

Final Environmental Impact Assessment Report for Olievenhoutbosch Road

GAUT: 002/11-12/E0135

June 2015



LEBOMBO GARDEN BUILDING 36 LEBOMBO ROAD
ASHLEA GARDENS
0081
P.O. BOX 11375
MAROELANA
Tel: (012) 346 3810
Fax: 086 570 5659
E-mail: lizelleg@mweb.co.za



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LIST OF ABBREVIATIONS

- CBD:** Central Business District
- C-Plan:** Conservation Plan
- DEA:** Department of Environmental Affairs and Tourism
- DFA:** Development Facilitation Act
- EAP:** Environmental Assessment Practitioner
- ECA:** Environmental Conservation Act
- EIA:** Environmental Impact Assessment
- IEMA:** Institute of Environmental Management and Assessment
- EIAR:** Environmental Impacts Assessment Report
- EMM:** Ekurhuleni Metropolitan Municipality
- CoT:** City of Tshwane
- DWS:** Department of Water and Sanitation
- EMP:** Environmental Management Plan
- GAPA:** Gauteng Agricultural Potential Atlas

GDARD: Gauteng Department of Agriculture, Conservation and Environment
GSDF: Gauteng Spatial Development Framework
I&AP: Interested and affected party
IDP : Integrated Development Plan
MOU: Memorandum of Understanding
NSBA: National Spatial Biodiversity Assessment
NEMA : National Environmental Management Act
ORTIA: O.R. Tambo International Airport
PoS: Plan of Study
RDM: Resource Directed Measures
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
WMA: Water Management Area

GLOSSARY OF TERMS

Agricultural Hub: An area identified for agricultural use by GDARD according to the Draft Policy on the Protection of Agricultural Land (2006).

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.

Conservation of Agricultural Resources Act (Act No. 43 of 1983): This Act provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

C-Plan: The GDARD'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. GDARD C- Plan Version 2, 2005.

Development Facilitation Act (DFA) 1995 (Act 67 of 1995): This Act formulates a set of general principles to serve as guidelines for land development.

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.

GDARD Draft Ridges Policy, 2001: According to the GDARD Draft Ridges Policy no development should take place on slopes steeper than 8.8%.

GDARD Draft Red Data Species Policy, 2001: A draft policy to assist with the evaluation of development applications that affected Red Data plant species.

GDARD Requirements for Biodiversity Assessments Version 2 (March 2008) (Draft): GDARD requirements for biodiversity assessments.

National Environmental Management Act (NEMA), 1998 (Act No 107 of 1998): NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

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

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.

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.

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).

National Veld and Forest Fire Act, 1998 (Act No. 101, 1998): The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic. Furthermore the Act provides for a variety of institutions, methods and practices for achieving the prevention of fires.

National Road Traffic Act, 1996 (Act No. 93 of 1996): This Act provides for all road traffic matters which shall apply uniformly throughout the Republic and for matters connected therewith.

National Water Act, 1998 (Act No 36 of 1998): The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed

and controlled.

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 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.

Water Services Act, 1997 (Act No 108 of 1997): The purpose of this Act is to ensure the regulation of national standards and measures to conserve water.

Agricultural Hub: An area identified for agricultural use by GDARD according to the Draft Policy on the Protection of Agricultural Land (2006).

1. INTRODUCTION, BACKGROUND AND WAY FORWARD

1.1 Introduction

JR 209 Investments (Pty) Ltd appointed **Bokamoso Landscape Architects and Environmental Consultants**, to compile an Environmental Scoping Report and Environmental Impact Assessment (EIA) for the proposed construction of the road and its associated listed activities. The application is made for authorization for the construction of a section of Olievenhoutbosch from Main Road in the west to proposed Road K54 in the east (to the east of the R21 freeway). Centurion is becoming a sought after and busy high-density node which also incorporates many mixed-use developments and local roads such as Olievenhoutbosch Road (a local road) are urgently needed in the area to alleviate the existing and future west-east traffic congestion problems.

At present the Nelmaphius Road is the only west-east road that drains traffic in between Main Road in the east (and Johan Vorster Avenue in the south-east) to the R21 (in the vicinity of the Irene Village Mall) and this road is almost permanently congested. The accesses to the Cornwall Hill Residential Estate and Cornwall Hill College are situated in Nelmaphius Drive (between Main Road and the R21) and the residents of the estate required in the public participation process for the Irene x 89, 90, 91 and 92 developments that Olieventhoutbosch Road urgently be developed in order to allow for another west-east link to drain the area. This road is also required from an emergency point of view, because the current congested conditions on the roads in the area makes it extremely difficult to move through the area in emergency situations (i.e. when someone in the Cornwall Hill Estate must urgently get to a hospital).

The proposed road under consideration only represents a section of the larger Olievenhoutbosch Road (from Main Road in the west to proposed Road K54) and is approximately 4km in extent. The involved section of Olievenhoutbosch Road is located in Centurion and falls within the area of jurisdiction of the City of Tshwane Metropolitan Municipality (CTMM) (**refer to Figure 1: Locality Map and Figure 2: Aerial Map**).

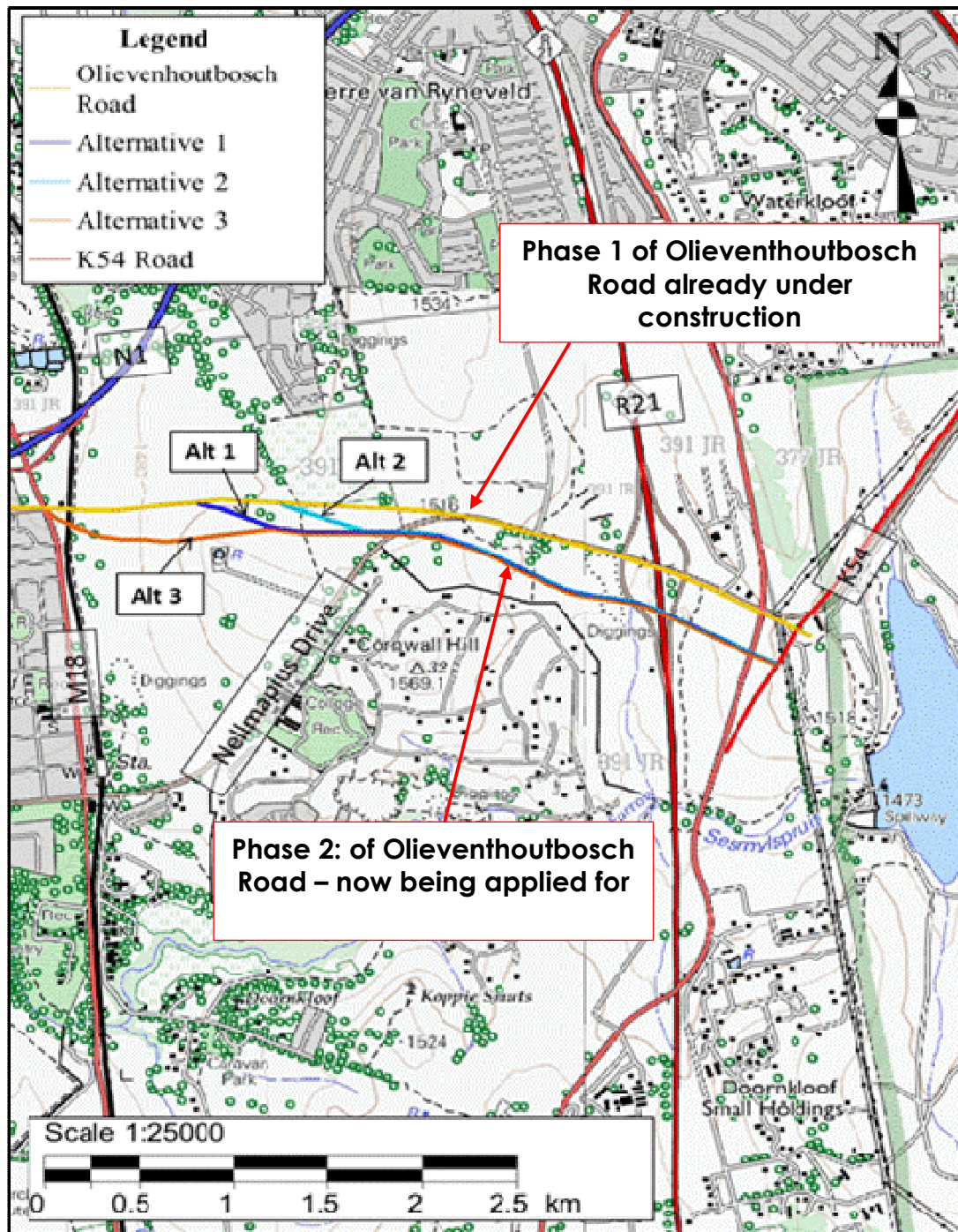


Figure 1 – Locality Map

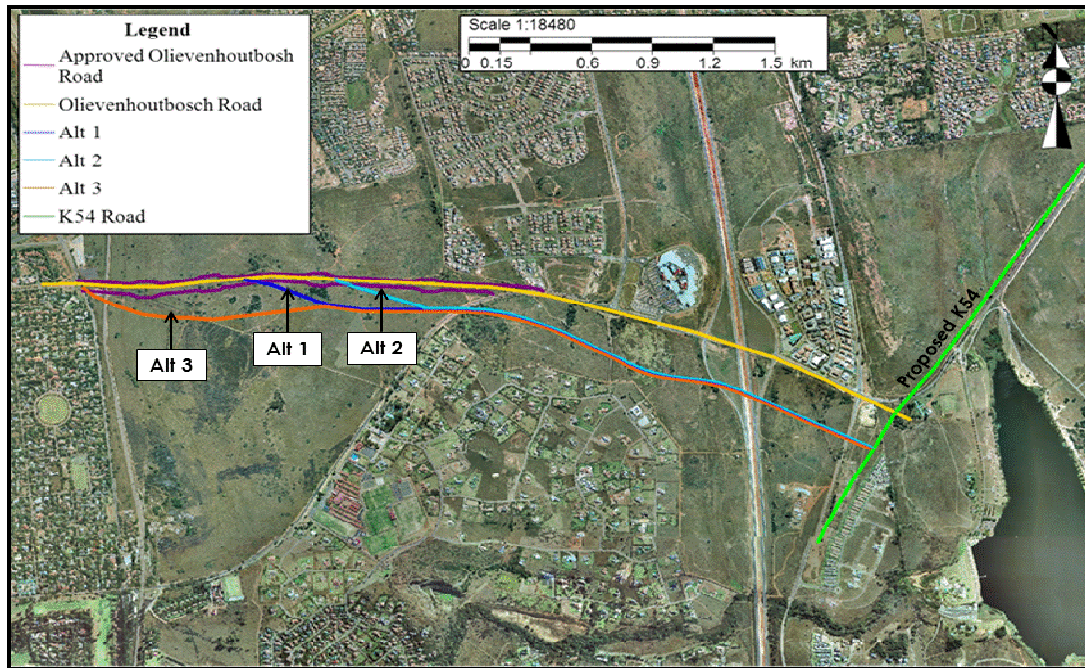
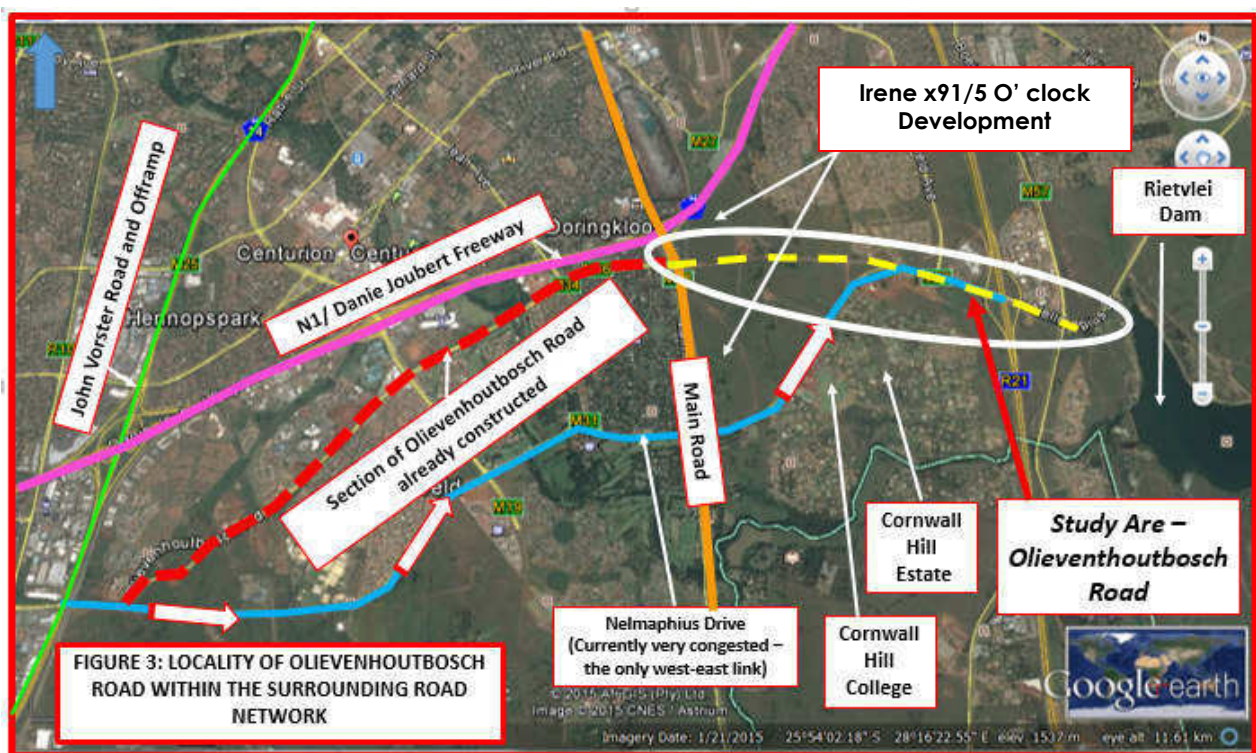


Figure 2 – Aerial Map

Note: Enlarged copies of the figures inserted in between the text below are included in Annexure A of this report.



Activities Applied For In Terms of NEMA - (In Line with Section 32 (2) (b) & (c))

The application is made in terms of Government Notice No. R544, R545 and R546 published in the Government Gazette no. 33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998).

