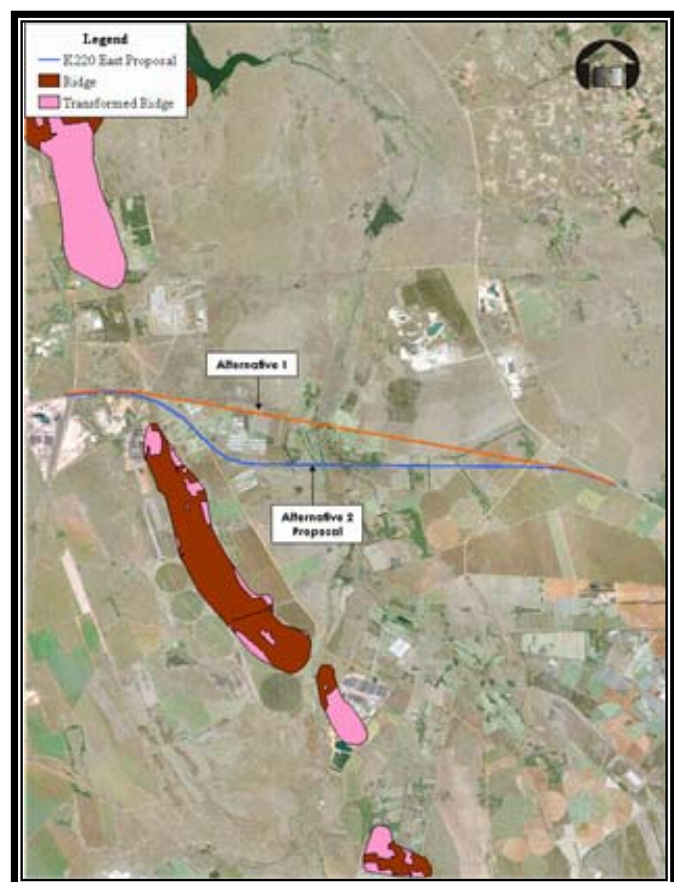


Figure12 – GDACE
C-Plan Ridges Map

The proposed K220 East will be in line with the development planning for the area.

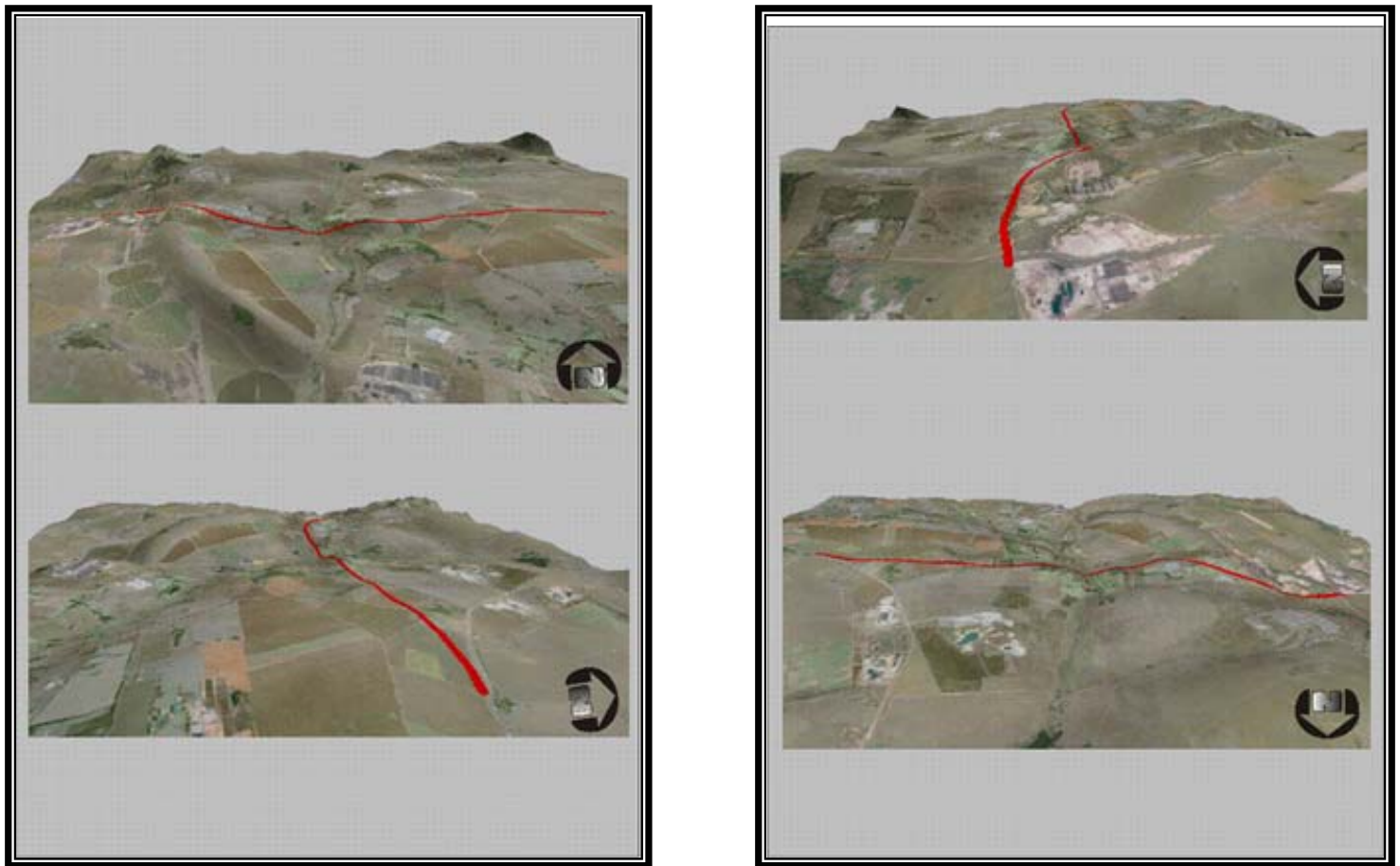


Figure 13 – 3D Illustration

Preliminary Issues Identified

- From a road design point of view the slope of the study area is regarded as suitable for the involved section of the K220;
- Only sections of the proposed road will be visible from surrounding view-sheds; and
- The proposed development will be in line with the future planning for the area.

Additional Information or Studies Required for the EIA Phase

A storm water management plan must be compiled for the construction and operational phases of the road and must be included in the EIA Report for the Construction Phase of the road.

7.1.4 Climate

The climate is typical of the Transvaal Highveld. The summers are mild to hot and the winters mild. It is a summer rainfall region with a mean annual precipitation of approximately 700mm. The moisture index is between 0 – 20, indicating a sub-humid area. The Weinert N value is approximately 2.4, which indicates that chemical decomposition is the predominant form of weathering of rock.

The climatological data for the site was taken from the weather station Irene.

Wind

Summer prevailing winds northwest, winter winds southeast.

Temperature °C

Maximum 26.7 °C, minimum 14.4 °C in summer. Winter temperature maximum 18.2 C, minimum 2.7°C.

Rain

Maximum rainfall 960mm, minimum 559mm, with an average of 717mm.

Mist

10 Days

Lighting

87 Days

Hail

4 Days

Preliminary Issues Identified

- Should the construction phase be scheduled for the summer months, frequent rain could cause very wet conditions, which makes road construction and environmental rehabilitation works extremely difficult especially in flood line and wetland areas;
- Such wet conditions often cause delays to building projects and the draining of water away from the construction works (in the case of high water tables) into the water nearby water bodies, could (if not planned and managed correctly) have an impact on the water quality of these water bodies;
- If dry and windy conditions occur during the construction phase, dust pollution could become a problem. During the summer months dust pollution could be carried over the properties to the south of the study area (i.e. the proposed Twenty One Development) and during the winter months dust could be carried over the R21 freeway and properties to the north of the study area (i.e. the proposed Witkoppies Development).

Additional Information or Studies Required for the EIA Phase

No additional studies required.