Please take note that on 4 December 2014 the New Environmental Impact Assessment Regulations was published under Government Notice R.982 and came into effect on the 8th of December 2014. According to Chapter 8, Transitional Arrangements and Commencement, and Regulation 52, Continuation of actions undertaken and Authorizations issued under previous NEMA regulations it is stated:

“52. (1) Any actions Undertaken in terms of the previous NEMA regulations and which can be undertaken in Terms of a provision of these Regulations must be regarded as having been undertaken in terms of provision of these Regulations. (2) Any authorisation issued in terms of the previous NEMA Regulations must be regarded to be an environmental authorisation issued In terms of these Regulations”

and Regulation 53, Pending Applications and appeals (NEMA), states:

“53. (1) An application submitted in terms of the previous NEMA regulations and which is Pending when these Regulations take effect, must despite the repeal of those Regulations be dispensed with in terms of those previous NEMA regulations as if those previous NEMA Regulations were not repealed” as well

as “(3) Where an application submitted in terms of the previous NEMA regulations, is pending in relation to an activity of which a component of the same activity was not identified under the previous NEMA notices, but is now identified in terms of section 24(2) of the Act, the competent authority must dispense of such application in terms of the previous NEMA regulations and may authorise the activity identified in terms of section 24(2) as if it

was applied for, on condition that all impacts of the newly identified activity and requirements of these Regulations have also been considered and adequately assessed.”

Therefore from the above it is clear that since this application was submitted in terms of the Amended 2010 NEMA EIA Regulations and are still pending the consideration of the Environmental Authorization will be made in terms of the 2010 Regulations. The new EIA Regulations, 2014 was taken in to consideration and all relevant listed activities as listed in Table 4 below was taken in to account.

Activities Applied for in Terms of NEMA 2010

In terms of Government Notices no. R544, no. R545 and no. R546 published in the Government Gazette no. 33306 of 02 August 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) an Environmental Impact Assessment Process is required for the above-mentioned project, due to the fact that the following listed activities will be triggered / could be triggered:

Table 1: Listed activities in terms of Notice No. R 544

Listing No. 1 R. 544, 18 June 2010	Activity 11	The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas (viii) jetties exceeding 50 square meters in size; (ix) slipways exceeding 50 square meters in size; (x) buildings exceeding 50 square meters in size; or more where such construction occurs within 32 meters of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
Listing No. 1 R. 544, 18 June 2010	Activity 18	The Infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from: (i) a watercourse; (ii) the sea; (iii) the seashore (iv) the littoral active zone, an estuary or a distance of 100 metres inland of high-water mark of the sea or an estuary, whichever distance is the greater-

		<p>but excluding where such infilling, depositing, dredging, excavation, removal or moving</p> <ul style="list-style-type: none"> (i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (ii) occurs behind the development setback line
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Table 2: Listed activities in terms of Notice No. R 545

Listing No. 2 R. 545, 18 June 2010	Activity 18	<p>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 03 July 2006 and which have not been authorized by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 or 2009, made under section 24(5) of the Act and published in Government Notice No.385 of 2006, -</p> <ul style="list-style-type: none"> (i) 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 of 1998); (ii) It is a road administered by a provincial authority; (iii) The road reserve is wider than 30 meters, or (iv) The road will cater for more than one lane of traffic in both directions.
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Table 3: Listed activities in terms of Notice No. R 546

Listing No. 3 R. 546, 18 June 2010	Activity 4	<p>The construction of a road wider than 4 meters with a reserve less than 13.5 meters.</p>	<p>(b) In Gauteng:</p> <ul style="list-style-type: none"> i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus area; iii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; iv. Sites identified in terms of the Ramsar Convention; v. Sites identified as irreplaceable or important in the Gauteng Conservation plan; vi. Areas larger than 2 hectares zoned for use as public open space; vii. Areas zoned for a conservation purpose. viii. Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environmental Conservation Act, 1989 (Act No. 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983); <p>Any site identified as land with high agricultural potential located within the Agricultural Hubs or important Agricultural Sites identified in terms of the Gauteng Agricultural Potential Atlas, 2006</p>
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Listing No. 3 R. 546, 18 June 2010	Activity 13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) The undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Management Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list. (2) The undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010	<p>(d) In Gauteng:</p> <ul style="list-style-type: none"> i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus areas; iii. Any declared protected area including Municipal or Provincial Nature reserves as contemplated by the Environmental Conservation Act, 1989 (Act No. 73 of 1989), the Nature Conservation Ordinance (Ordinance 12 of 1983); iv. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; v. Sites or areas identified in terms of an International Convention vi. Sites identified as irreplaceable or important in the Gauteng Conservation plan;
Listing No. 3 R. 546, 18 June 2010	Activity 19	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer.	<p>(b) In Gauteng:</p> <ul style="list-style-type: none"> i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus areas; iii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; iv. Sites or areas identified in terms of an International Convention;

			<ul style="list-style-type: none"> v. Any site identified as land with high agricultural potential located within the Agricultural Hubs or Important Agricultural Sites identified in terms of the Gauteng Agricultural Potential Atlas, 2006. vi. All sites identified as irreplaceable or important in the Gauteng Conservation plan; vii. Any declared protected area including Municipal or Provincial Nature reserves as contemplated by the Environmental Conservation Act, 1989 (Act No. 73 of 1989), the Nature Conservation Ordinance (Ordinance 12 of 1983) and the NEMPAA.
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Activities considered in Terms of NEMA 2014

In terms of Government Notices no. R983, no. R984 and no. R985 published in the Government Gazette no. 38282 of 04 December 2014 of the National Environment Management Act, 1998 (Act No. 107 of 1998) the following listed activities will be triggered / could be triggered:

Table 4: Listed activities in terms of Notice No. R 984

Listing No. 1 R. 893, December 2014	Activity 12	<p>The development of-</p> <ul style="list-style-type: none"> (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii) marinas exceeding 100 square metres in size; (viii) jetties exceeding 100 square metres in size; (ix) slipways exceeding 100 square metres in size; (x) buildings exceeding 100 square metres in size; (xi) boardwalks exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; <p>where such development occurs-</p> <ul style="list-style-type: none"> (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; - <p>excluding-</p>
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		<p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area; or</p> <p>(ee) where such development occurs within existing roads or road reserves.</p>
Listing No. 1 R. 893, December 2014	Activity 19	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from-</p> <p>(i) a watercourse;</p> <p>(ii) the seashore; or</p> <p>(iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing, dredging, excavation, removal or moving-</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or</p> <p>(i) (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.</p>
Listing No. 2 R,984 December 2014	Activity 15	<p>The clearance of an area of 20 hectares or more of indigenous vegetation is required for-</p> <p>(i) Linear development activities; or</p> <p>(ii) Maintenance proposes undertaken in accordance with a maintenance management plan.</p>
Listing No. 2 R,984 December 2014	Activity 27	<p>The development of -</p> <p>(i) a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);</p> <p>(ii) a road administered by a provincial authority;</p> <p>(iii) a road with a reserve wider than 30 metres; or</p> <p>(iv) a road catering for more than one lane of traffic in both directions; but excluding the development and related operation of a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010, in which case activity 24 in Listing Notice 1 of 2014 applies.</p>

Table 5: Listed activities in terms of Notice No.3 of R 985

Listing No. 3 R. 985 December 2014	Activity 12	The clearance of an areas of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.	<p>(d) In Gauteng:</p> <ul style="list-style-type: none"> i. within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water marks of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or iv. On land, where at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.
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1.2 Background

Olievenhoutbosch Road is a planned road situated on Portion 198, Remainder of Portion 330 and Portion 355 of the farm Doornkloof 391-JR. The yellow line in **Figure 1** represents the approved Olievenhoutbosch road that links up with Nellmapius Drive that is currently being constructed. The proposed road as described in this application will only add additional lanes to the already approved Olievenhoutbosch Road and will thus also assist with traffic congestion problems in the area. The proposed alignment traverses approved townships **Irene X 89, 90, 91 & 92** as indicated in **Figures 3 and 4 (also attached as Annexures B and C)**.

Centurion and Irene are situated to the west and south-west of the proposed alignment, the Cornwall Hill College and Residential Estate to the south and Pierre van Ryneveld to the

north. The road will be a direct-link from these areas and N1 National freeway to the K54 and also the R21 National freeway. This Environmental Impact Assessment Report (EIAR) has been prepared to comply with Section 32 of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998).

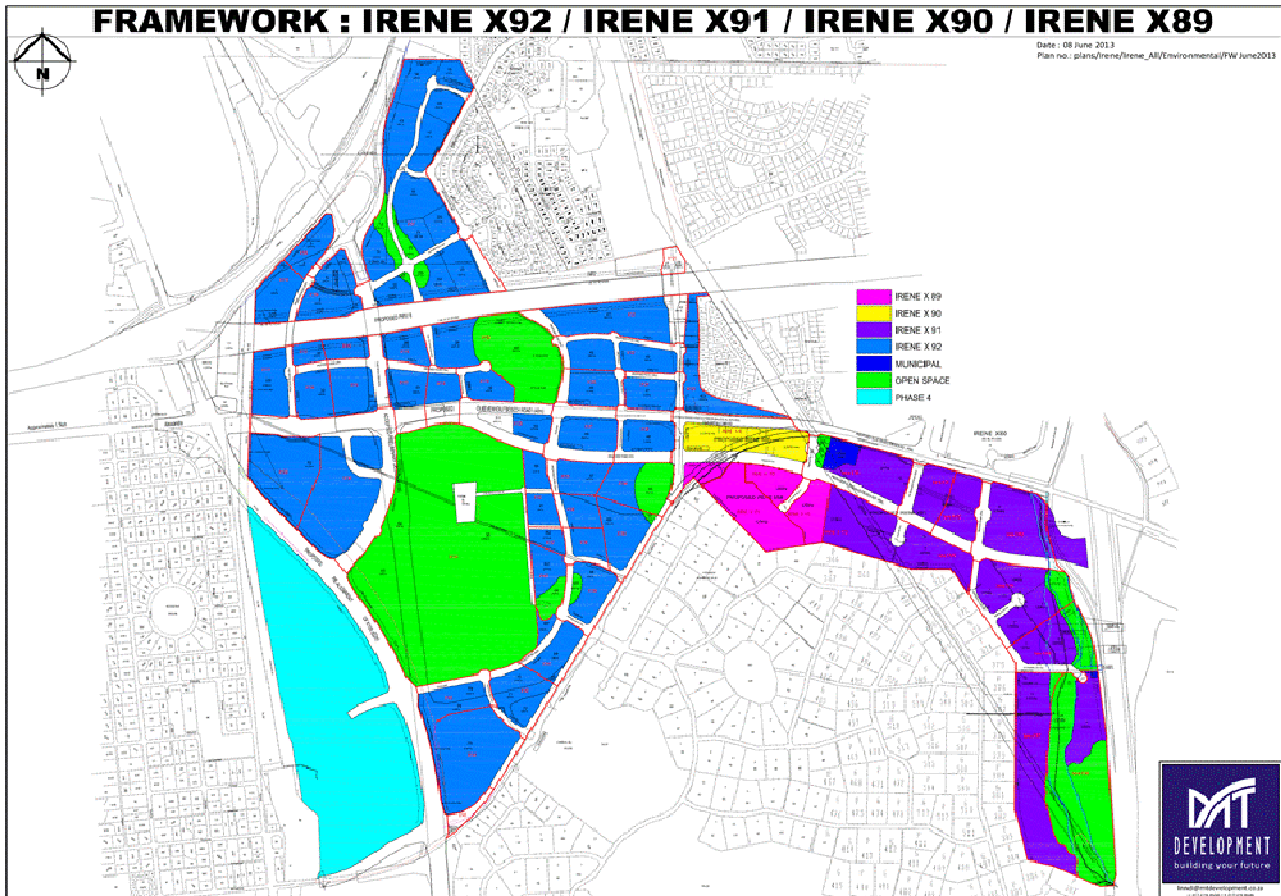


Figure 4 – Irene X89, 90, 91 & 92 Framework

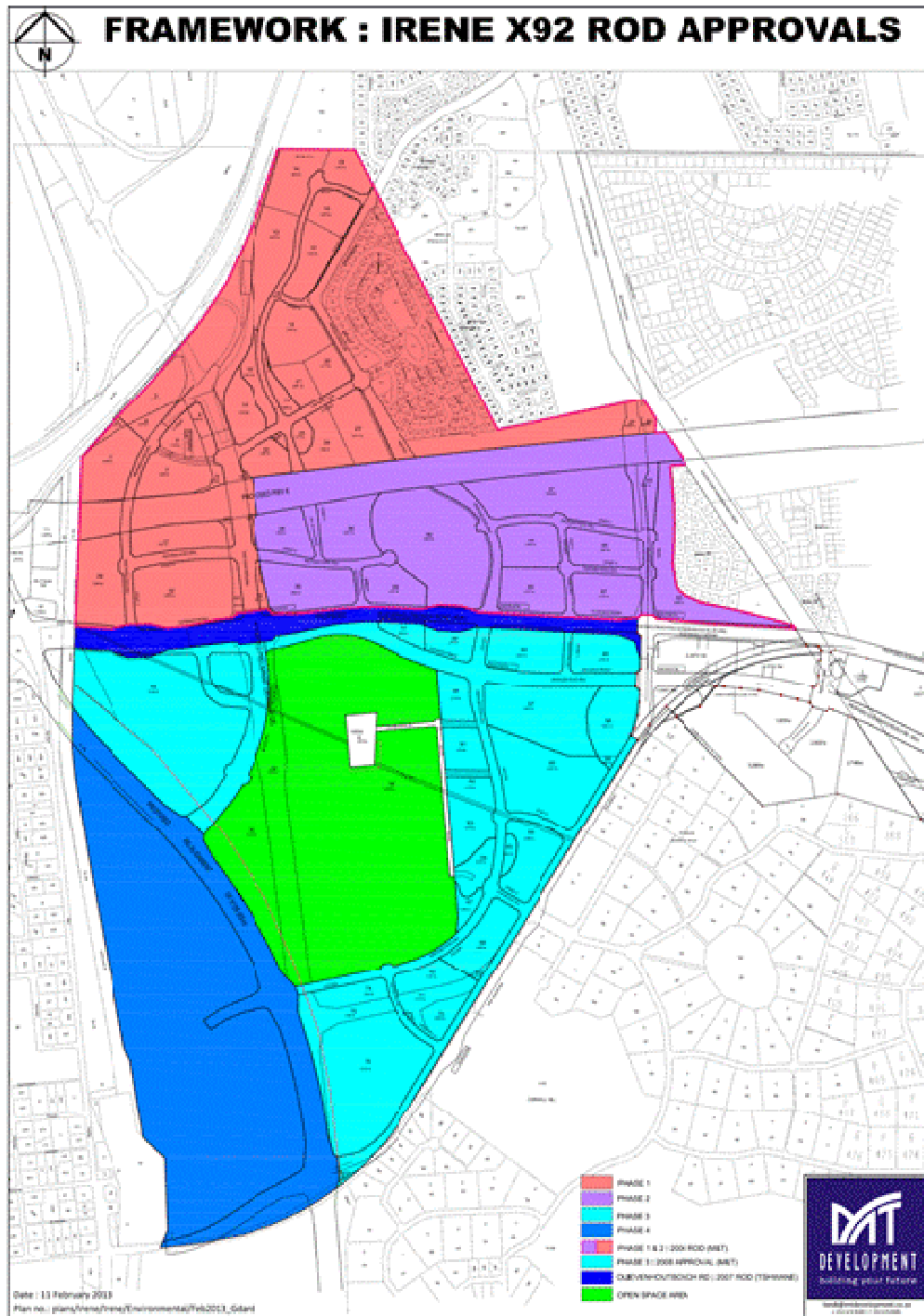


Figure 5– Irene X 92 Framework

The Gauteng Department of Agriculture and Rural Developments (GDARD) approved the Plan of Study for Environmental Impact Assessment (EIA) and Scoping Report for the Olievenhoutbosch Road EIA, on 26 June 2013. GDARD requested that the following information requirements be addressed in the EIAR: **Refer to Annexure D**