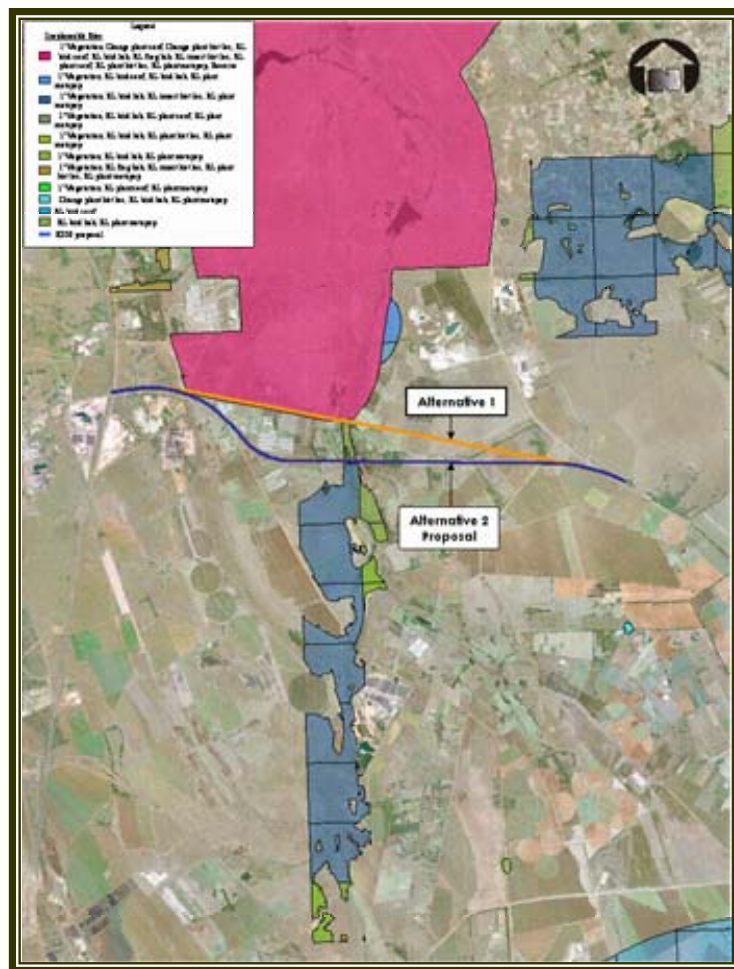
7.2 The Biological Environment

7.2.1 Flora and Fauna

The proposed route lies in the quarter degree grid square 2528CD (Rietvlei Dam) and passes through two vegetation units that Mucina & Rutherford (2006) classified as Rand Highveld Grassland and Carltonville Dolomite Grassland. The Rand Highveld grassland was described by these authors as a highly variable landscape with extensive sloping plains and a series of slightly elevated ridges. The vegetation is species rich, wiry, sour grassland, characterized by *Themeda*, *Eragrostis*, *Heteropogon* and *Elionurus*, alternating with low sour scrubland on rocky outcrops and steeper slopes. The area comprises quartzite ridges supporting shallow soils on rocky ridges and soils of various quality elsewhere.

This vegetation unit is considered endangered. Almost 50% of the unit has already been transformed by cultivation, plantations, urbanization and dam building.

The Carltonville Dolomite Grassland was described as a species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This vegetation unit is considered vulnerable. Almost a quarter of the unit is already transformed by cultivation, urbanization, mining and the building of two dams. Both these vegetation units fall within a warm-temperate region



**Figure 14 – GDACE C-Plan
Irreplaceable Sites**

with strongly seasonal summer rainfall with very dry winters and frequent winter frosts. The conservation target of both units is 24% and both units are poorly conserved in statutory reserves and a few private conservation areas. Both are well preserved in the adjacent Rietvlei Dam Nature Reserve.

According to GDACE C-Plan a small section of the proposed alignment (Alternative 2) crosses an irreplaceable site, while a large section of **Alternative 1** borders an irreplaceable site (Rietvlei Dam Nature Reserve) (*refer to Figure 14*).

GDACE Biodiversity Information:

According to the information revealed from GDACE specialist biodiversity studies are required to investigate the following aspects:

- Plants, with specific reference to *Cheilanthes deltoidea* and *Trachyandra erythrorrhiza*;
- Birds, with specific reference to Secretary bird, African Grass Owl, African Marsh Harrier and White-bellied korhaan;
- Amphibians, with specific reference to Giant Bullfrog;
- Wetlands;
- Rivers;
- Caves; and
- Vegetation.

Preliminary Issues Identified

- A **small section** of the both alternatives runs through an irreplaceable site (at the crossing of the Rietvlei Spruit and associated wetland) and could have an impact on red data flora and fauna (i.e. *Cheilanthes deltoidea* and *Trachyandra erythrorrhiza*, Secretary bird, African Grass Owl, African Marsh Harrier and White-bellied korhaan birds and Giant Bullfrog);

- A large section of Alternative 1 runs adjacent to an irreplaceable site (Rietvlei Dam Nature Reserve and could have a significant impact on red data flora and fauna);
- Both alternatives runs through Natural grassland areas;
- Both alternatives crosses the Rietvlei Spruit and associated wetland. The riverine vegetation and wetland vegetation are regarded as sensitive;
- Loss of habitat, with special reference to possible red data bird and Giant Bullfrog habitat;
- The study area is located on dolomite and caves could be present; and
- Snaring and hunting of fauna species on the study area and on adjacent properties during the construction phase.

Additional Information or Studies Required for the EIA Phase

- A Flora and Fauna Survey including specialist biodiversity studies to investigate the following aspects:
 - Plants, with specific reference to *Cheilanthes deltoidea* and *Trachyandra erythrorrhiza*;
 - Birds, with specific reference to Secretary bird, African Grass Owl, African Marsh Harrier and White-bellied korhaan; and
 - Amphibians, with specific reference to Giant Bullfrog should be conducted and the Report be incorporated as part of the EIA report;
- Mitigation measures to be supplied in the EIA report;
- A wetland delineation and river assessment should be conducted and the reports be included as part of the EIA report; and
- The presence of caves should be investigated and if present a biodiversity cave study should be conducted.

8. DESCRIPTION OF THE SOCIAL ENVIRONMENT [Regulation 29(c) (d)]

8.1 Cultural and Historical

It terms of the legislation, it is necessary to identify and list the specific legislation and permit requirements, which potentially could be infringed upon by the proposed project. The necessity and possibilities for the implementation of mitigation measures should also be identified.

It should be noted that in terms of the South African Resources Act (Act 25 of 1999) Section 35(4) no person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or material.

Also important is that Section 34(1) of this act states that no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit, issued by the relevant provincial heritage resources authority.

At ± km 16,15 the proposed route affects a farm outbuilding. According to the officials at Rietvlei Dam Nature Reserve some of the older structures and buildings on the involved farm may have cultural and historical value (older than 50 years) and during the site visit a few stone structures (located to the south of the proposed alignment) were also identified (*refer to Figure 15, Cultural Map*).



Figure 15 – Cultural Map

Preliminary Issues Identified

- The proposed alignment may have an impact on structures with cultural and historical value; and
- If archaeological sites are exposed during construction work, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.

Additional Information or Studies Required for the EIA Phase

In terms of Section 38 of the South African Resources Act (Act 25 of 1999) SAHRA was notified of the proposed K220 East. The SAHRA comments must be addressed during the EIA process.

8.2 Agricultural Potential

According to GDACE C-plan the involved section of route K220 traverses areas ranging from **high to very low to no agricultural potential soils** and falls within the **Kungwini Agricultural Hub**, an area identified for agricultural use by GDACE according to the **Draft Policy on the Protection of Agricultural Land (2006)** (*refer to Figures 16 and 17*).

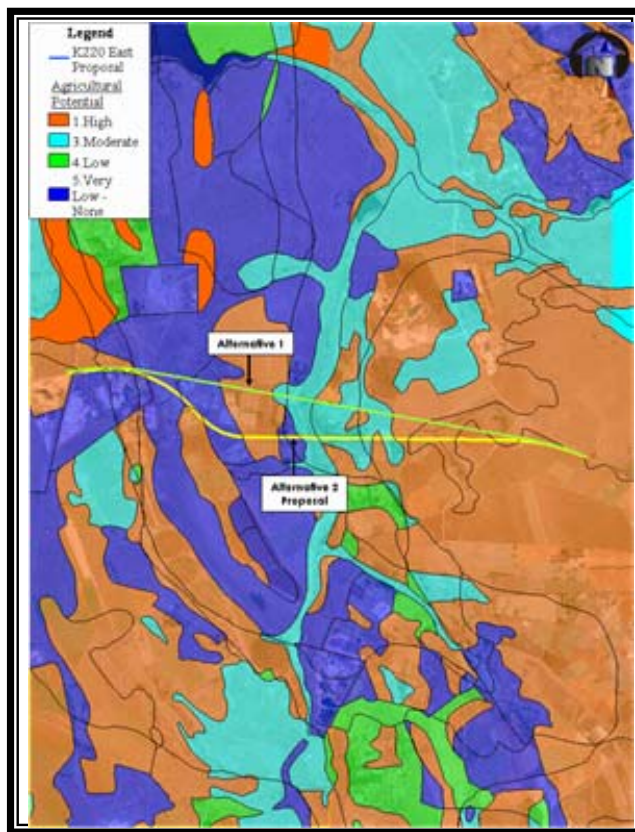


Figure 16 –
GIDS Agricultural Potential

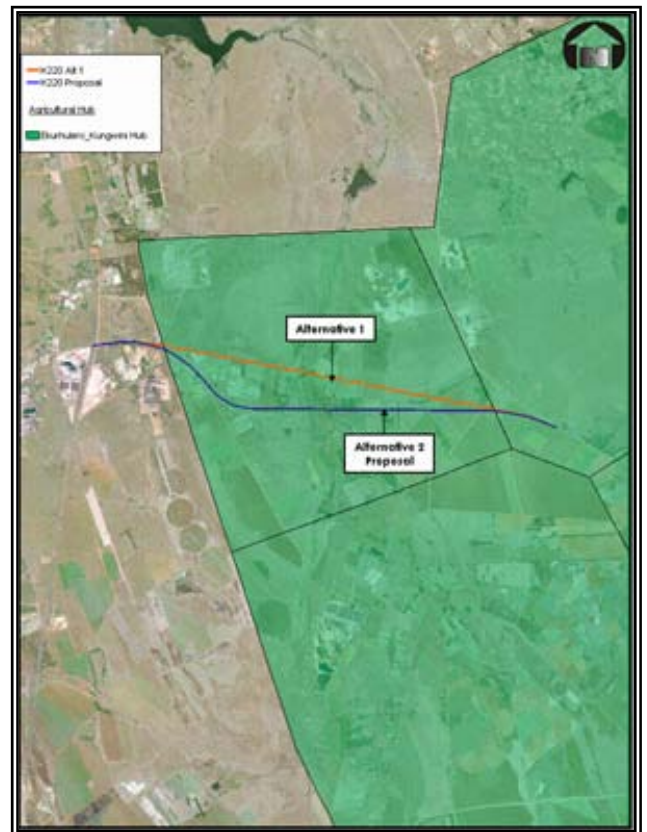


Figure 17 –
GDACE Agricultural Hub

Preliminary Issues Identified

- Areas with high agricultural potential soils are traversed by both alignments of the involved section of route K220; and
- Both alignments of the involved section of the proposed route traverse the Kungwini Agricultural Hub.

Additional Information or Studies Required for the EIA Phase

An Agricultural Potential Survey should be conducted and the Report be included as part of the EIA Report.

An Agricultural Rating Plan (A-Plan) is currently being compiled for the GDACE Agricultural Hubs and the agricultural rating for the study area will be addressed in the EIA Report if the A-Plan is available.

8.3 Qualitative Environment

8.3.1 Noise Impact

The proposed section of the K220 runs through a rural area where small scale agriculture is still practiced but which is changing to residential and commercial uses. Clay manufacturing, quarrying and brick making activities are located to the western end of the proposed route. It also crosses a number of provincial routes (K109, K147, P36-1 and R21 Albertina Sisulu Freeway).

Preliminary Issues Identified

Pro-active planning in the area had already taken place around the K220 alignment and the involved section of the K220 was taken into consideration during the layout designs of proposed new developments in the area. If planned correctly, the involved section of the K220 should therefore not have a significant noise impact on the surrounding environment (currently and in future).

Additional Information or Studies Required for the EIA Phase

A noise impact assessment is not regarded as necessary during the EIA phase of the Route Determination phase of the involved section of the K220, however a noise impact study should be done during the EIA process for the construction phase of the route.

8.3.2 Visual Environment

The following visual assessment criteria (*see Table 5*) have been used to determine the impact of the proposed development on the state of the environment – the significance is indicated by the respective colour coding for each of the impacts, being high, medium and low:

Table 5: Visual Impact Criteria

CRITERIA	IMPACT		
	HIGH	MEDIUM	LOW
Visibility	A prominent place with an almost tangible theme or ambience	A place with a loosely defined theme or ambience	A place having little or no ambience with which it can be associated
Visual quality	A very attractive setting with great variation and interest – no clutter	A setting with some visual and aesthetic merit	A setting with no or little aesthetic value
Compatibility with the surrounding landscape	Cannot accommodate proposed road without the development appearing totally out of place – not compatible with the existing theme	Can accommodate the proposed road without it looking completely out of place	The surrounding environment will ideally suit or match the proposed road
Character	The site or surrounding area has a definite character/ sense of place	The site or surrounding environment has some character	The site or surrounding environment exhibits little or no character/ sense of place
Visual Absorption Capacity	The ability of the landscape not to accept a proposed development because of a uniform texture, flat slope and limited vegetation cover	The ability of the landscape to less easily accept visually a particular type of development because of less diverse landform, vegetation and texture	The ability of the landscape to easily accept visually a particular type of development because of its diverse landform, vegetation and texture
View distance	If uninterrupted view distances to the site are > 5 km	If uninterrupted view distances to the site are < 5 km but > 1 km	If uninterrupted view distances to the site are > 500 m and < 1000 m

Critical Views	Views of the site seen by people from sensitive view sheds i.e. farms, nature areas, hiking trails etc.	Some views of the site from sensitive view sheds	Limited or partial views of the site from sensitive view sheds
Scale	A landscape with horizontal and vertical elements in high contrast to human scale	A landscape with some horizontal and vertical elements in some contrast to human scale	Where vertical variation is limited and most elements are related to the human and horizontal scale

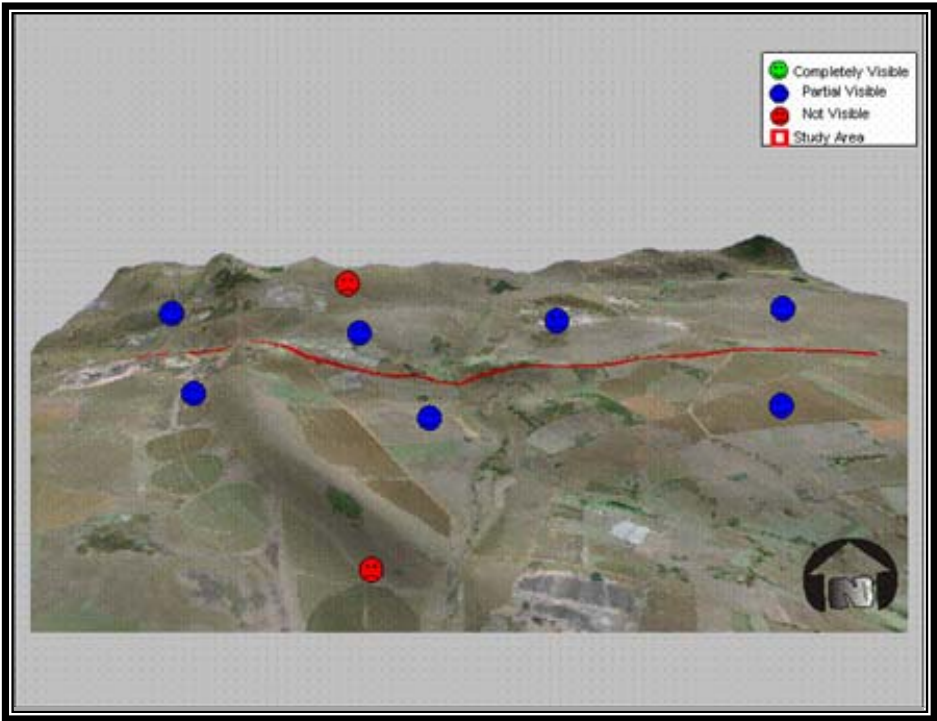


Figure 18 – Visual Assessment

From the visual assessment it is evident that only sections of the proposed road will be visible from the various view sheds that surround the study area. It will be partly visible from the proposed Twenty One Development situated to the south. *Refer to Figure 18, Preliminary Visual Assessment.*

Preliminary Issues Identified

Due to the gently undulating topography the proposed route is not visible in its entirety and will be partially visible from the surrounding properties to the south and north. The involved section of the K220 will have a medium to low visual impact on the surrounding environment however it should be planned and designed correctly, to minimise any impacts in the area.

Additional Information or Studies Required for the EIA Phase

No additional studies to be done during the EIA phase.

8.3.3. "Sense of Place"

The concept of "a Sense of Place" does not equate simply to the creation of picturesque landscapes or pretty buildings, but to recognise the importance of a sense of belonging. Embracing uniqueness as opposed to standardisation attains quality of place. In terms of the natural environment it requires the identification, a response to and the emphasis of the distinguishing features and characteristics of landscapes. Different natural landscapes suggest different responses. Accordingly, settlement design should respond to nature.

In terms of the human made environment, quality of place recognises that there are points where elements of settlement structure, particularly the movement system, come together to create places of high accessibility and these places are recognised in that they become the focus of public investment, aimed at making them attractive, user-friendly and comfortable to experience.