1. The Ecological Sensitivity Study must cover both fauna and flora and must meet the Department's Directorate of Biodiversity Management requirements for Biodiversity assessments.
2. The EIAR must report on the possible impacts on the subject site, which in terms of Conservation Plan Version 3.3 part of the proposed site is designated as an important and irreplaceable area with patches of suitable habitat for *Hebenaria mossii* which is a red listed plant, *Hebenaria barbertoni* which is an orange listed plant, *Rhinolophus clivosus* which is a priority red listed mammal and Gauteng grassland which is a primary vegetation.
3. Sensitivity map reflecting all good natural vegetation, including form of habitat and ridge systems along the entire alignment of the proposed road must be provided for the Department to determine the extent of impacts associated with the proposed road.
4. The road designs must show the interconnection with the proposed and existing township(s). It must also be overlaid with a sensitivity map and must be clear and legible and be printed on a readable scale map with distinctive legend in solid colours.
5. An assessment of alternatives must include a comparative assessment of all alternatives and must reflect environmental and socio-economic impact of each alternative along the entire route alignment. Further, the assessment of alternatives must be discussed in relation to the approved Olievenhoutbosch Road alignment traversing the sensitive 5 O' Clock site and how is it going to affect the other phased activities in the area.
6. It must be noted that there are areas which, as a result of environmental sensitivities, were excluded from 5 O' Clock development and this road and any of its proposed

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- alternative alignments must not begin to start new discussion to encroach on such areas.
7. The stormwater management plan must indicate all points of inlet and outlet as well as connections with the existing municipal systems (if there are any) and must comply with the standard and requirements of the City of Tshwane Roads and Stormwater Division.
 8. The Department noted with great concern that the Plan of Study for EIA is very vague owing to the view that there are studies that have been done not long ago in the area and information from such studies will be used for this activity. The Department will like to draw the EAP's attention to the fact that each activity is decided on its own merits and as such the evaluation of this activity will be done based on the information collected specifically for this activity. Should there be any deviation from this principle, kindly ensure that such information is updated and is relevant to make a decision on this activity. Further, the Department expects an EIA process to be undertaken using all accepted methods of impact assessment and not according to the subject plan of study contained in the Scoping Report submitted for this road and all relevant stakeholders must be directly consulted during all phases of the EIA process.
 9. All issues raised by interested and affected parties must be addressed during the EIA process.
 10. A detailed project and site specific Environmental Management Plan (EMP) must be compiled and included in the EIAR.

2 ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) - (In Line with Section 32 (2) (a) (i) & (ii))

The new Environmental Regulations require that relevant details of the Environmental Assessment Practitioner be included as part of the EIA Report. In this regard, attached as **Annexure E**, is a copy of the CV of the EAP for this project, Ms. Lizelle Gregory from Bokamoso Landscape Architects and Environmental Consultants CC. 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 18 years' experience in the following fields:
 - Environmental Planning and Management;
 - Compilation of Environmental Impact Assessments;
 - Landscape Architecture; and
 - Landscape Contracting

Ms. L. Gregory also lectured at the Technicon of South Africa and the University of Pretoria. She is a registered member of the South African Council of the Landscape Architects Profession (SACLAP), the International Association of Impact Assessments (IAIA) and the Institute of Environmental Management and Assessment (IEMA).

3 SCOPE OF WORK AND APPROACH TO THE STUDY

An application form for environmental authorisation of the relevant activity as well as an Environmental Scoping Report has been submitted to Gauteng Department of Agriculture, and Rural Developments (GDARD). An investigative approach was followed and the relevant physical, social, economic and institutional environmental aspects were assessed.

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 identified the anticipated environmental aspects in an issues matrix and it also supplied a preliminary significance rating for the impacts identified. The scoping process also assessed the possible impacts of the proposed Road on the surrounding environment (including the interested and affected parties).

This document represents the EIA for the proposed Road. The EIA must be in line with Section 32 of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) and the Approved Plan of Study for EIA that was submitted as part of the Scoping Report.

The EIA takes into consideration the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity. 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 proposed activity and any feasible and reasonable alternatives were identified. In addition, 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 by the activity are included.

An identification of all legislation and guidelines that Bokamoso is currently aware of is considered in the preparation of this EIA 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/ should be undertaken. The EIA Report eventually determines whether a proposed project should receive the "go-ahead" or whether the "no-go" option should be followed. If the EAP recommends that the project receive the "go-ahead", it will (in most cases) be possible to mitigate the issues identified to more acceptable levels. Reference is also 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 (in terms of Sub-Regulation 1) are also included. Sub-Regulation 1 requires that the following information be included as part of the Public Participation Section of the EIA report:

- (i) The steps undertaken in accordance with the Plan of Study For EIA,

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- (ii) A list of persons, organisations and government organs that were registered as interested and affected parties;
 - (iii) A summary of comments received from, and a summary of issues raised by the interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments;
 - (iv) Copies of any representations, objections and comments received from the registered interested and affected parties.

The mitigation measures and guidelines that are listed in the EIA Report are also summarised in a user-friendly document named an Environmental Management Plan (EMP). An EMP is also a requirement of the EIA Process (Section 32 and 34 of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998)).

4. DESCRIPTION OF THE PROPOSED ACTIVITY

4.1. Name of Activity

The construction of a section of Olievenhoutbosch Road from **Main Road** in the west to **K54** in the east. The involved section of Olievenhoutbosch road is approximately **4 km** in extent and is actually only a widening of the involved section of Olievenhoutbosch Road. GDARD already issued an authorisation for Olievenhoutbosch Road between Main Road and the K54, but this authorisation was only for one lane in each direction. The traffic and development pressure in the area however increased significantly and therefore it will be necessary to widen Olievenhoutbosch Road to a road with at least two lanes in both directions. **Figure 3** above supplies an illustration of the 3 alignment alternatives considered for the widening of Olievenhoutbosch Road. This figure also indicated the alignment of the approved Olievenhoutbosch Road, which is currently under construction. Take note that Olievenhoutbosch Road is not a provincial road. Olievenhoutbosch Road is a local authority road, which will mainly assist with the distribution of local traffic.

4.2. Particulars of Applicant

Applicants Name: Mr. Cobus Cronje
On behalf of JR 209 Investments (Pty) Ltd

Physical Address: Witchhazel Avenue 340
Eco Court Building
Highveld
Centurion
Pretoria

Postal Address: P.O. Box 39727
Faerie Glen
0043
Tel: (012) 676 8594
Fax: 086 570 5659

Contact Person: Mr. Cobus Cronje

4.3 Background of the Route

Although this Scoping/EIA process will only be done for a section of Olievenhoutbosch Road, the proposed section of Olievenhoutbosch forms part of a larger entity to be viewed holistically in order to understand the purpose of the road. The future road network in the south-eastern section of Centurion is shown on **Figure 5**.

The main purpose of the Olievenhoutbosch alignment will be to reduce the concentration of traffic on the National Highway N1, Nelmaphius Drive and to accommodate increased traffic generated by new developments in the surrounding area (residential, commercial, industrial).

Olievenhoutbosch Road is a Metropolitan Class 3 Road that will link the Samrand Interchange on the Ben Schoeman freeway (N1) with the R21 route (Kempton Park freeway) in the east. This will eventually entail that Olievenhoutbosch Road will be a major parallel route to the National N1 route and will have five (5) access points to the N1 through existing interchanges and will distribute flows in the south-eastern section of Tshwane.

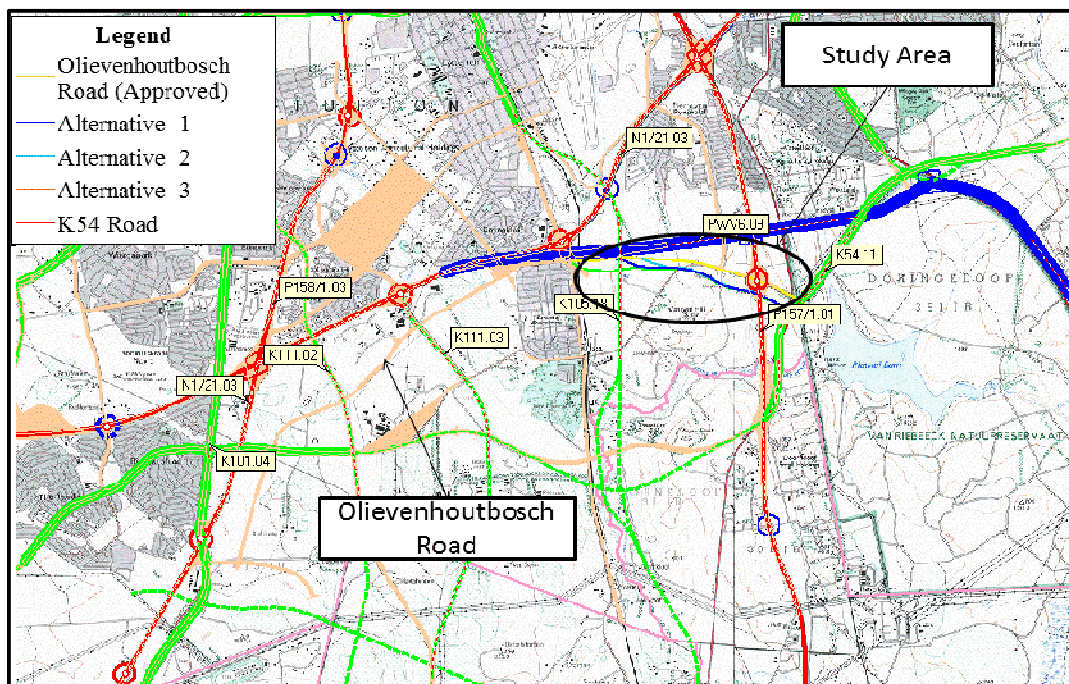


Figure 6 – Future Road Network

These access points are on the Samrand interchanges, Rooihuiskraal interchange, John Voster Drive interchange, Botha Avenue interchange and Nellmapius Avenue interchange.

This road will also be linked to several existing and proposed K-routes running through the area, namely the K101, K54, K111, K109 and K105. **(Refer to Figure 6: Future Road Network)**

4.4 Particulars of Activity

4.4.1 Nature of Activity

The proposed activity is the **Construction of a section of Olievenhoutbosch Road from Main Road in the west to the proposed Road K54 in the east.**

4.4.2 Location of Activity

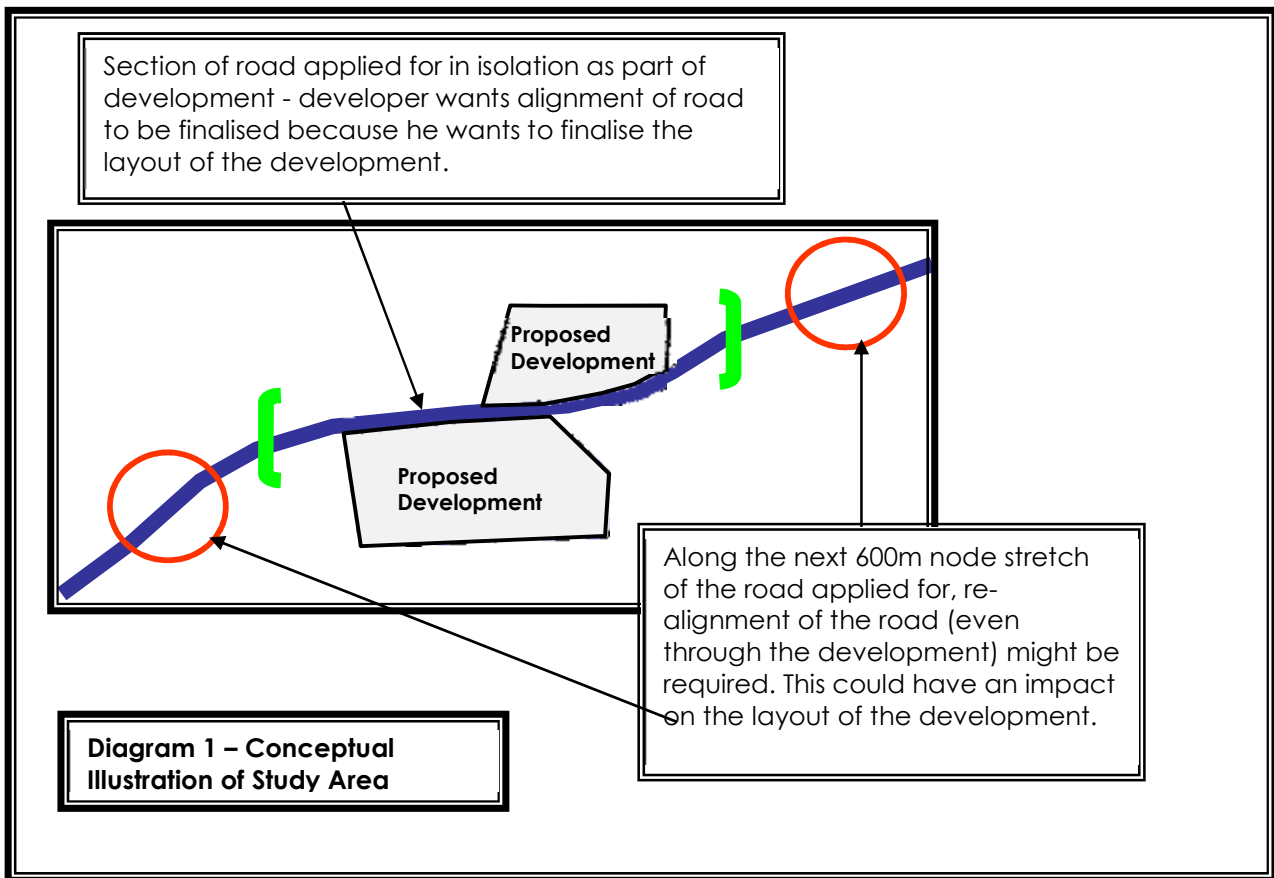
Refer to Figure 1 for Locality Map and Figure 2 for Aerial Map

The involved section of Olievenhoutbosch road lies on the boarder of quarter degree grid square 2528CC and 2528CD (Centurion) and stretches in a west-east direction from **Main Road to the proposed Road K54.**

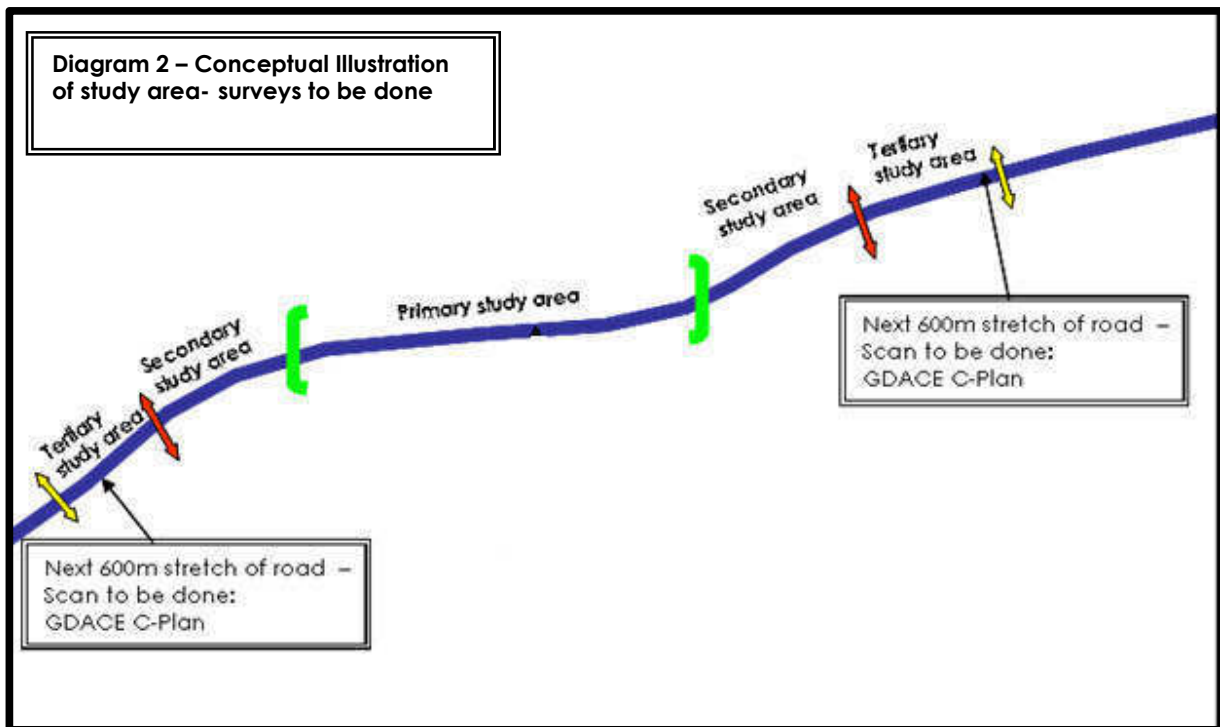
4.4.3 Delineation of the study area

The section of Olievenhoutbosch Road investigated in this EIA Report is only a small section **(approximately 4km)** of a route which forms an important link in the Gauteng Road Network system and in the local authority road network system **(refer to Figure 6).**

There were cases in the past where GDARD considered and authorised only isolated sections of local roads, K-routes and 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 Diagram 1 below for a conceptual illustration of Study Area.**



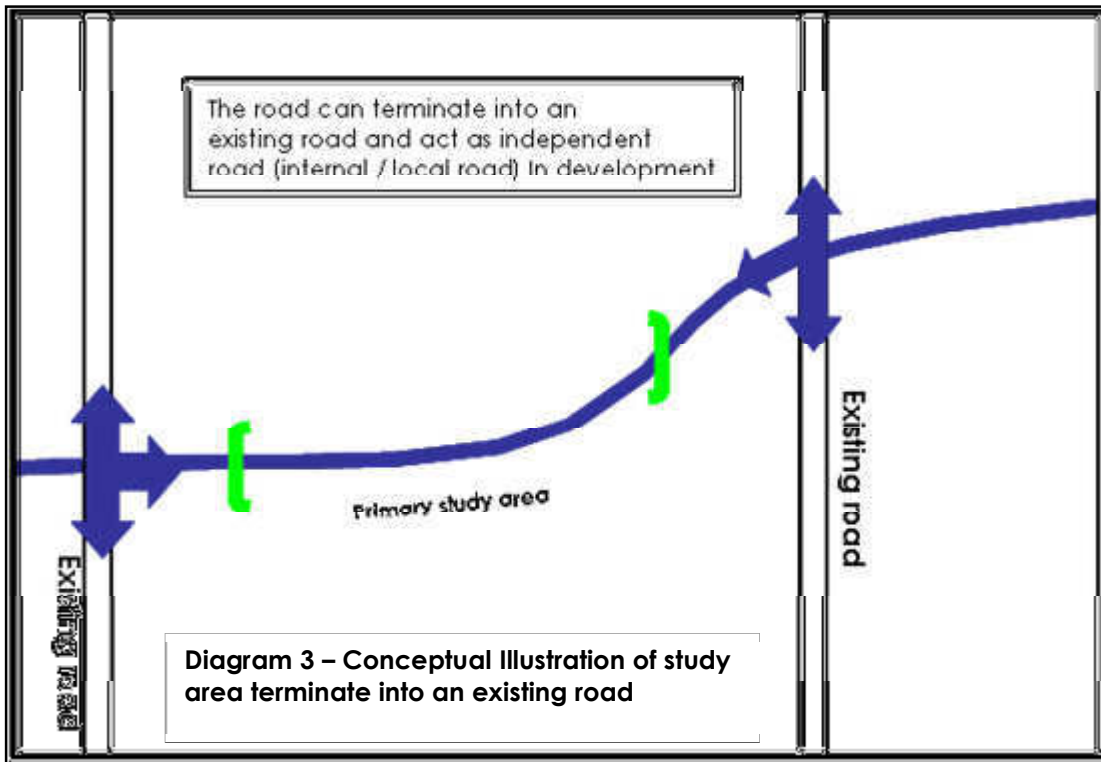
In order to prevent such cases, GDARD now requires that EAPs not only limit their environmental assessments to the portion of a road applied for, but that they also extend their investigations to incorporate a longer section of the road (to both sides of the involved portion of the road). This will allow 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 Diagrams 2 and 3** for conceptual illustrations.

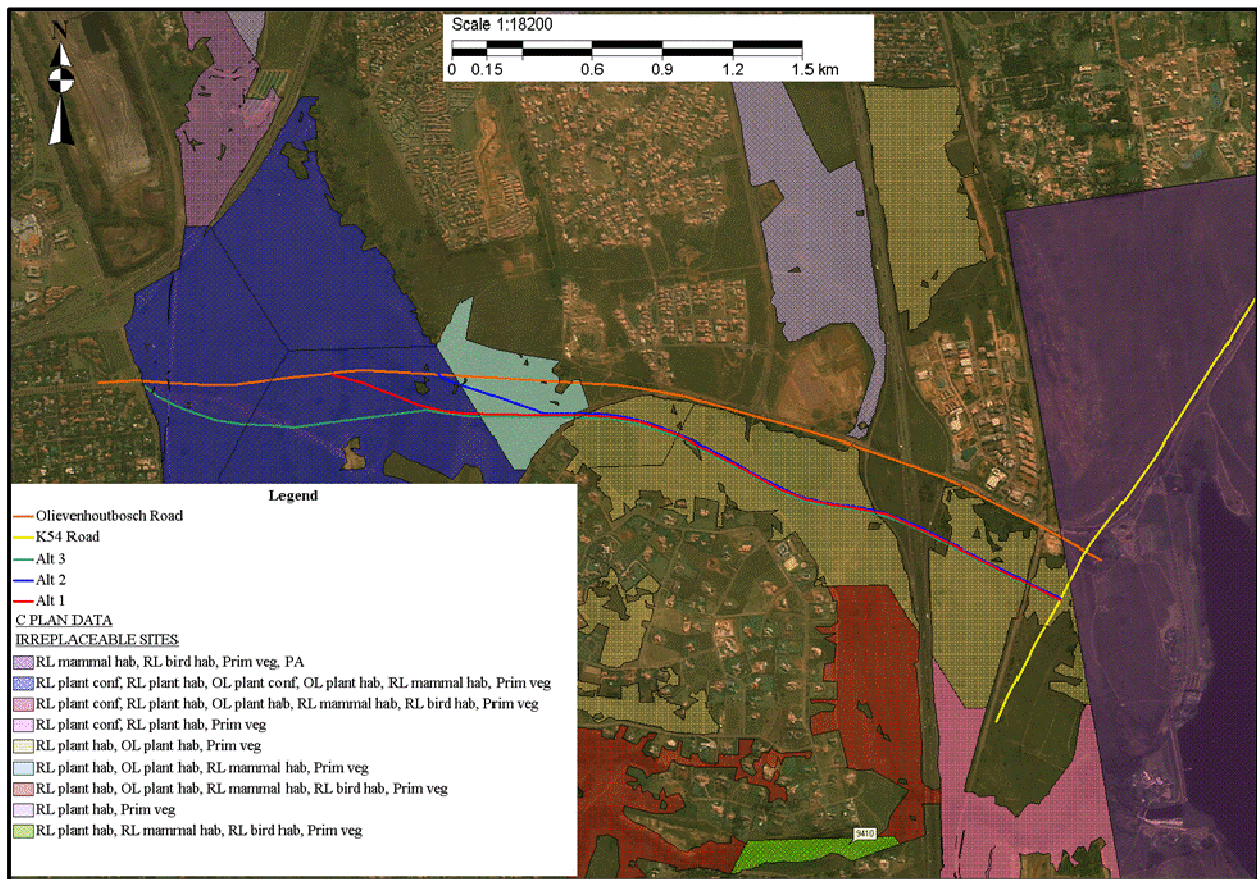


According to a traffic engineer an acceptable distance which would allow for an amendment in the alignment is 600m from a node (distance from one intersection to the next potential intersection).

In the case of this application the EAPs investigated the 600m node extensions of the involved section of Olievenhoutbosch Road and identified **irreplaceable sites to the east** of the involved section of the route that could result in a “fatal flaw” (**refer to Figure 7**).

However, Olievenhoutbosch Road terminates onto the proposed K54 as indicated on **Figure 6** and therefore the presence of irreplaceable sites on the eastern extension is not regarded as a fatal flaw.





**Figure 7 – Irreplaceable Sites Map
GDARD C Plan 3**

4.4.4 The role of Olievenhoutbosch Road in the in the Gauteng Road Network and the importance of the proposed road for the City of Tshwane.

Refer to Figure 7 for locality of the proposed Olievenhoutbosch Road 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;

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- Increased car ownership;
 - 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 overall objectives of the Gautrans road network are to provide mobility and access in the Gauteng province. Even though Olievenhoutbosch Road is a local road it plays an important role in achieving mobility and access objectives of the local authority and the Gauteng Department of Roads and Transport (GDRT). In a regional context, Olievenhoutbosch Road provides west-east mobility through the eastern parts of Centurion and Irene. On a local scale Olievenhoutbosch Road also distributes traffic from the N1-R21 to areas such as Irene, Pierre van Ryneveld, Doringkloof, Lyttelton and Kloofsig. It also provides additional access to the Centurion CBD and the Gautrain Station via River Road / Lenchen Avenue.

A further function of the road is to open the land adjacent to it for development.

With the tremendous increase in population and employment opportunities in these areas, traffic volumes between Centurion and Kempton Park will increase significantly within the next few decades. It is important that the planned routes between these two areas should be preserved to ensure sufficient linkage. Olievenhoutbosch Road as one of these planned routes plays an essential role in the establishment of the linkage.

4.4.5 The Need For Olievenhoutbosch Road

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 play a supporting role to the R21 Albertina Sisulu Freeway to the east. It would also provide local accessibility by means of well-spaced intersections with minor arterials and collector roads and in a few instances give direct access to minor tracts of land.

In the south it comes from the SAMRAND light industrial and business area situated on the west of the N1. Then it moves through a massive concentration of warehouses that constitutes a distribution point of commercial goods on a provincial scale. Moving northwards there are manufacturing, transport and commercial orientated land uses located between the spine road and the N1. There are also huge residential estates being developed just east of it. The area north of the K54's crossing of the N1 is the Eco-Park development. Further to the east of the K109's crossing of the N1 the nearly fully developed Highveld Technopark is situated as well as a Denel weapons manufacturing plant. The Highveld residential precinct is also situated within this district. Moving the intersection of the R21 more commercial/office orientated uses can be found.

Apart from serving an important west-east mobility function, Olievenhoutbosch road will also provide additional regional access towards the Gautrain station in West Street. The proposed road also runs through a newly approved development node namely Irene x 89, 90, 91 and 92 and this road will not only accommodate traffic generated by these developments, but it will also increase the accessibility of these townships.

4.4.6 Intersecting roads

The involved section of Olievenhoutbosch Road intersects with other important routes including the N1 – R21 Freeway, Nellmapius Drive, proposed PWV 6, K105 and K54 as well as the Pretoria- Germiston railway line.

End Points and Length

Olievenhoutbosch Road to be constructed is proposed to be from Main Road in the west to the K54 in the east. The involved section of the proposed Road is approximately **4km** in extent.

4.4.7 Design Standards Of The Proposed Route

Design Speed

Vela VKE Engineers stated that the road design is for a class 3 road with a design speed of 80 -100 km/h.

Road Reserve Width

The involved Engineers propose that Olievenhoutbosch Road be developed as a one-way couplet. The eastbound leg of the one-way couplet adjacent to the Irene x91 township will follow the alignment of the existing Nellmapius Drive. The westbound leg of the one-way couplet passes through the Irene x91 Irene Township inside a 40m road reserve. The required road reserve widths for the two legs of the one-way couplet must be confirmed by the City of Tshwane.

Cross section

For the first phase the road will only consist of one lane. At a later stage an additional lane will be added if needed. As previously mentioned, this lane will only direct traffic from east to west, and the approved Olievenhoutbosch road will direct traffic west to east.

4.4 Basic Road Planning Phases

- **History of the Road**

In approximately the 1970s Olievenhoutbosch Road was actually planned as a freeway that will run parallel to the N1 Freeway. It was predicted that the N1 Freeway will become very congested and that it will eventually be necessary to construct a freeway that runs parallel to the N1 freeway.

It was confirmed during a meeting at the local authority that this second parallel freeway will never be constructed but that this "freeway" alignment has however been protected throughout the years and eventually became the alignment of a major local road namely Olievenhoutbosch Road. The section of Olievenhoutbosch Road from John Vorster Avenue to Main road had already been constructed and is already very busy. Some road works in between Jean Avenue and Main Road are still taking place.

It is however not yet possible to drive via Olievenhoutbosch Road from John Vorster Road in the south-west to the R21 in the east, because the road currently terminates at Main Road. At main road you must turn towards the south and then turn towards the east into Nelmaphius Road to reach the R21. As already mentioned Nelmaphius Road is very congested and will not be able to carry any additional traffic. As mentioned, the section of Olievenhoutbosch Road between Main Road and Nelmaphius Road had already been approved and construction for this phase already commenced, but this first and scaled down phase of the road will not be sufficient to accommodate the traffic to be generated by all the existing and future developments in the area.