The landscape is usually experienced in a sensory, psychological and sequential sense, in order to provide a feel and image of place ("genius loci").

A landscape is an integrated set of expressions, which responds to different influences. Each has its unique spirit of place, or “genius loci”. Each landscape has a distinct character, which makes an impression in the mind, an image that endures long after the eye has moved to other settings.

If planned correctly the proposed road could enhance the genius loci of the broader area by establishing infrastructure for the future development of the area.

Sense of Place is the subjective feeling a person gets about a place, by experiencing the place, visually, physically, socially and emotionally. The “Sense of Place” of a property/ area within the boundaries of a city, is one of the major contributors to the “Image of a City/ City Image”.

City Image consists of two main components, namely **place structure** and **sense of place**. Place structure refers to the arrangement of physical place making elements within a space, whereas sense of place refers to the spirit of a place. It could be defined as follows:

- **Place Structure** refers to the arrangement of physical place making elements within a unique structure that can be easily legible and remembered.
- The **Sense of place** is the subjective meanings attached to a certain area by individuals or groups and is closely linked to its history, culture, activities, ambience and the emotions the place creates.

The Rietvlei Dam Nature Reserve and Rietvlei Spruit are the Sense of Place creators in the area. Mining activities currently have a negative impact on the “Sense of Place” of the area.

Preliminary Issues Identified

If not planned correctly (i.e. though the holistic planning of the entire development area) the proposed road could have a negative impact on the “Sense of Place” to be created in this developing area.

Additional Information or Studies Required for the EIA Phase

Landscaping/rehabilitation guidelines for the linear strips of land adjacent to the proposed road.

8.4. Institutional Environment [Regulation 29(E)]

8.4.1 On an International Level

Relevant International Conventions to which South Africa is party:

- **Convention relative to the Preservation of Fauna and Flora** in their natural state, 8 November 1993 (London);
- **Convention on Biological Diversity**, 1995
(provided and added stimulus for a re-examining and harmonization of its activities relating to biodiversity conservation. This convention also allows for the in-situ and ex-situ propagation of gene material); and
- **Agenda 21** adopted at the United Nations Conference on Environment and Development (UNCED) in 1992.
(An action plan and blueprint for sustainable development).

8.4.2 On a National Level

(i) The National Environmental Management Act; 1998 (Act 107 of 1998)

In terms of regulation no. R387 and R386 published in the Government Notice no. 28753 of 21 April 2006 of the National Environment Management Act, 1998 (Act No. 107 of 1998) an Environmental Impact Assessment Process is required for the proposed road. This act addresses issues relating to environmental administration and it promotes sustainable development.

If the involved authorities do not take the principles of NEMA into consideration when evaluating an environmental report/ document, the involved authority can be held responsible for any damage to the environment (social, ecological and economical).

(ii) The National Water Act, 1998 (Act No: 36 of 1998)

In terms of section 144 of the National Water Act it is required that the 1:50 and 1:100 year flood line be indicated on all the relevant drawings that are being submitted for approval. The proposed road is affected by flood lines with an expected frequency of 1:50 or 1:100 years (Rietvlei Spruit) and a wetland.

The study area is affected by water resources, flood lines and a wetland. Section 21 water use licences will be required for any development which may take place within and/or impact any water resource and or floodlines. The National Water Act also required that the 1:50 and 1:100 year flood line be indicated on all the development drawings (even the drawings for the external services) that are being submitted for approval.

(iii) National Environmental Management: Air Quality Act (Act No. 39 of 2004)

This act replaced the Atmospheric Pollution Prevention Act (Act No. 45 of 1965), however Part 2 of the act is still applicable. Part 2 deals with the control of noxious or offensive gases and has no relevance to the proposed road.

The purpose of the Act is “To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incident thereto”.

(iv) National Heritage Resource Act, 1999 (Act No 25 of 1999)

The National Heritage Resources Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

It is important to note that in terms of the National Heritage Resources Act, (Act No 25 of 1999); all historical sites and materials older than 50 years are protected. It is an offence to destroy, damage, alter or remove such objects from the original site, or excavate any such site(s) or material without a permit from the National Monuments Council. Gravesites are subject to the requirements of the National Monuments Act, No. 28 of 1969.

(v) National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004)

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species

and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

Specialist ecological and wetland assessment studies must be conducted for the study area.

(vi) National Spatial Biodiversity Assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Specialist ecological and wetland assessment studies must be conducted for the study area.

(vii) National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003)

The purpose of this Act is to provide the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.

Specialist ecological and wetland assessment studies must be conducted for the study area.

(viii) Development Facilitation Act, 1995: Resource Document on the Chapter 1 Principle of the DFA

This legislation has provided for an entire new land planning system. It contains principles that are applicable to all applications and decision making in land planning and development. The Development Planning Commission was established in terms of the DFA to, among other things compile a manual to explain and generalize the principles. The

“Resource Document on the Chapter 1 Principles of the DFA” was compiled and published for this purpose.

The document states that there should be integration of forward planning and land use management. Meaning applications should first be considered in terms of the principles. The principles must be holistically applied and should not be used to construct standardized settlement forms or ways of doing things. Their main purpose is to exclude this form of planning. They need to be interpreted according to local contextual conditions.

8.4.3 On a Local Level

Planning Responsibilities of the Involved Local Authority

The prerogative to plan a development within its jurisdictional area has been, in terms of the Local Government Transitional Act, 1993 and recently the Municipal Systems Act, 2000, vested in the local authority involved.

In order to ensure that the proposed developments comply with the standards and requirements of the involved local authority (Kungwini Local Municipality), the relevant officials were involved in the planning of the project from the start.

(i) The Local Government Ordinance, 1939 (Ordinance 17 of 1939)

Section 152(1) of the Ordinance states that the objects of Local government and per implication those of Kungwini Local Municipality are inter alia to ensure the provision of services to communities in a sustainable manner. The construction of the involved section of the K220 will comply with this.

The capital costs for the proposed road will essentially be borne by the developer. Relative to this, however there lies an obligation on the local authority to support proposals in its

interest (expansion of its tax base) as well as those in the interest of the community (investment and ensuring sustainability of development over time).

(ii) The Gauteng Spatial Development Framework (GSDF)

The Gauteng Spatial Development Framework (GSDF) identified a **“Core Economic Focus Area”** for Gauteng Province which broadly represents the triangular area between the CBD’s of Pretoria, Johannesburg and the Johannesburg International Airport (JIA). This triangle corresponds with the **N1, R24 and R21 Albertina Sisulu freeways**, and the GSDF proposed that economic development and associated investment be optimized in the area.

The primary philosophy of the **Economic Core Area** is to make optimal uses of the resources available in the area to promote economic development. In the case of the R21 Corridor the most important resources available include:

- the existing R21 Albertina Sisulu freeway which links the City of Tshwane to the Johannesburg International Airport;
- the Johannesburg International Airport which is the major entrance point of foreign visitors to Southern Africa;
- large pockets of undeveloped land surrounding route R21 in the Ekurhuleni /Kungwini Metropolitan Area with relatively easy access to bulk services provision;
- the close proximity and accessibility of workers to serve the R21 corridor, and which also benefit from the development in terms of job opportunities and income; and
- current market/development trends around route R21 which shows a natural propensity towards development along its alignment.

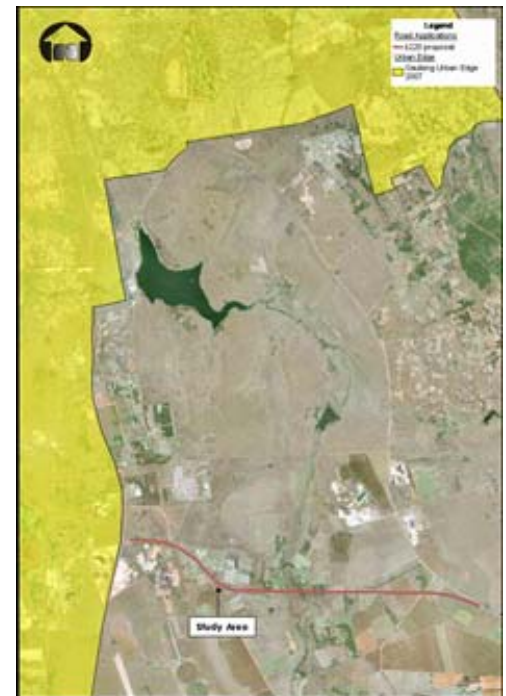


Figure 19 – Gauteng Provincial Urban Edge,

The study area is located outside the Gauteng Provincial Urban Edge as indicated on *Figure 19, Gauteng Urban Edge Delineation, 2007*.