It will also be necessary to implement that 2nd phase of this important route on an urgent basis and this EIA Report represents the application for the 2nd Phase/ widening of the section of Olievenhoutbosch Road between Main Road in the west and Road K54 in the east (just to the east of the R21 Freeway).

The involved section of the proposed Olievenhoutbosch Road is now at Detail Design stage and the engineering drawings for the road are attached hereto as **Annexure N. Also refer to Figures 3 and 4 for road alignment through the new Irene x 89, 90, 91 and 92 townships.**

5. ALTERNATIVES IDENTIFIED [Regulation 29(b)]

5.1 The “No-Go” Alternative

The proposed Olievenhoutbosch Drive runs parallel to the N1 freeway and is completely surrounded by township/ urban development. As mentioned, the road reserve of Olievenhoutbosch Road was actually protected for a new freeway that was supposed to be developed parallel to the N1 freeway. The land allocated for the freeway was never developed and it became the preferred alignment alternative for a much needed Class 3 local road in the area.

Deviation from the road alignment as proposed will have more significant social and economical impacts and the exclusion of this road from the local and provincial road network system will cause severe traffic congestion on other roads (i.e. Nelmapius Road, Main Road and John Vorster Avenue).

Also take note that this application is only for the widening of a section of Olievenhoutbosch Road between Main Road and the K54, which is already under construction. If approved, the construction phase for the widening of the road will be incorporated as part of the current construction works and it will eventually save costs on construction camp establishment, the erection of fences and the rehabilitation works to be done after the completion of the construction works. It will furthermore prevent a rehabilitated area from being disturbed again (after the second phase has been approved).

The “No-Go” alternative is therefore not considered as a viable alternative from a road planning point of view.

From an environmental point of view the impact of the construction and operational phase of the involved section of Olievenhoutbosch Road can be mitigated to acceptable levels and is not regarded as significant. According to GDARD C-Plan 3, the study area is regarded as **ecologically sensitive. Refer to Figure 7, Irreplaceable Sites map.**

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

Diagram 4: Environmental issues - “No-Go” Option


Issue	Short term	Medium term	Long Term	Impact
Geology and soils				Positive
				Neutral
				Negative
The construction works for the first phase of this road already commenced on the same study area and some areas are already exposed. The inclusion of the construction of the second phase of the road will add to the areas to be exposed, but the impact will not be significantly higher than the existing impacts.				
Hydrology				Positive
				Neutral
				Negative
The existing construction works for the first phase of the road and the township development already had an impact on the hydrology of the study area. Take note that the study area is not affected by any wetlands or watercourses. The proposed road will furthermore not be constructed below the 1:100 year flood line. The only impact on the hydrology will be impacts caused by insufficient storm water management during the construction phase. If the road construction for phase 1 is completed, the area will most probably be rehabilitated and permanent storm water management measures will be implemented.				
If the second phase is only implemented years after the completion of the construction for the 1 st phase of the road, such additional construction works will again cause impacts on the hydrology, geology, fauna and flora and it will again require rehabilitation measures and the implementation of new storm water management measures. It only makes more sense to complete all the construction works whilst the construction for the 1 st phase is still taking place.				
The “No-Go” option is not regarded as a long terms option, because this upgraded road is essential for the longer term traffic flow in the area. If this road is not constructed, it will have significant socio-economical impacts.				
Vegetation				Positive
				Neutral

	Negative
<p>If no development takes place around the linear strip of land earmarked for the involved section of Olievenhoutbosch Drive, the impacts on the vegetation will not be significant. If developments take place around the linear strip of land earmarked for Olievenhoutbosch Drive (i.e. Irene X 70 & 71 development (5 'O Clock Site)), the edge effects could, in the long term, have an impact on the ecological potential and bio-diversity of the vegetation of the study area.</p> <p>If the second phase is only implemented years after the completion of the construction for the 1st phase of the road, such additional construction works will again cause impacts on the hydrology, geology, fauna and flora and it will again require rehabilitation measures and the implementation of new storm water management measures. It only makes more sense to complete all the construction works whilst the construction for the 1st phase is still taking place.</p> <p>The "No-Go" option is not regarded as a long terms option, because this upgraded road is essential for the longer term traffic flow in the area. If this road is not constructed, it will have significant socio-economical impacts.</p>	
Fauna	Positive
	Neutral
	Negative
<p>If no development takes place around the linear strip of land earmarked for the involved section of Olievenhoutbosch Drive, the impacts on the fauna and flora and bio-diversity will not be significant. If developments take place around the linear strip of land earmarked for Olievenhoutbosch Drive (i.e. Irene X 70 & 71 development (5 'O Clock Site)), the edge effects could, in the long term, have an impact on the ecological potential and bio-diversity of the vegetation of the study area. fauna in this area.</p> <p>If the second phase is only implemented years after the completion of the construction for the 1st phase of the road, such additional construction works will again cause impacts on the hydrology, geology, fauna and flora and it will again require rehabilitation measures and the implementation of new storm water management measures. It only makes more sense to complete all the construction works whilst the construction for the 1st phase is still taking place.</p> <p>The "No-Go" option is not regarded as a long terms option, because this upgraded road is essential for the longer term traffic flow in the area. If this road is not constructed, it will have significant socio-economical impacts.</p>	
Social	Positive
	Neutral
	Negative
<p>The No-Go alternative is not viable from a road planning traffic point of view. Traffic congestion will only increase in the area, because many new development have already been approved in this quadrant of Centurion. Olievenhoutbosch Road forms a very important local link road and it was planned to accommodate more than 1 lane in both directions. As already mentioned, former prediction regarded this parallel road as extremely important and in the original road planning maps it was indicated as a freeway parallel to the N1.</p>	
Economic	Positive
	Neutral
	Negative
<p>If only the first phase of the road is constructed, the road will not be able to accommodate the traffic that will be generated in the longer terms. This could have negative economical impacts, because business owners don't want to open businesses in areas with severe traffic congestion and potential clients prefer to visit facilities that are accessible and visible.</p>	

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

Diagram 5: Environmental issues of the proposed section of Olievenhoutbosch Drive

Issue	Short term	Medium term	Long Term	Impact
Geology and soils				Positive
				Neutral
				Negative
<p>In the short term (the construction phase), the proposed Olievenhoutbosch Drive will have a negative impact on the geology and soils of the study area. It is, however possible to mitigate the impacts to acceptable levels. If well planned, the long term impacts on the geology and soils will be neutral or even positive.</p>				
Hydrology				Positive
				Neutral
				Negative
<p>In the short term (the construction phase), the proposed Olievenhoutbosch Drive will have a negative impact the hydrology of the study area. It is, however possible to mitigate the impacts to acceptable levels. If well planned, the long term impacts on the hydrology will be neutral or even positive.</p> <p>Effective temporary and permanent storm water management and guidelines to reduce impacts on the water courses as well as a dolomite risk management plan will have to be implemented during all the development phases</p>				
Vegetation				Positive
				Neutral
				Negative
<p>The proposed Olievenhoutbosch Drive will have a negative impact on the vegetation of the study area in the short and medium term. The natural grassland vegetation will be permanently lost, but the proposed vegetative coverage of the road reserves could be natural vegetation that will create habitats for fauna species adaptable to the urban environment. In the long term the vegetative coverage will also prevent erosion, siltation and water pollution. It will also assist with softening of the road reserves and the screening of the road at strategic points.</p>				
Fauna				Positive
				Neutral
				Negative
<p>The proposed Olievenhoutbosch Drive will have a negative impact on the vegetation and fauna and bio-diversity of the study area in the short and medium term. The natural grassland vegetation will be permanently lost, but the proposed vegetative coverage of the road reserves could be natural vegetation that will create habitats for fauna species adaptable to the urban environment. In the long term the vegetative coverage will also prevent erosion, siltation and water pollution. It will also assist with softening of the road reserves and the screening of the road at strategic points.</p>				
Social				Positive
				Neutral
				Negative

<p>From a social, institutional and economical point of view, the implementation of the proposed Olievenhoutbosch Drive could have significant positive impacts. However, the proposed road could have an impact on the Sense of Place of the Irene area.</p> <p>The construction phase could cause some social impacts during the construction phase, but in the long term the surrounding community and the larger region will benefit from the road. The construction of the road will create some temporary job opportunities.</p>	
Economic	<p style="text-align: right;">Positive</p>  <p style="text-align: right;">Neutral</p> <p style="text-align: right;">Negative</p>
<p>From an economical point of view, the implementation of the proposed Olievenhoutbosch Drive could have a neutral impact. However, the proposed road could have an impact on the Sense of Place of the Irene area.</p> <p>The construction of the road will create some temporary job opportunities which will benefit the community.</p>	

Note: From the preliminary information it is anticipated that the bio-physical impacts associated with the proposed section of Olievenhoutbosch Drive are predominantly negative in the short term, but turns neutral and positive in the medium term and long term. It is however anticipated that the socio-economic issues will be positive from the short term to the long term.

5.2 Alignment Alternatives

Refer to Figure 8 for Alternative Alignments

Three alternative routes for the involved section Olievenhoutbosch road were investigated.

Alternative 1: Deviates secondly towards the north of the existing Olievenhoutbosch Road.

Alternative 2: Deviated first towards the north to join the existing Olievenhoutbosch Road.

Alternative 3: Only joins the existing Olievenhoutbosch Road at the intersection with Main road.

The approved Olievenhoutbosch road that is being constructed stretches from the Main road in the west and connects to Nellmapius Drive in the east. The alternatives in **Figure 7** will direct traffic from the east to west and the approved Olievenhoutbosch Road will let traffic flow from west to east.

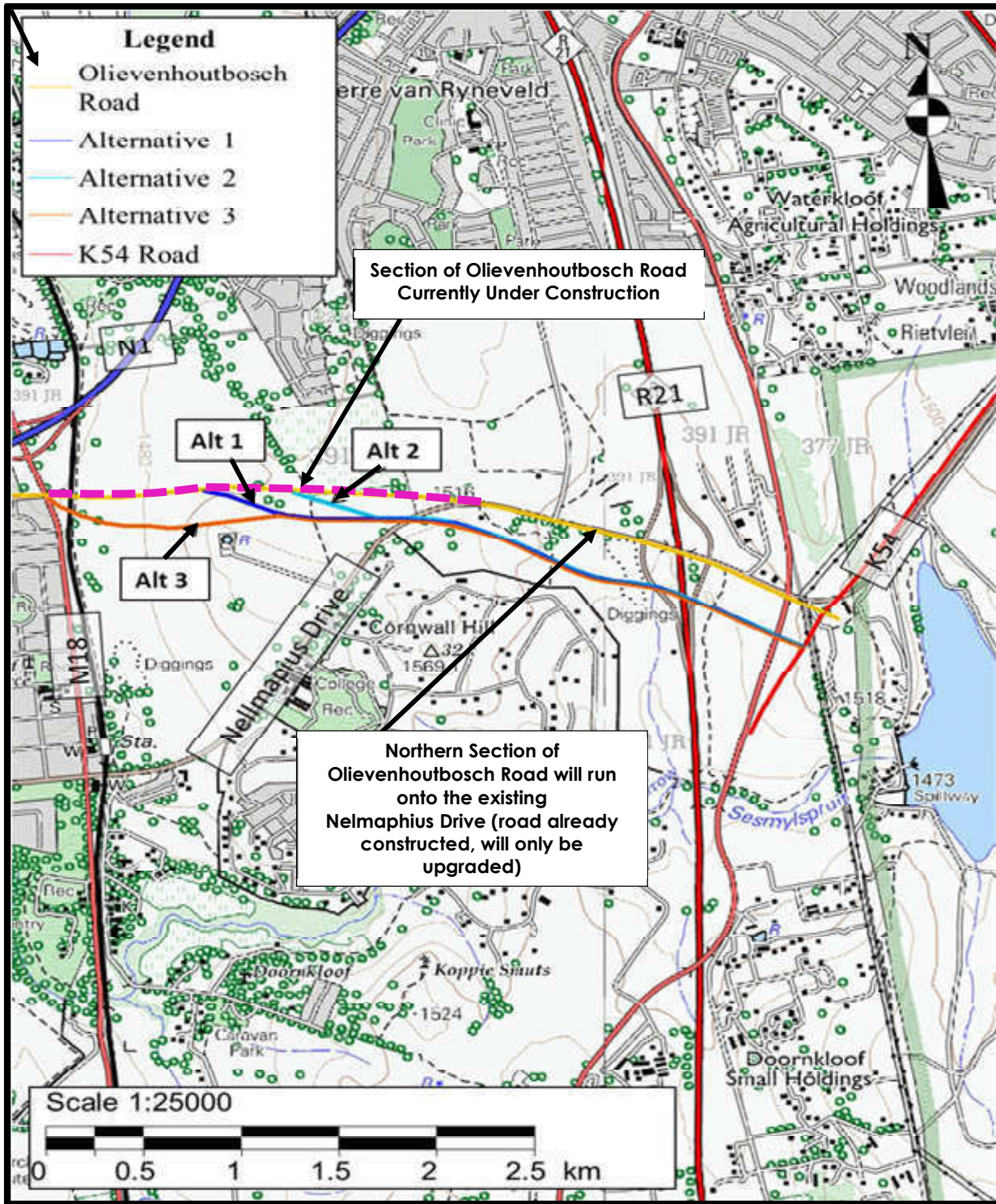


Figure 8a: Alignment Alternatives on 1:50 000 map

Alternative 1: This alternative will deviate from the approved Phase 1 alignment just after the railway line. It will however have a more significant impact on the bio-physical environment than alternative 2. A large section of this alignment will traverse an irreplaceable site.

Alternative 1 however follows the alignment of a proposed road in the approved township of **Irene x92, Irene x91 and Irene x89.**

Finding:

This alignment has a more significant impact on the bio-physical environment than Alternative 2. It will however have lower bio-physical and economical impacts than Alternative 3.

Alternative 2: This alternative deviates from the approved Olievenhoutbosch alignment just before it intersects with Nelmaphius Drive. This alignment alternative will have the lowest economical and ecological impacts and the eastern section of the alignment runs through a township, which already received a positive decision from GDARD. This eastern alignment was already indicated on the township layouts that formed part of the EIA applications for such townships (Irene x 89 and 91).

Finding:

This alignment alternative is regarded as the preferred alternative from a social, economical, bio-physical and institutional point of view.

Alternative 3: The entire length of this alternative runs parallel to the approved section of Olievenhoutbosch Road (Between main Road and Nelmaphius Road). The western section of the road is however not regarded as the preferred alternative, because it will require a double bridge across the railway line and the ecological impacts on the sensitive western

portion of the study area will also be significant, because a much wider area will be disturbed and the area will also (in the long term) be affected by additional edge effects.