(iv) The Kungwini Integrated Development Plan (IDP) and Spatial Development Framework, 2002

According to the IDP the study area falls under Zone 1 – Settlement areas and is reserved for Intense Urbanisation. The area is impacted upon by development pressures from the west (Tshwane Metropolitan Municipality Area) and will have to accommodate dense urban development, including high-income housing developments. The proposed K220 will comply with the Kungwini IDP.

(v) Gauteng Transport Infrastructure Act, 2001 (Act No 8, 2001)

The purpose of this Act is to consolidate the laws relating to roads and other types of transport infrastructure in Gauteng. It provides for the planning, design, development, construction, financing, management, control, maintenance, protection and rehabilitation of provincial roads, railway lines and other transport infrastructure in Gauteng.

According to this provincial act, the proposed alignments for all the Gautrans roads on the Gautrans Grid Road Network Map must be honoured by planners.

This Act is relevant to the proposed K220 East.

(v) *Municipal Systems Act – No. 32 of 2000*

This Act clearly establishes the Integrated Development Plan and Integrated Spatial Development Framework as guidelines to inform development and processes in this regard.

(vii) GDACE C-Plan

The environmental data contained in the GDACE C-Plan was taken into consideration during the compilation of the scoping report. According to the GDACE C-Plan a **small section** of the proposed road cuts across irreplaceable sites at the crossing of the Rietvlei Spruit and associated wetland (*refer to GDACE Irreplaceable Sites Map, figure 14*).

Please note that the recommended K220 route crosses the Rietvlei Spruit at its **narrowest point** where another road previously crossed the vlei. The remains of pipe culverts and headwalls are still visible at the recommended crossing point.

A red data fauna and flora survey will be conducted during the EIA phase to confirm the occurrence of red data species. A wetland delineation and river assessment study will also be done. Mitigation measures will be provided by the fauna, flora and wetland specialists.

(viii) GDACE Draft Red Data Species Policy

According to the GDACE C-Plan a **small section** of the proposed road cuts across irreplaceable sites at the crossing of the Rietvlei Spruit and associated wetland (*refer to GDACE Irreplaceable Sites Map, figure 14*).

As already mentioned the recommended K220 route crosses the Rietvlei Spruit at its **narrowest point** where another road previously crossed the vlei.

A red data fauna and flora survey will be conducted during the EIA phase to confirm the occurrence of red data species and mitigation measures will be provided by the fauna and flora specialists.

(ix) GDACE Draft Ridges Policy

The proposed road does not cut across any ridges according to the GDACE C-plan Version 2 and therefore the Draft Ridges Policy is not regarded as applicable.

(xiii) Draft Policy on the Protection of Agricultural Land (2006)

The study area lies within an Agricultural Hub that was identified by GDACE in 2006. The Draft Policy on the Protection of Agricultural Land (2006) is therefore applicable to the proposed road, but the area is urbanising in terms of the Kungwini IDP.

Preliminary Issues Identified

- All relevant legislation, policies and guidelines must be taken into consideration during the planning phases of the route; and
- The proposed route is in line with the future planning for the area.

Additional Inputs or Studies Required

Ecological studies to determine the presence of red data species are required during the EIA phase.

8.5 Services and Infrastructure

Services that are visible in the area include ESKOM overhead power lines that cross K220 at approximately km 13,5 and overhead TELKOM lines along existing roads. The proposed route will also cross a SATS fuel line.

The proposed route will also intersect with existing and proposed provincial roads (R21 Freeway, K109, K147, P36-1).

Preliminary Issues Identified

- The crossing/intersection with existing and planned roads;
- Servitudes registered across the area to be traversed by the route; and
- Overhead high-voltage electrical cables cross the route.

Additional Inputs Or Studies Required during the EIA process

Servitudes must be indicated in Engineering drawings to be included as part of the EIA document for the Construction Phase of the road.

8.6 Properties Affected

The following properties area affected by the involved section of the K220:

- Portions 19, 16, 2 and 17 of the farm Sterkfontein 401 JR;
- Portions 7, 8, 3, 21, 12, 13, 35, 19, 15, 18, 16, 17, 22, 1, 30, 31 and 29 of the farm Witkoppies 393 JR; and
- Remainder and Portion 5 of the farm Grootfontein 394 JR.

Preliminary Issues Identified

Expropriation of the road reserve required for the involved section of the K220 will affect a number of properties. The owners of affected properties have been informed of the proposed road.

Additional Inputs Or Studies Required during the EIA process

The expropriation of land to be finalized during the EIA Phase of the Construction Phase of the proposed route.

8.7 Public Participation

(Refer to Annexure E for Public Participation)

Public Participation is a cornerstone of any environmental impact assessment. The principles of the National Environment Management Act, 1998 (Act No. 107 of 1998) govern many aspects of environmental impact assessments, including public participation. These include provision of sufficient and transparent information on an ongoing basis to the stakeholders to allow them to comment and ensuring the participation of previously disadvantaged people, women and youth.

Effective public involvement is an essential component of many decision-making structures, and effective community involvement is the only way in which the power given to communities can be used efficiently. The public participation process is designed to provide sufficient and accessible information to interested and affected parties (I&AP's) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits.
- Verify that their issues have been captured.
- Verify that their issues have been considered by the technical investigations.
- Comment on the findings of the EIA.

In terms of the Guideline Document for Environmental Impact Assessment (EIA) Regulations promulgated in terms of the National Environmental Management Act (Act No.107 of 1998), stakeholders (I&AP's) were notified of the Environmental Evaluation Process through:

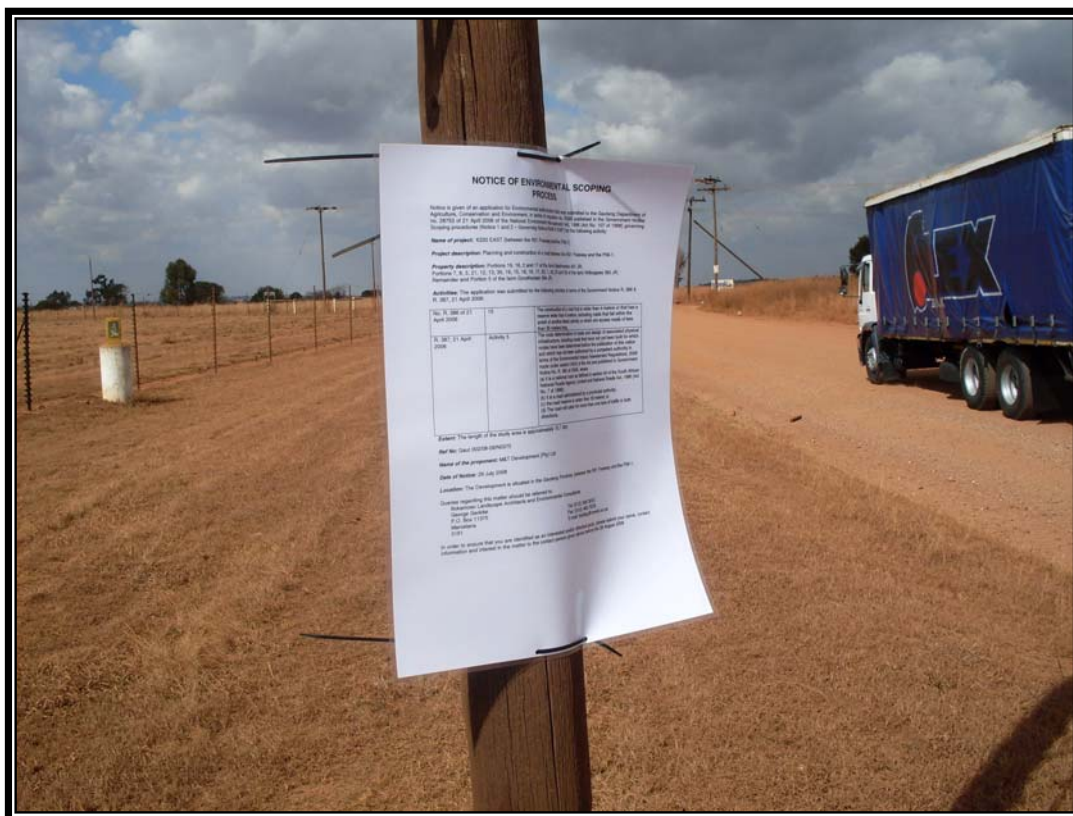
- 1) An advertisement was placed in 'Die Beeld' newspaper on 11 October 2008 and readvertised in Beeld on 17 November 2008 to include an additional activity, Activity 4, No. R. 386 of 21 April 2006 (*Annexure E1*).