Finding:

This alignment alternative will be the most expensive to construct and it will have to most significant impacts on the geology, flora and sensitive habitats.

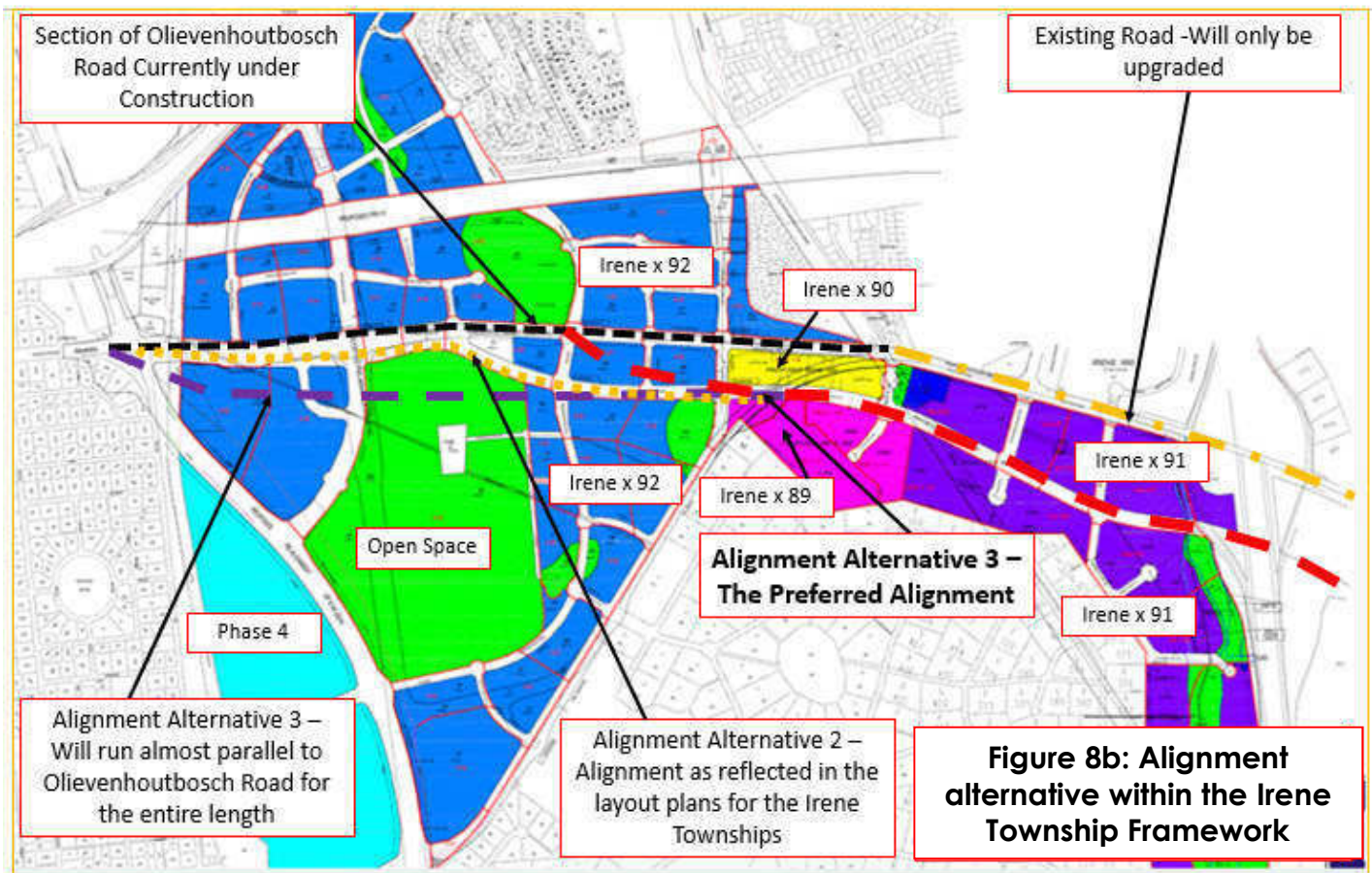


Figure 8b: Alignment alternative within the Irene Township Framework

6. THE DESCRIPTION OF THE BIOPHYSICAL AND SOCIO-ECONOMICAL ENVIRONMENTS – (In line with Section 32 (d))

6.1. THE PHYSICAL ENVIRONMENT

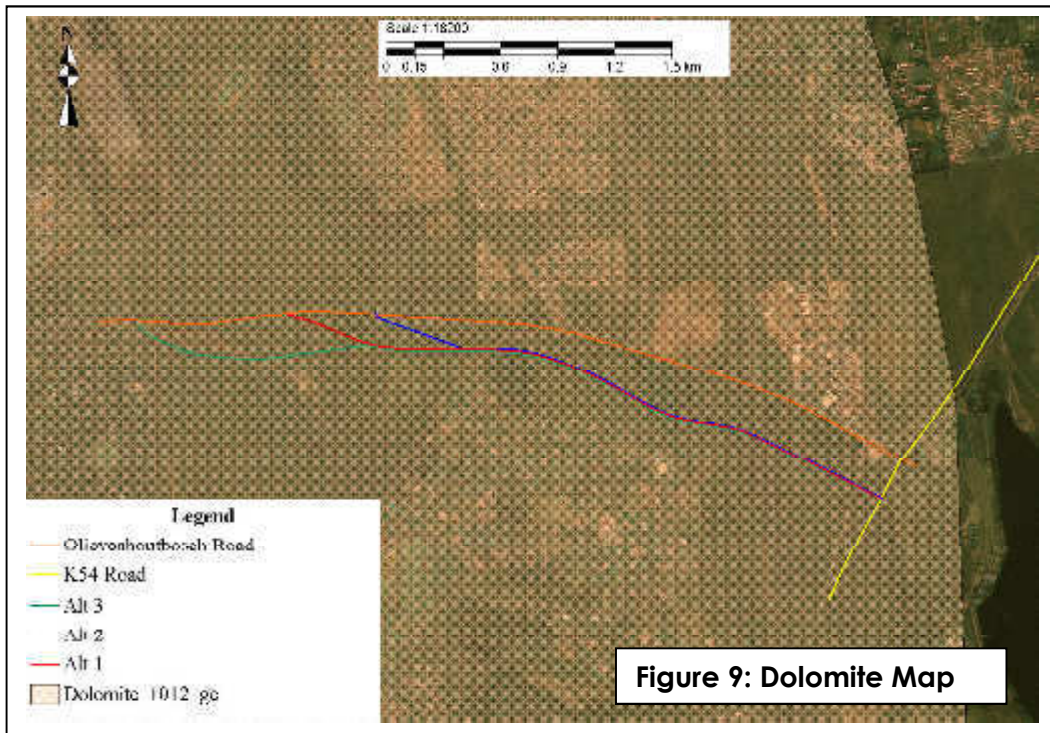
This section briefly describes the biophysical and socio-economical environments. It also lists the anticipated adverse and beneficial impacts of the proposed development on the environment. Where possible, mitigation measures were supplied for the adverse impacts and the significance of the impacts listed was also indicated in specific impact tables. In some cases the impacts have already (during the planning phase) been addressed to such an extent that it was not regarded as necessary to carry the impacts over to the significance rating section of the report.

Although it was not necessary to mitigate the positive impacts listed in the impacts tables, the positive impacts identified in this section of the report will also automatically be carried over to the significance rating section of the report to indicate the specific benefits associated with the proposed development. This will also make it possible to compare the severity of the adverse impacts with the advantages of the beneficial impacts and to eventually make an informed decision regarding the proposed development.

The following section incorporates the most important information supplied by specialist studies and reports.

6.1.1. Geology and Soils

Due to the fact that the study area is underlain by dolomite, some geological constraints are expected (**refer to Figure 9: Dolomite Map**).



A large part of the proposed road falls within an area with, rocky outcrops with limiting soils depth, and to the east there is a small area which consists of Limiting soil depth and high clay content. **(Refer to Figure 10 Soils Map)**

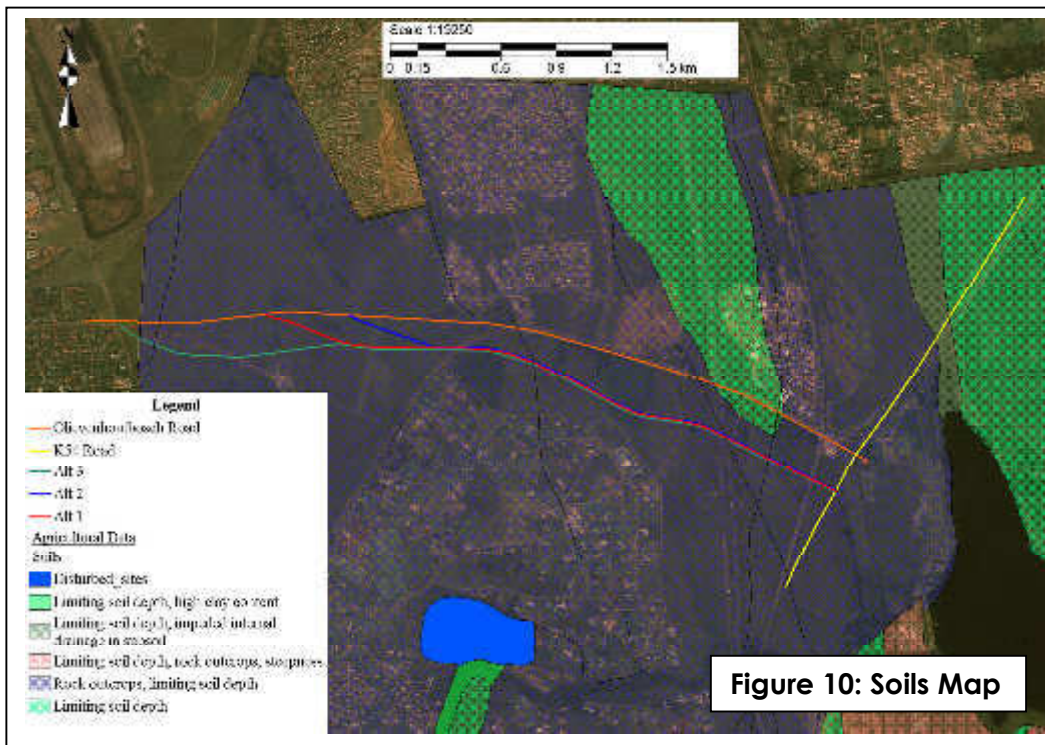


Table 6: Issues and Impacts – Geology and Soils

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact - Not Necessary To Mitigate ⚙️
1)	Risk for formation of sinkholes and dolines	-	🟡
2)	Stability of road and structures	-	🟡
3)	Excavatability problems are foreseen and some blasting exercises may be required	-	🟢
4)	Potential damage to metallic elements placed underground due to corrosive soils in dolomitic areas	-	🟢
5)	Erosion	-	🟡
6)	Stockpile areas for construction materials and topsoil	-	🟡

6.1.1.a Discussion of issues identified, possible mitigation measures and significance of issue after mitigation – geology and soils

1) Risk for formation of sinkholes and dolines

The entire route, approximately **4Km**, is underlain by dolomite and the development of sinkholes and dolines are possible if poor water management takes place. Where the blanket cover is removed during road construction and changes in the ground and surface water regime occur, the potential risk for the development of sinkholes and dolines is increased.

Table 7: Significance of Issue 1 (Risk for formation of sinkholes and dolines) After Mitigation

Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ⚙️	Mitigation	Significance of Issue after mitigation
	Already achieved ✓ Must be implemented during P lanning phase, C onstruction and/ or O perational phase P / C / O Mitigation	Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP

<p>Medium ☺</p>	<p>P & C – The NHBRC precautionary measures for development in dolomitic areas must be implemented.</p> <p>P, C & O – Stormwater management is extremely important and must be designed to prevent the concentrated ingress and ponding of water.</p> <p>P, C & O –The road should preferably be at ground level to facilitate drainage i.e. the natural drainage paths should not be disturbed and the road should be used to facilitate storm water drainage.</p> <p>P, C & O – Wet surfaces such as water supply lines must preferably not run close to (within 10m) along the road. Where such a service crosses the road alignment, all due care should be taken to ensure that the pipe does not leak.</p> <p>O - A monitoring plan must form part of the general maintenance plan for the road and allowance must be made for stability problems to be addressed immediately.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p>
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Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

2) Stability of road and structures

Transported collapsible material covers much of the area and colluvium and residual material on the dolomitic areas may also be collapsible.

Table 8: Significance of Issue 2 (Stability of structures) After Mitigation

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ⚡</p>	<p>Mitigation Already achieved ✓ Must be implemented during Planning phase, Construction and/ or Operational phase P / C / O Mitigation</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P & C – The precautionary measures and foundation design from the involved geotechnical engineers must be implemented to ensure the stability of structures and embankments.</p> <p>P & C – The dolomite stability along the route must be determined.</p> <p>P & C – More detailed foundation investigations should be conducted for structures such as bridges and culverts.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

3) Excavatability problems are foreseen and some blasting exercises may be required

Excavation problems are expected on the areas underlain by quartzite and andesite and blasting may be required for deep excavations.

Table 9: Significance of Issue 3 (Excavatability problems are foreseen and some blasting exercises may be required) After Mitigation

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ⚡</p>	<p>Mitigation Already achieved ✓ Must be implemented during</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E</p>
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	<p>Planning phase, Construction and/ or Operational phase P / C / O Mitigation</p>	<p>Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High ☺</p>	<p>C – Surrounding residents must be informed of blasting exercises at least one week in advance.</p> <p>C – Blasting operations should be carefully controlled and the necessary safety precautions must be implemented.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

4) Corrosive nature of the soils

Potential damage to metallic elements placed underground due to corrosive soils in dolomitic areas.

Table 10: Significance of Issue 4 (Corrosive nature of the soils) After Mitigation

<p>Mitigation Possibilities High ☺ Medium ☹ Low ☒ Positive Impact/ Neutral - Not Necessary To Mitigate ☼</p>	<p>Mitigation Already achieved ✓ Must be implemented during Planning phase, Construction and/ or Operational phase P / C / O Mitigation</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High ☺</p>	<p>P & C – All metallic elements used must be galvanised or protected by other anti-corrosive methods.</p>	<p>L - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

5) Erosion

Unnecessary clearing of vegetation could lead to exposed soils prone to erosive conditions. Insufficient soil coverage after placing of topsoil, especially during construction where large surface areas are applicable could also cause erosion. To cause the loss of soil by erosion is an offence under the Soil Conservation Act (Act No 76 of 1969). The management of surface water run-off during construction is very important to prevent soil erosion on the site. If construction takes place during the rainy season, sufficient storm water management will be required to manage water runoff.

Table 11: Significance of Issue 5 (Erosion) After Mitigation

Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ⚡	Mitigation Already achieved ✓ Must be implemented during Planning phase, Construction and/ or Operational phase P / C / O Mitigation	Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP
Medium 🟡	<p>P & C – A storm water management plan must be compiled for the construction and operational phases of the proposed road.</p> <p>P & C – Cut-off drains should be excavated up- and down-hill of denuded areas to reduce run-off across these areas.</p> <p>P & C – Large exposed areas during the construction phases should be limited. Where possible areas earmarked for construction during later phases should remain covered with vegetation coverage until the actual construction phase. This will prevent unnecessary erosion and siltation in these areas.</p>	<p>H - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

	<p>P & C - Rehabilitate exposed areas immediately after construction in these areas is completed (not at the end of the project).</p> <p>P & C – Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided.</p> <p>P – Specifications for topsoil storage and replacement to ensure sufficient soil coverage as soon as possible after construction must be implemented.</p> <p>P & C – All embankments must be adequately compacted and planted with grass to stop any excessive soil erosion and scouring of the landscape.</p> <p>C – Storm water diversion measures are recommended to control peak flows during thunder storms.</p> <p>P & C – The eradication of alien vegetation should be followed up as soon as possible by replacement with indigenous vegetation to ensure quick and sufficient coverage of exposed areas.</p>	<p>L - To be included in EMP</p> <p>L - To be included in EMP</p> <p>L - To be included in EMP</p> <p>L - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p>
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Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

6) Stockpile areas for construction materials and topsoil

Designated areas for stockpiling of construction materials must be specified by the Environmental Control Officer in an area that is already disturbed. Stockpiling in the wrong

areas might be detrimental to fauna and flora and will deplete the soil quality. Topsoil should be stockpiled as specified in the EMP to ensure that the soil quality doesn't deplete and that the grass seed remain in the soil for later rehabilitation of the disturbed areas.

In addition to the impact discussed in the paragraph above, rainwater falling onto stockpiles may become polluted with dust originating from aggregate and other construction material, such as bitumen from pre-mix stockpiles. Therefore stockpiles of topsoil should be correctly covered to prevent this as well as loss of topsoil by wind erosion.

The footprint of stockpile areas will be contaminated with the stored material and will require cleaning before rehabilitation.

The study area and its surroundings are furthermore regarded as very sensitive from an ecological point of view and it is therefore also important that no topsoils be dumped in natural areas that have not been designated for the storage of materials or for the storage of topsoil and sub-soil.

Table 12: Significance of Issue 6 (Stockpile areas for construction materials and topsoil) After Mitigation

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ⚡</p>	<p>Mitigation Already achieved ✓ Must be implemented during Planning phase, Construction and/ or Operational phase P / C / O Mitigation</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>C - Remove vegetation only in designated areas for construction. C - Rehabilitation works must be done immediately after the involved works are completed C -All compacted areas should be ripped prior to them being</p>	<p>M - To be included in EMP M - To be included in EMP M - To be included in EMP</p>

	<p>rehabilitated/landscaped;</p> <p>P/C - The top layer of all areas to be excavated must be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material should be used for the rehabilitation of the site and for landscaping purposes</p> <p>C - Strip topsoil at beginning of works and store in stockpiles no more than 1,5 m high in designated materials storage area.</p> <p>C – Stockpiles should be covered correctly</p> <p>C – Identify areas for the storage of topsoil prior to the construction phase and explain the sensitivity of the study area to the contractors. Explain that the surrounding vegetation is extremely sensitive and that all materials, including topsoil and subsoil are only to be stored in designated areas.</p>	<p>M- To be included in EMP</p> <p>M- To be included in EMP</p> <p>M- To be included in EMP</p> <p>M- To be included in EMP</p>
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Result: *Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table*

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.

Table 13: Issues and Impacts – Hydrology

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact/ Neutral - Not Necessary To Mitigate 🌟
7)	Siltation, erosion and water pollution could occur in the Sesmyl Spruit and associated wetlands and systems lower down in the catchment area if a stormwater management plan is not implemented.	-	😊
8)	Groundwater pollution and contamination of the Sesmyl Spruit and associated wetlands.	-	😊
9)	Perched water conditions	-	😊
10)	Increased storm water runoff from road into surrounding natural areas	-	🟢

6.1.2.2.c Discussion of issues identified, possible mitigation measures and significance of issue after mitigation - Hydrology

7) Siltation, erosion and water pollution could occur in the Sesmyspruit and associated wetlands due to a lack of suitable storm water management measures during construction and operational phases.

If erosion, siltation and water pollution is not addressed, the sustainability of the wetlands crossed by the proposed road and the open space systems lower down in the catchment area can be negatively impacted by the development.

More impermeable surfaces will lead to an increase in the speed, quantity and quality of the storm water and erosion could be caused at discharge points of storm water.

Table 14: Significance of Issue 7 (Siltation, erosion and water pollution) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🟠 Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation Already achieved ✓ Must be implemented during Planning phase, Construction and/ or Operational phase P / C / O Mitigation</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P / C / O – The storm water design for the proposed road must be designed to:</p> <ul style="list-style-type: none"> - Reduce and/ or prevent siltation, erosion and water pollution. - Storm water runoff should not be concentrated as far as possible and sheet flow should be implemented. - The vegetation must be retained as far as possible, and rehabilitated if disturbed by construction activities to ensure that erosion 	<p>M - To be included in EMP</p>

	and siltation do not take place.	
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Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

8) Groundwater pollution and contamination of Sesmyspruit

The dolomitic formation is regarded as one of the best aquifer in South Africa and it has a very high yielding and storage capacity as well as a high recharge potential. The ground water pollution potential on the study area is regarded as high and if not planned and managed correctly, the construction and operational phases of the proposed road could cause sub-surface water pollution as discussed below.

Uncontrolled construction activities could cause run-off contaminated with silt or cement to reach the wetlands, streams and spring, leading to water contamination. Accidental spillages of diesel, oil or other hazardous substances could contaminate soil, leach into the groundwater or reach the water bodies through run-off.

The storm water management plan must be designed to:

- Reduce and/ or prevent siltation, erosion and water pollution; and
- Improve the surface and ground water quality of the study area and the lower lying areas within the catchment area.

Table 15: Significance of Issue 8 (Ground water pollution and contamination of Sesmyspruit) After Mitigation/ Addressing of the Issue

Mitigation Possibilities	Mitigation	Significance of Issue after mitigation
High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨	Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase	Low/ eliminated L / E Medium M High H

	P / C / O	Not possible to mitigate, but not regarded as a fatal flaw NP
Medium ☹️	<p>P/C/O - Compilation of a storm water management plan that will address storm water management during the construction and operational phases of the project.</p> <p>P/C – Bridges or other infrastructure to cross the stream and drainage line should be constructed first to allow the remainder of the work to be undertaken on grade and should preferably be constructed during the dry season.</p> <p>P/C – Containment of run-off from construction areas should be implemented and the streams closed off from access by construction workers.</p> <p>P/C – Cut-off drains should be trenched between the streams and the construction activities and hay bales should be stacked along the trenches where possible to contain siltation.</p> <p>P/C/O – All spillages must be cleaned up and contaminated soil removed as hazardous waste.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

9) Perched water

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

Table 16: Significance of Issue 9 (Perched water) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase P / C / O</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P/C/O - Special drainage designs will be required in mudrock areas, especially during wet seasons. P/C – Precautionary measures to prevent seepage of groundwater into excavations should be implemented.</p>	<p>M - To be included in EMP M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

10) Increased storm water run-off from the proposed road into surrounding natural areas.

The proposed road will add a large amount of hard surfaces and will also lead to the compaction of soils. The soil layers will thus become less permeable, storm water will be canalised rather than evenly spread. The quantity and speed of the storm water will increase significantly and the quality of the surface water will deteriorate, because of the lack of vegetative coverage. Erosion and siltation will also become a problem.

In order to address this issue, it will be necessary to compile a storm water management plan/ system for the proposed development.

Table 17: Significance of Issue 10 (Increased storm water run-off from the proposed road into surrounding natural areas) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase P / C / O</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High 🟢</p>	<p>P - Compilation of a storm water management plan that will address storm water management during the construction and operational phases of the project.</p> <p>P / C / O - The storm water management plan must be designed to:</p> <ul style="list-style-type: none"> • Reduce and/ or prevent siltation, erosion and water pollution. • Improve the surface and ground water quality of the study area and the lower lying areas within the catchment area; and • Ensure that no ponding of water and concentrated ingress of water take place. 	<p>M - To be included in EMP and conditions of approval</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

6.1.3 Topography

According to the GDARD C-plan version 2 the proposed route is not located on a ridge in the western and eastern areas (**refer to Figure 12, Ridges and Figure 13, Preliminary Visual Assessment**) The route slopes towards the Sesmylspruit as indicated on **Figure 11, Hydrology Map**. 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 5'o Clock Site situated to the North. **Refer to Figure 13, Visual Assessment**.

The proposed Olievenhoutbosch Road will be in line with the development planning for the area.

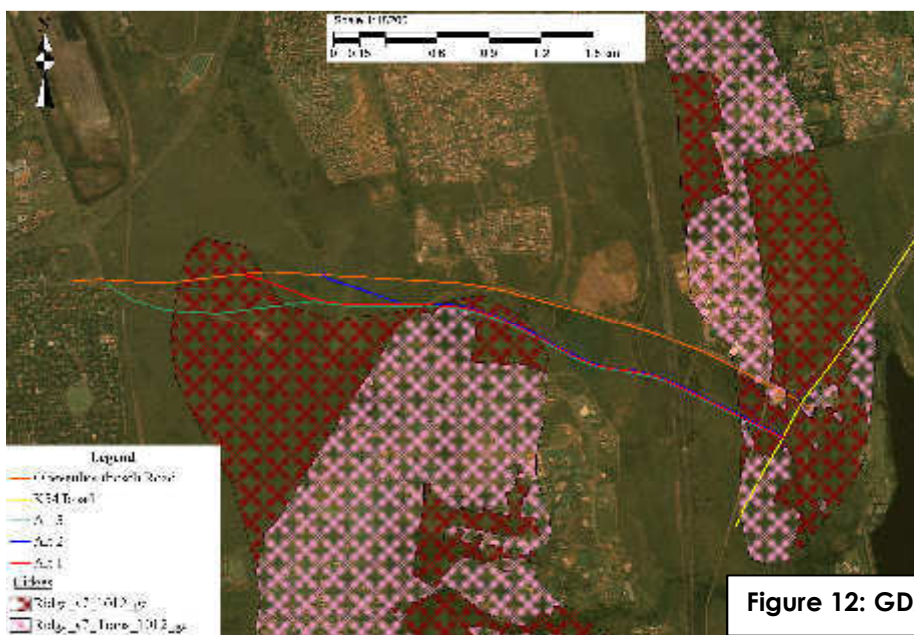


Figure 12: GDARD C-Plan Ridges Map

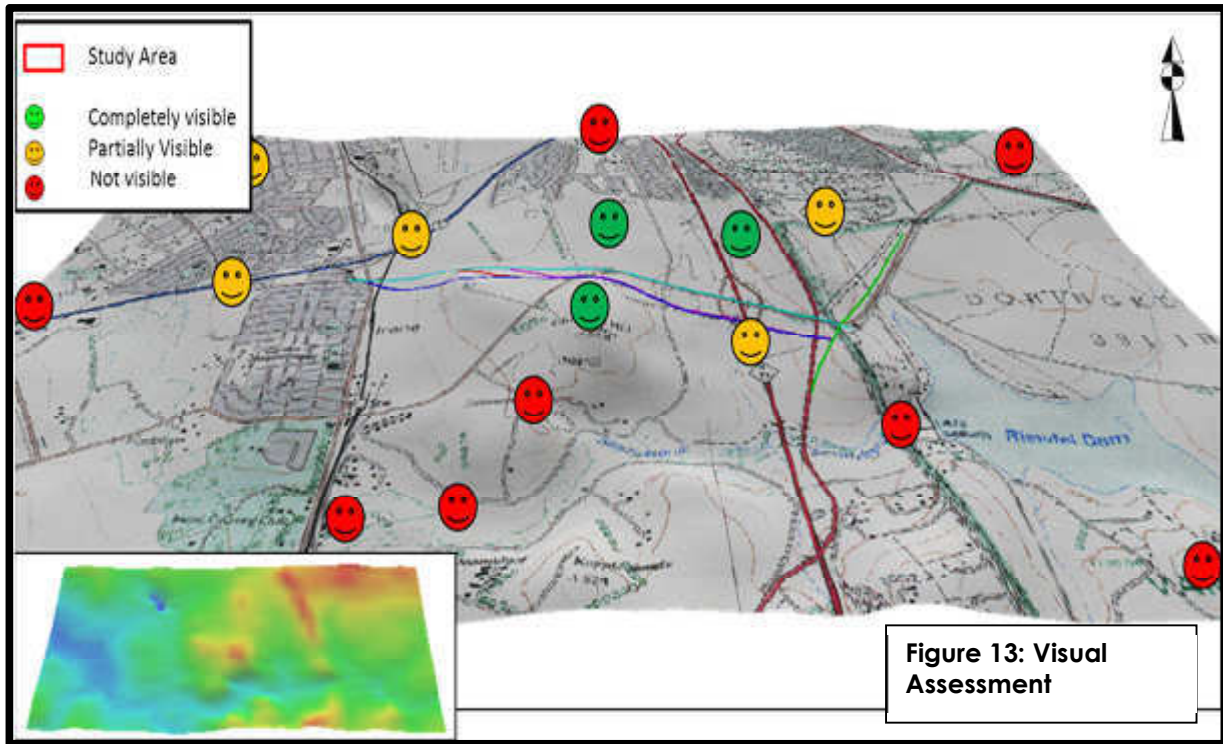


Table 18: Issues and Impacts – Topography

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 😊 Medium 😐 Low ☹️ Positive Impact - Not Necessary To Mitigate ✨
11)	Due to the topography only a section of the proposed road will be visible from the surrounding view-sheds. The proposed road will be visible from the higher lying sections of the Irene x 92, 91 and 89 study areas. The townships must however still develop and the potential buyers of properties will be aware of the proposed road that will traverse the study area.	- / + Depending on the architectural style and finishes	😊

6.1.4.a Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

11) Due to the topography only sections of the proposed road will be visible from surrounding view-sheds.

Mitigation measures to restrict/ prevent the visual impacts of the road will have to be implemented.

Table 19: Significance of Issue 11 (only sections of the proposed road will be visible from surrounding view-sheds in the Flatter Areas around the Study Area) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase P / C / O</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P/C/O - Possible mitigation measures that could be considered are the establishment of dense vegetation at strategic points to screen-off the most visible sections of the roads / construction of berms adjacent to the road/ a combination of berms with vegetation.</p>	<p>M – To be incorporated as part of the EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed assessed in the Significance Rating Table

6.1.4 Climate

The climate is typical of the Transvaal Highveld. The summers are mild to hot and the winters are 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 climatological data for the site was taken from the weather station in 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

Table 20: Issues and Impacts – Climate

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact - Not Necessary To

			Mitigate ☀
12)	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.	-	☹
13)	If dry and windy conditions occur during the construction phase, dust pollution could become a problem.	-	☹

6.1.5.a Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

12) Should the construction phase be scheduled for the summer months, frequent rain could cause very wet conditions, which makes it extremely difficult to build in and to do rehabilitation works of disturbed areas.