- 2) A site notice that was erected (at prominent points on and around the study area) on 10 October 2008 and 19 November 2008 (including Activity 4, No. R. 386 of 21 April 2006) (**Annexure E2**).
- 3) On 10 October 2008 and 19 November 2008 (including Activity 4, No. R. 386 of 21 April 2006) public notices/ flyers were distributed to the councillor and neighbouring properties and estates/ developments that may be affected by the proposed section of the K220 (**Annexure E3**).
- 4) Notices were also sent to the Rietvlei Dam Nature Reserve, SAHRA, SANRAL, ESKOM and Rand Water (**Annexure E4**).
- 5) The draft Scoping Report will be available for review by Kungwini Local Municipality and DWAF for a period of 28 days and comments received will be addressed in the final Scoping Report.

The following persons/organisations registered as I & AP:

	Name	Contact Details	Address
1	DKOA - David Larsen	Tel: 011 316 1393 salbu@email.com	
2	Isabel Du plessis	Tel: 072 267 5993	P.O. Box 35 Oliifantsfontein 1665
3	Johan vd Walt	Tel: 011 970 1240 kempestate.polka.co.za	13-18 Witkoppies
4	Bert Coelho	Tel: 072 4563191 bcoelho@vodamail.co.za cariencoelho@vodamail.co.za	
5	Dr Herman Joubert on behalf of the owners of land portions 15, 20 & 113 of the farm Doornkloof 391 JR.	hsj@tiq.co.za	

Photographs of Site Notice



Implications for development

The following issues/comments were raised during the public participation process:

- **Dr. Herman Joubert on behalf of the owners of land portions 15, 20 & 113 of the farm Doornkloof 391 JR (*refer to Annexure E5 for correspondence*)**

Dr Joubert represents the owners of land portions 15, 20 & 113 of the farm Doornkloof 391 JR, who obtain access from provincial road D2383. Dr Joubert stated that the position of the access of D2383⁷ on the proposed K220 has a direct impact on the accessibilities of their properties and it is requested that the planning and design of this intersection have to take their input and requirements into consideration. Should this road not link with the K220 the involved parties will be severely affected and as such would strongly object to any road planning that does not accommodate the connection of the existing road with the future planned K220.

Response:

It is recommended that the planning and design of this intersection (D2382) have to take Dr. Joubert's input input and requirements into consideration.

The Draft Scoping Report will be available for review by I & AP for a period of one month and issues/comments documented will be addressed in the Final SR and EIA report.

Additional Inputs Or Studies Required during the EIA process

All registered I & AP will be notified of the EIA process. Issues/comments received from I & AP will be addressed in the EIA report.

Any additional activities identified during the EIA phase (if any) will be advertised during the EIA Phase.

⁷ The road refer to by Dr. Joubert is D2382 and **not** D2383.

The draft EIAR will be available for review by I & AP's and any comments received will be addressed in the final EIAR.

9. ENVIRONMENTAL SCOPING *[Regulation 29(f) (g)]*

9.1 Preliminary Environmental Issues and Sensitivity Map

Refer to Figure 19 for the Preliminary Sensitive Issues Map

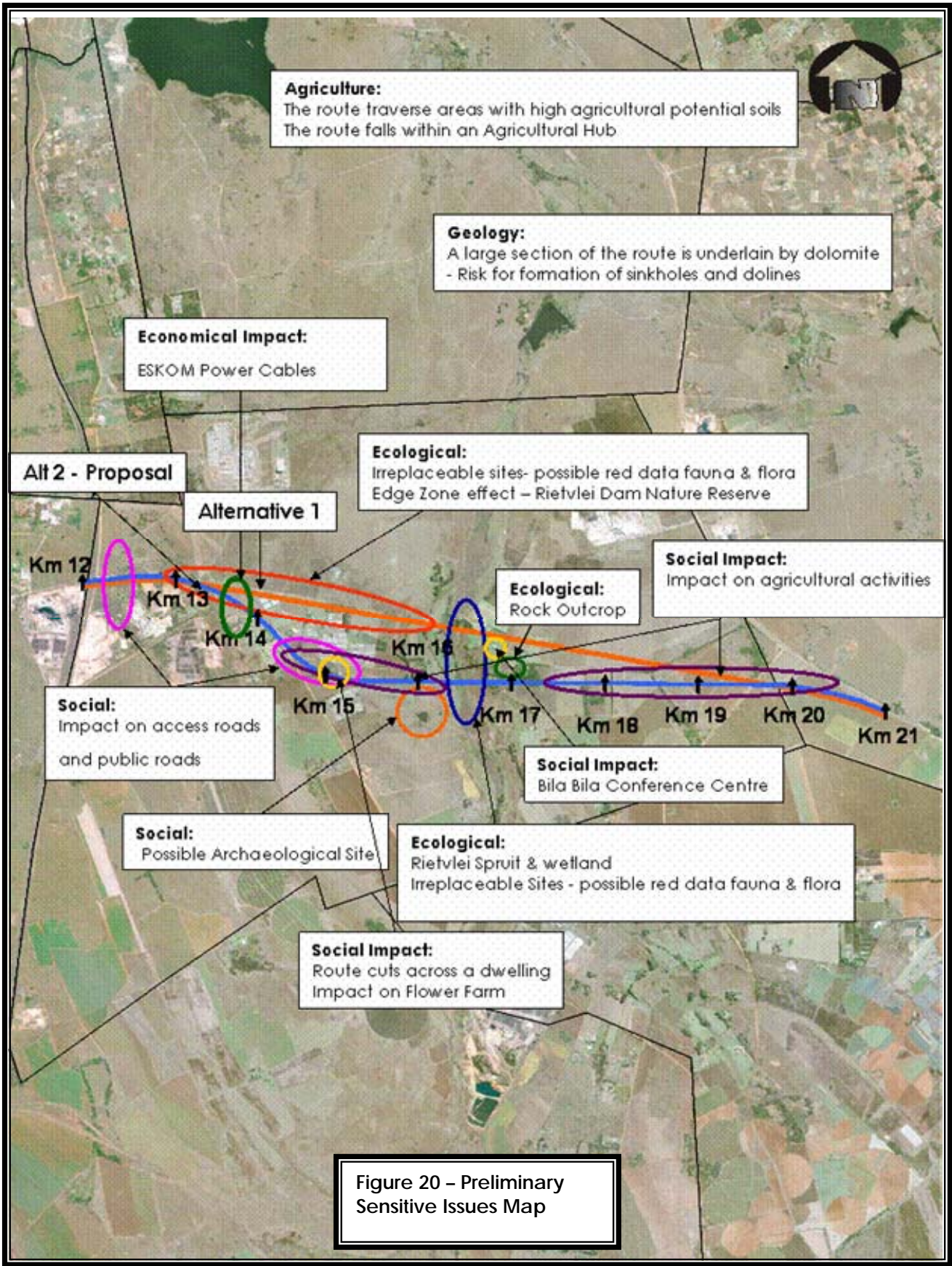
From the preliminary information available, the following environmental issues were identified:

- **Geotechnical:** Dolomite is present over a large portion of the route, which poses the risk of formation of sinkholes and dolines. According to the geotechnical engineer there are certain geotechnical constraints that must be taken into consideration during the planning and designing of the road, i.e. collapsible sands, expansive clays, excavability etc.
- **Possible red data flora and fauna species:** According to GDACE C-plan, Version 2, a **small section** of both alternatives cuts across irreplaceable sites at the crossing of the Rietvlei Spruit and associated wetland (*refer to GDACE Irreplaceable Sites Map, figure 14*). Please note that the recommended K220 route crosses the Rietvlei Spruit at its **narrowest point** where another road previously crossed the vlei. The remains of pipe culverts and headwalls are still visible at the recommended crossing point. A red data fauna and flora survey will be conducted during the EIA phase to confirm the occurrence of red data species and mitigation measures will be provided by the fauna and flora specialists.

A large section of Alternative 1 runs adjacent to an irreplaceable site (Rietvlei Dam Nature Reserve).

- **The Rietvlei Spruit and associated wetland:** The alignments cross the Rietvlei Spruit. As already mentioned the recommended K220 route crosses the Rietvlei Spruit at its **narrowest point** where another road previously crossed the vlei. The remains of pipe culverts and headwalls are still visible at the recommended crossing point. The riparian vegetation is regarded as sensitive
- **Rietvlei Dam Nature Reserve:** Alternative 1 runs adjacent to the Rietvlei Dam Nature Reserve and could have a higher impact on the Reserve in comparison with Alternative 2.
- **Grassland:** The proposed alignments of this section of the K220 traverse Natural grassland areas.
- **Rock outcrop:** From \pm km 16,7 - \pm km 17,2 Alternative 2 route runs south of a rocky outcrop.
- **Archaeological sites:** Alternative 2 runs to the north of a possible historical structure that is protected by the National Heritage Resources Act (Act No 25 of 1999). This must be confirmed during the EIA phase.
- **High Agricultural Potential Soils:** The involved section of route K220 traverses areas with high agricultural potential soils and is located within the Kungwini/Ekurhuleni Agricultural Hub. However, the area is urbanising in conformance to the Kungwini IDP.
- **Agricultural Activities:** Both alternatives traverse areas utilized for agricultural activities.
- **Expropriation of land:** Expropriation of the road reserve required for the involved section of the K220 will affect a number of properties.

- **Access to properties:** At \pm km 12,3 the proposed route intersects the access to D2382, at \pm km 14,9 and \pm km 15,5 respectively the proposed route intersects two private entrance roads to farms, at \pm km 14,8 the proposed route intersects a public access road (dirt road) and at \pm km 17,1 the proposed route intersects a road that leads to an existing farm house.
- **Blasting:** Some blasting may be required during the construction of the road and mitigation measures will have to be implemented.
- **Need and desirability:** The extension of the K220 creates a new west to east link between P157-1 and PWV 17 and will establish another element to facilitate a more balanced road network as well as improve regional access to the area.



9.2 Anticipated impacts, including cumulative impacts

The impacts/ aspects (beneficial and adverse) of the proposed section of the K220 (Alternative 1 and Alternative 2 "Proposal") on the receiving environment were identified. The above impacts, as well as the affected environmental characteristics, are indicated in **Tables 6 and 7** below.

Table 6: Comparative Assessment between impacts of Alternatives 1 and 2 for Road K220 East

Environmental Aspects <u>Key to impacts:</u> 😊 l- Lower positive 😊 m- Medium positive 😊 h- Higher positive 😞 l- Lower negative 😞 m- Medium negative 😞 h- Higher negative 😊 - Neutral	Physical				Biological		Socio-Economical								Institutional				Total of Impacts	
	Geology and Soils	Hydrology	Topography	Climate	Fauna	Flora	Qualitative Environment Visual, Noise, Pollution, Security	Compatibility of Land-Use	Availability of municipal services	Upgrading of Municipal Services	Economical Impact Local Authority	Economical Impact I&AP's	Economical Impact Private Sector	Cultural and Historical	Impact on high agricultural potential land	In line with IDP	In line with SDF or other frameworks And open space plans	In line with policies and guidelines	In line with Water Act and other legislation	
CONSTRUCTION PHASE																				
Preliminary Issues and Impacts																				
Alternative 1	😞 h	😞 h	😊	😞 m	😞 h	😞 h	😞 m	😊 m	😊	😊 h	😊	😞 h	😊 h	😊	😞 h	😊 h	😊 h	😊 h	😊 h	😊 x 4 😊 h x 6 😞 h x 6 😞 m x 2 😞 l x 0
Alternative 2 “Proposal”	😞 h	😞 h	😊	😞 m	😞 m	😞 m	😞 m	😊 m	😊	😊 h	😊	😞 h	😊 h	😞 h	😞 h	😊 h	😊 h	😊 h	😊 h	😊 x 3 😊 h x 5

																				😊 m x 1 😞 m x 4 😞 h x 5 😞 l x 0
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

OPERATIONAL PHASE

Preliminary Issues and Impacts

	Geology/ soils	Hydrology	Topography	Climate	Fauna	Flora	Qualitative Env	Land-Use	Municipal Serv	Upgrading of Mun Serv	Econ Impact LA	Econ Impact I & AP's	Econ Impact Priv Sector	Cult & Hist	Agric Potential	IDP	SDF, Open Space Plan	Policies/ Guidelines	Acts other legislation	
Alternative 1	h	h		l	h	h	m	h	h	h	h	h	h	l	h	h	h	h	h	h x 9 m x 0 l x 0 x 2 h x 6 m x 1 l x 2
Alternative 2 "Proposal"	h	h		l	m	m	m	h	h	h	h	h	h	l	h	h	h	h	h	h x 9 m x 0

[illegible]

Table 7: Comparative Assessment between impacts of Alternative 1 and 2 after Mitigation

Environmental Aspects <u>Key to impacts:</u> 😊 l- Lower positive 😊 m- Medium positive 😊 h- Higher positive 😞 l- Lower negative 😞 m- Medium negative 😞 h- Higher negative 😐 - Neutral	Physical				Biological		Socio-Economical									Institutional				Total of Impacts
	Geology and Soils	Hydrology	Topography	Climate	Fauna	Flora	Qualitative Environment Visual, Noise, Pollution, Security	Compatibility of Land-Use	Availability of municipal services	Upgrading of Municipal Services	Economical Impact Local Authority	Economical Impact I&P's	Economical Impact Private Sector	Cultural and Historical	Impact on high agricultural potential land	In line with IDP	In line with SDF or other frameworks And open space plans	In line with policies and guidelines	In line with Water Act and other legislation	
CONSTRUCTION PHASE																				
Preliminary Issues and Impacts																				
Alternative 1	😞 l	😞 l	😐	😞 l	😞 h	😞 h	😞 l	😊 h	😐	😊 h	😐	😞 l	😞 l	😐	😞 h	😊 h	😊 h	😊 h	😊 h	😊 h x 6 😐 x 4

																				<div>☹️ l x 6</div> <div>☹️ m x 0</div> <div>☹️ h x 3</div>
Alternative 2 “Proposal”	<div>☹️ l</div>	<div>☹️ l</div>	<div>😬</div>	<div>☹️ l</div>	<div>☹️ l</div>	<div>☹️ l</div>	<div>☹️ l</div>	<div>😊 h</div>	<div>😬</div>	<div>😊 h</div>	<div>😬</div>	<div>😬</div>	<div>☹️ l</div>	<div>😬</div>	<div>☹️ m</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h x 6</div> <div>😬 x 5</div> <div>☹️ l x 7</div> <div>☹️ m x 1</div> <div>☹️ h x 0</div>
OPERATIONAL PHASE																				
Preliminary Issues and Impacts																				
	Geology/ soils	Hydrology	Topography	Climate	Fauna	Flora	Qualitative Env	Land-Use	Municipal Serv	Upgrading of Mun Serv	Econ Impact LA	Econ Impact I & AP's	Econ Impact Priv Sector	Cult & Hist	Agric Potential	IDP	SDF, Open Space Plan	Policies/ Guidelines	Acts other legislation	
Alternative 1	<div>☹️ l</div>	<div>☹️ l</div>	<div>😬</div>	<div>😬</div>	<div>☹️ h</div>	<div>☹️ h</div>	<div>☹️ l</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 l</div>	<div>😊 h</div>	<div>😬</div>	<div>☹️ l</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h</div>	<div>😊 h x 9</div> <div>😊 m x 0</div> <div>😊 l x 1</div> <div>☹️ l x 4</div> <div>☹️ m x 0</div> <div>☹️ h x 2</div>

																				☹ x 3
Alternative 2 "Proposal"	☹ I	☹ I	☺ 	☺ 	☹ I	☹ I	☹ I	☺ h	☺ h	☺ h	☺ h	☺ I	☺ h	☺ 	☹ I	☺ h	☺ h	☺ h	☺ h	☹ x 9 ☹ m x 0 ☹ l x 1 ☹ l x 6 ☹ m x 1 ☹ x 3

9.3 Comparative Assessment between Alternative 1 and Alternative 2

The Tables above are preliminary comparative assessments based on the issues identified in the Scoping Report. The issues identified are based according to the status quo information that was available for the Scoping Phase and the scoping report already identified the aspects that must be investigated in more detail during the EIA phase.

The purpose of the preliminary issues identification and comparative assessment process is

- 1) To identify “fatal flaws” that could prevent the project from happening at an early stage;
- 2) To identify specialist studies and plans to be done for the EIA phase of the application;
- 3) To identify the mitigation possibilities of the preliminary issues identified; and
- 4) To compare (already at an early stage) the workable alternatives identified with each other before and after mitigation.

The comparative assessment will assist the EAP with the identification of the preferred alternative. The environmental issues and the results of the comparative assessment are however only preliminary results that must be still confirmed during the EIA phase. Some of the specialist studies done during the EIA phase could identify additional issues to be addressed and it could even identify “Fatal Flaws” that could prevent the project from happening/ place restrictions (i.e. buffers around red data species identified) that could have a significant impact on the alternatives identified and the alignment of the proposed section of the road.

Due to the fact that many of the high impact issues identified in the above mentioned tables can be mitigated to more acceptable levels, the issues ratings before and after mitigation could differ considerably. In many cases, high impact issues (mostly related to the construction phase of a development) can be mitigated completely. The

comparative assessment after mitigation (Refer to table above) will therefore give a more accurate indication of the preliminary preferred alternative for the project.

Table 8: Summary - Comparative Assessment between Alternative 1 and Alternative 2 before Mitigation

Environmental Aspects	Physical	Biological	Socio-Economic	Institutional
Alternative 1	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 1 😊 h x 7	😊 l x 0 😊 m x 0 😊 h x 8
	😞 l x 1 😞 m x 1 😞 h x 4	😞 l x 0 😞 m x 0 😞 h x 4	😞 l x 0 😞 m x 2 😞 h x 4	😞 l x 0 😞 m x 0 😞 h x 0
	😐 x 2	😐 x 0	😐 x 4	😐 x 0
Alternative 2 "Proposal"	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 1 😊 h x 7	😊 l x 0 😊 m x 0 😊 h x 8
	😞 l x 1 😞 m x 1 😞 h x 4	😞 l x 0 😞 m x 4 😞 h x 0	😞 l x 1 😞 m x 2 😞 h x 5	😞 l x 0 😞 m x 0 😞 h x 0
	😐 x 2	😐 x 0	😐 x 2	😐 x 0

Table 9: Summary - Comparative Assessment between Alternative 1 and Alternative 2 after Mitigation

Aspects	Physical	Biological	Socio-Economic	Institutional
Alternative 1	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 1 😊 m x 0 😊 h x 7	😊 l x 0 😊 m x 0 😊 h x 8
	😞 l x 5 😞 m x 0 😞 h x 0	😞 l x 0 😞 m x 0 😞 h x 4	😞 l x 5 😞 m x 0 😞 h x 1	😞 l x 0 😞 m x 0 😞 h x 0
	😞 x 3	😞 x 0	😞 x 4	😞 x 0
Alternative 2 "Proposal"	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 1 😊 m x 0 😊 h x 7	😊 l x 0 😊 m x 0 😊 h x 8
	😞 l x 5 😞 m x 0 😞 h x 0	😞 l x 4 😞 m x 0 😞 h x 0	😞 l x 4 😞 m x 1 😞 h x 0	😞 l x 0 😞 m x 0 😞 h x 0
	😞 x 3	😞 x 0	😞 x 5	😞 x 0

Summary

From the comparison of the two alternatives it can be concluded that the ecological impact of Alternative 1 is higher than that of Alternative 2 due to the locality of Alternative 1 adjacent to the Rietvlei Dam Nature Reserve.

The socio-economical impacts of the two alternatives are more or less similar.

From an ecological point of view Alternative 2 is regarded as the preferred alternative.

A detailed comparison of the alternatives will be included in the EIA document.

10. METHODOLOGY OF ASSESSING IMPACTS THAT HAVE BEEN IDENTIFIED

Significance Description Methodology

The significance of Environmental Impacts will be assessed in the EIA process in accordance with the following method:

Significance is the product of probability and severity. Probability describes the likelihood of the impact actually occurring, and is rated as follows:

- | | | | |
|--------------------------|-----------------|---|--|
| <input type="checkbox"/> | Improbable | - | Low possibility of impact to occur either because of design or historic experience.
Rating = 2 |
| <input type="checkbox"/> | Probable | - | Distinct possibility that impact will occur.
Rating = 3 |
| <input type="checkbox"/> | Highly probable | - | Most likely that impact will occur.
Rating = 4 |
| <input type="checkbox"/> | Definite | - | Impact will occur, in the case of adverse impacts regardless of any prevention measures.
Rating = 5 |

The severity factor is calculated from the factors given to "intensity" and "duration". Intensity and duration factors are awarded to each impact, as described below.

The Intensity factor is awarded to each impact according to the following method:

- | | | |
|------------------|---|---|
| Low intensity | - | natural and man made functions not affected –
Factor 1 |
| Medium intensity | - | environment affected but natural and man made
functions and processes continue -Factor 2 |
| High intensity | - | environment affected to the extent that natural or man
made functions are altered to the extent that it will
temporarily or permanently cease or become
dysfunctional - Factor 4 |

Duration is assessed and a factor awarded in accordance with the following:

- | | | |
|-------------|---|--|
| Short term | - | <1 to 5 years - Factor 2 |
| Medium term | - | 5 to 15 years - Factor 3 |
| Long term | - | impact will only cease after the operational life
of the activity, either because of natural
process or by human intervention - Factor 4. |
| Permanent | - | mitigation, either by natural process or by
human intervention, will not occur in such a
way or in such a time span that the impact
can be considered transient - Factor 4. |

The severity rating is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below. For example:

The Severity factor = Intensity factor X Duration factor

$$\begin{aligned} &= 2 \times 3 \\ &= 6 \end{aligned}$$

A Severity factor of six (6) equals a Severity Rating of Medium severity (Rating 3) as per table below:

TABLE 10: SEVERITY RATINGS

RATING	FACTOR
Low Severity (Rating 2)	Calculated values 2 to 4
Medium Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High severity (Rating 5)	Calculated values 13 to 16
Severity factors below 3 indicate no impact	

A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating.

The significance rating should influence the development project as described below:

- ☐ Low significance (calculated Significance Rating 4 to 6)
Positive impact and negative impacts of low significance should have no influence on the proposed development project.
- ☐ Medium significance (calculated Significance Rating >6 to 15)
Positive impact: Should weigh towards a decision to continue
Negative impact: Should be mitigated to a level where the impact would be of medium significance before project can be approved.
- ☐ High significance (calculated Significance Rating 16 and more)
Positive impact: Should weigh towards a decision to continue, should be enhanced in final design.

Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to at least medium significance rating.

In correspondence received from GDACE some officials was of the opinion that the significance methodology used by Bokamoso applies a simple mathematical formula to environmental aspects with significantly different sensitivity values, which might or might not give an inaccurate final significance value.

The significance methodology used by Bokamoso was prescribed to environmental consultants in courses in impact assessments. No methodology can be accurate to a numerical value where the environment is concerned, because it cannot be measured. Numerical values are only an indication of the significance or severance of impacts. If we do not agree with the outcome of the assessment, we will adjust the numerical value to reflect a more realistic significance. The methodology only acts as an aid to the environmental consultant and the consultant need to use his/her experience in the field together with the methods in order to reach a realistic significance of impacts. Bokamoso, in particular Me. Lizelle Gregory, has extensive experience in the field of impact assessments.

11. PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

(Refer to Annexure F: Plan of Study for EIA)

The plan of study for Environmental Impact Assessment which sets out the proposed approach to the environment impact assessment of the application include:

- A description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialized processes, and the manner in which such tasks will be undertaken;
- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;
- Particulars of the public participation process.

12. CONCLUSION

The purpose of the scoping process was to do a status quo analysis of the study area, to investigate the alternatives considered for the project, to identify the most significant environmental issues associated with the proposed project, to determine the impact of the proposed development on the social environment and to identify (already at an early stage) possible “fatal flaws” that could prevent the project from happening.

It is important to note that the scoping process identified other crucial issues that must be addressed in more detail during the EIA process and it is requested that the authorities responsible for evaluation of the scoping report (GDACE and the involved local authority) examine the issues listed under each environment and where possible add issues to/remove issues from the issues lists. The mitigation possibilities of the issues listed were also identified in this scoping report and we (Bokamoso) are of the opinion that it will be possible to mitigate all the detrimental issues completely or to more acceptable levels.

However, the issues listed will be assessed in more detail during the EIA phase and detailed mitigation measures to reduce or prevent the issues/impacts will be supplied and incorporated as part of an Environmental Management Plan (EMP) for the preconstruction, construction and/or operational phases of the project.

13. RECOMMENDATIONS

Based on the above-mentioned information supplied and the conclusions that were made, it is suggested that the Scoping Report be accepted, that the Plan of Study for EIA be approved and that the applicant be allowed to commence with the EIA for the project.

The completed EIA must include the following information/comply with the following documents:

- The approved Plan of Study for EIA;
- The following specialist reports listed by Bokamoso in this Scoping Report and the Plan of Study for EIA:
 - A Flora and Fauna Survey including specialist biodiversity studies to investigate the following aspects:
 - Plants, with specific reference to *Chellanthes deltoidea* and *Trachyandra erythrorrhiza*;
 - Birds, with specific reference to Secretary bird, African Grass Owl, African Marsh Harrier and White-bellied korhaan; and
 - Amphibians, with specific reference to Giant Bullfrog should be conducted and the Report be incorporated as part of the EIA report;
 - A wetland delineation and river assessment should be conducted and the reports be included as part of the EIA report;
 - The presence of caves should be investigated and if present a biodiversity cave study should be conducted; and
 - An agricultural potential survey.
- Additional specialist inputs and other relevant information listed by the relevant authorities; and
- An Environmental Management Plan.