These 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 Sesmyspruit and associated wetlands, could (if not planned and managed correctly) have an impact on the water quality of these water bodies.

It is recommended that the construction of bridges/culverts over stream crossings be scheduled for the dry season to decrease the impact on the environment and to prevent damage to structures due to flooding.

Table 21: Significance of Issue 12 (Should the construction phase be scheduled for the summer months, frequent rain could cause very wet conditions, which makes it extremely difficult to build in and to do rehabilitation works of disturbed areas) After Mitigation/ Addressing of the Issue

Mitigation Possibilities	Mitigation	Significance of Issue after mitigation
High ☹ Medium ☹ Low ☹ Positive Impact/ Neutral - Not	Already achieved ✓ Must be implemented during	Low/ eliminated L / E

<p>Necessary To Mitigate ☀</p>	<p>planning phase, construction and/ or operational phase P / C / O</p>	<p>Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High 🟢</p>	<p>P/C – Construction workers and construction vehicles and machinery must stay out of the soggy areas during the wet periods. Barrier tape should be used to demarcate the areas that are drenched with water (especially the ecologically sensitive wetland area and the areas covered with valuable topsoil) and it should only be removed when the appointed Environmental Control Officer (ECO)/ site supervisor/ project manager/ main contractor regard the conditions in the affected areas as favourable.</p> <p>P/C – It is recommended that the construction of bridges/culverts over stream crossings be scheduled for the dry season.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed assessed in the Significance Rating Table

13) If dry and windy conditions occur during the construction phase, dust pollution could become a problem.

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.

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 north of the study area (i.e. the 5 O' clock Site) and during the winter months dust could be carried over the R21 freeway and properties to the south of the study area (i.e. the proposed Irene and Cornwall areas).

Sweeping of the construction site, clearing of builders' rubble and debris as well as the regular watering of the construction site (storage areas, roads etc.) must take place at least once a day.

Table 22: Significance of Issue 13 (Dust Pollution) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ⚙️</p>	<p>Mitigation Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase P / C / O</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High 🟢</p>	<p>P/C – Sweeping of the construction site, clearing of builders' rubble and debris as well as the regular watering of the construction site (storage areas, roads etc.) must take place at least once a day.</p>	<p>L - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed assessed in the Significance Rating Table

6.2 The Biological Environment

Biodiversity Requirements

GDARD required specialist biodiversity studies to investigate the following aspects:

- Plants, with specific reference to *Cheilanthes deltoideae*, *Brachycorythis anica*, *Habenaria mossii*, *Gnaphalium nelsonii*, *Herbenaria kraenzliniana*, *Trachyandra erythrorrhiza* and *Lithops lesliei*;
- Birds, with specific reference to *Eupodotis senegalensis*;
- Mammals, with specific reference to *Aterlerix frontalis*;
- Wetlands;
- Rivers;
- Caves, and
- Vegetation.

Refer to Annexure F for Biodiversity information received from GDARD.

Galago Environmental CC was appointed to conduct a flora, mammal, bird, reptile and amphibian survey for the involved section of Olievenhoutbosch Road (refer to Annexure G1 for the report).

6.2.1 Vegetation

The proposed route lies in the quarter degree grid cell 2528CC (Centurion) and 2528CD (Rietvlei Dam) passes through two vegetation units that Mucina and Rutherford (2006) classified as Rand Highveld Grassland (the eastern most part of the route) and Carletonville Dolomite Grassland. Small parts of this unit are conserved in statutory reserves and a few private conservation areas. Cultivation, urbanization, mining and the building of two dams already transform almost a quarter of the unit.

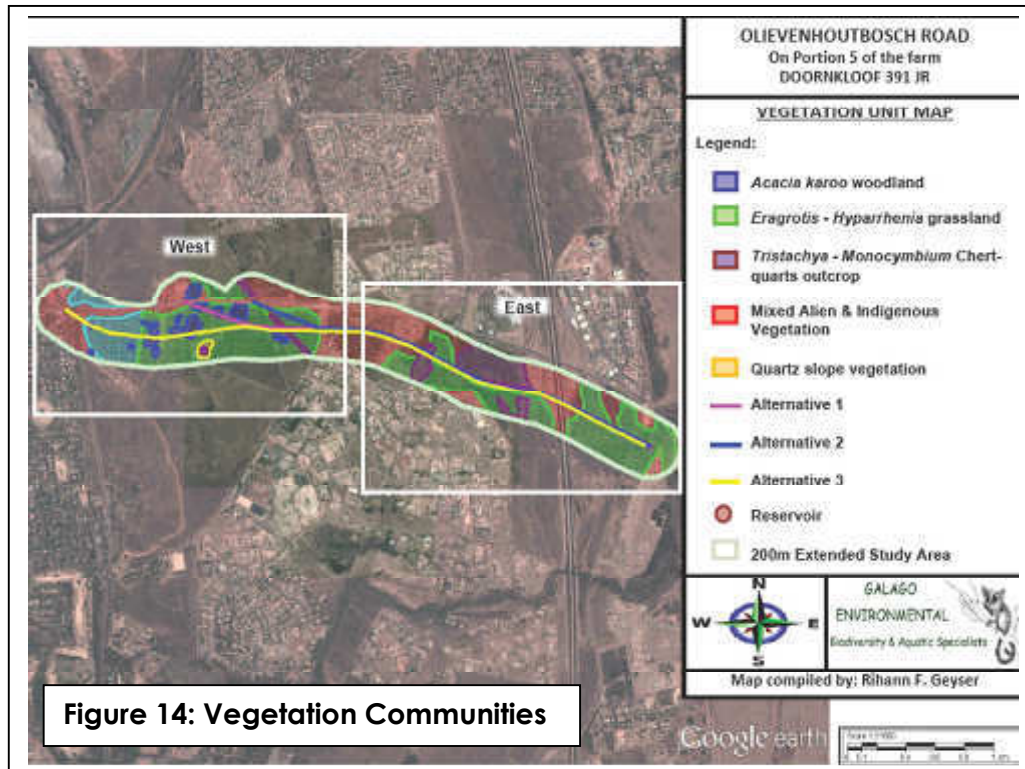
Carletonville Dolomite Grassland was described as a species-rich grassland with shallow soil and slightly undulating plains on dolomite dissected by prominent rocky chert ridges. This vegetation unit was considered vulnerable. Small parts of this unit are conserved in statutory reserves and a few private conservation areas. The conservation target of both units is 24%. Almost 50% of the Rand Highveld Grassland unit and almost a quarter of the Carletonville Dolomite Grassland have already been transformed by cultivation, plantations, mining, urbanization and dam-building.

The Rand Highveld Grassland is according to the authors 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. Typical herbs mostly belong to the Asteraceae and rocky ridges carry sparse woodlands with *Acacia caffra* and *Celtis africana* accompanied by rich suite of shrubs with the genus *Searsia* most prominent.

Both vegetation units fall within a warm-temperate summer-rainfall region with high summer temperatures and severe frequent winter frosts.

Six plant communities were identified during the vegetation survey (**refer to Figure 14**):

- *Eragrostis - Hyparrhenia* grassland;
- *Tristachya – Monocymbium* Chert;
- Mixed alien and indigenous vegetation;
- Quartz slope vegetation;
- Acacia Karroo woodland; and
- Mixed grassland on shallow dolomite.



- **Eragrostis - Hyparrhenia grassland**

Compositional aspects

According to Galago Environmental the study unit comprised dense natural grassland that straddled the R21 highway. Connectivity with natural grassland existed to the south, but was limited by various roads and the Sesmyl Spruit. Of the 239 plant species recorded along the proposed road 138 were recorded in the *Eragrostis - Hyparrhenia grassland*, 131 were indigenous species (**refer to Annexure G1, Appendix A, Section 6.6.1**).

Red – and orange-listed species

The habitat of the study unit was **suitable for two of the Red-listed plant species** known to occur in the quarter degree grid square, but none, however, founded in this study unit within 200 metres of the proposed route. A few specimens of the Orange List were found: ***Boophone disticha*, *Eucomis autumnalis* and *Hypoxis hemerocallidea*.**

Medicinal and alien species

Twenty-eight of the 43 medicinal species recorded in the vicinity of the proposed route were found in the study unit. Of the 23 alien species recorded in the vicinity of the proposed route 7 were found in this vegetation community. Of these, one species were **Category 1 Declared weeds**.

Connectivity and Sensitivity

This vegetation community was **not considered sensitive** by Galago Environmental.



Figure 15: *Eragrostis* - Hyparrhenia grassland east of the highway R21

Refer to Table 3, Appendix A, Annexure G1 for plants recorded in the *Eragrostis* - Hyparrhenia grassland

- ***Tristachya* – *Monocymbium* Chert;**

Compositional aspects

This study unit comprised natural primary grassland on outcrops of chert and quartz. Large areas of the study unit were disturbed by roadworks, especially south of Nellmapius Road. Roads and township development limited connectivity with natural grassland. Of the 239 plant species recorded along the proposed route 61 were recorded in the *Tristachya – Monocymbium Chert – Quartz* outcrop study unit. Of these, 59 were indigenous species. **(Refer to Annexure G1, Appendix A, Section 6.7.1).**

Red – and orange-listed species

According to Galago Environmental the habitat of the study unit was suitable for the Red-listed *Cheilanthes deltoidea subsp silicicola* known to occur in the quarter degree grid square. A few specimens of this species were found in the chert outcrop northwest of the endpoint of Alternative route 2. None were found in those parts of the *Tristachya – Monocymbium Chert – Quartz outcrop* study unit east and south of Nellmapius Road. The habitat is suitable for the Orange-listed *Callilepis leptophylla*, but none were found.

Medicinal and alien species

Nine medicinal species and two alien species were recorded in this study unit within 200 metres of the proposed route. Of the alien species one was a **Category 1 Declared weed**.

Connectivity and Sensitivity

The study unit was considered **sensitive** by Galago Environmental.



Figure 16: *Tristachya* – *Monocymbium* Chert south of Nellmapuis Road

Refer to Table 4, Appendix A, Annexure G1 for plants recorded in the *Tristachya* – *Monocymbium* Chert

- **Mixed alien and indigenous vegetation**

Compositional aspects

Areas along the proposed route where alien species have invaded as a result of introduced soil and areas where the ground was cleared and road construction has started were included in this study unit together with thickets of Black wattle and *Eucalyptus* sp.

The species diversity was low. Of the 239 plant species recorded, 52 were in the Mixed alien and indigenous vegetation study unit. Of these, 32 were indigenous species. **(Refer to Annexure G1, Appendix A, Section 6.8.1).**

Red – and orange-listed species

The habitat was **not suitable** for any of the Red List or Orange List species known to occur in the quarter degree grid cell.

Medicinal and alien species

Seven medicinal species were recorded in this study unit. Twenty of the 23 alien species were **Category 1 Declared weeds**, two were **Category 2 Declared invaders** and two were **Category 3 Declared invaders**.

Connectivity and Sensitivity

The study unit was not considered sensitive by Galago Environmental.

Refer to Table 5, Annexure G1 for a list of the plants recorded in the Alien and indigenous vegetation and cultivated fields.



Figure 17: Mixed alien and indigenous vegetation

- **Quartz slope vegetation**

Compositional aspects

The study unit comprised a quartz koppie with a large water reservoir in its centre. Access and service roads for the reservoir disturbed the natural vegetation. Connectivity with natural grassland existed in all directions.

Of the 239 plant species recorded, 34 were in the Quartz slope vegetation study unit. Of these, 33 were indigenous species. **(Refer to Annexure G1, Appendix A, Section 6.9.1).**

Red – and orange-listed species

The habitat was **suitable** for any of the Red List species *Holothrix randii* known to occur in the quarter degree grid cell, but none were found during the site visit. The habitat was suitable for three of the Orange List species, two of these species, *Boophone disticha* and *Hypoxis hemerocallidea* were found on the study unit.

Medicinal and alien species

43 medicinal species were recorded in this study unit. Fifteen were found in the Quartz slope vegetation study unit. One alien species that was not a declared invader was recorded on the study unit.

Connectivity and Sensitivity

As the habitat was suitable for the presence of the Red List *Holothrix randii* and no declared invaders were present, this study unit was considered **sensitive** by Galago Environmental. **Refer to Table 6, Annexure G1 for a list of the plants recorded in the Alien and indigenous vegetation and cultivated fields.**



Figure 18: Quartz slope vegetation on reservoir koppie

- **Acacia Karroo woodland**

Compositional aspects

This study unit comprised copses of indigenous trees and shrubs in natural grassland. Connectivity with natural grassland existed to the south. The species diversity of this study unit was high.

Of the 239 plant species recorded along the proposed route 81 were recorded in the Acacia karroo woodland study unit. Of these, 75 were indigenous species. **(Refer to Annexure G1, Appendix A, Section 610.1).**

Red – and orange-listed species

The habitat was not **suitable** for any of the Red List species known to occur in the quarter degree grid cell, but was suitable for three of the Orange List species *Hypoxis hemerocallidea*, but none were found on the study unit.

Medicinal and alien species

43 medicinal species were recorded in this study unit. Twenty were found in the Acacia Karroo woodland_study unit. Six alien species of which one was a **Category 1 Declared weed** was recorded on the study unit.

Connectivity and Sensitivity

The study area was **not considered sensitive** by Galago Environmental. **Refer to Table 7, Annexure G1 for a list of the plants recorded in the Alien and indigenous vegetation and cultivated fields.**



Figure 19: Copes of trees in the Acacia karroo woodland

- **Mixed grassland on shallow dolomite**

Compositional aspects

This study unit comprised natural primary grassland that was severely disturbed by road works. The species diversity of the mixed grassland on shallow dolomite study unit within 200 meters of the proposed route was much lower than that recorded during earlier unrelated

surveys. Of the 239 plant species recorded along the proposed route 89 were recorded in mixed grassland on shallow dolomite the study unit. Of these, 87 were indigenous species. **(Refer to Annexure G1, Appendix A, Section 6.11.1).**

Red – and orange-listed species

The habitat was **suitable** for two of the Red List species known to occur in the quarter degree grid cell. A specimen of the Red List *Melolobium subspicatum* and a few specimens of the Orange List *Hypoxis hemerocallidea* were found in this study unit.

Medicinal and alien species

43 medicinal species were recorded in this study unit. Seventeen were found in mixed grassland on shallow dolomite the study unit. Two alien species of which one was a **Category 1 Declared weed** was recorded on the study unit.

Connectivity and Sensitivity

The study area was considered **sensitive** by Galago Environmental. A 200-meter buffer should be maintained around the Red List species. **Refer to Table 8, Annexure G1 for a list of the plants recorded in the Alien and indigenous vegetation and cultivated fields.**



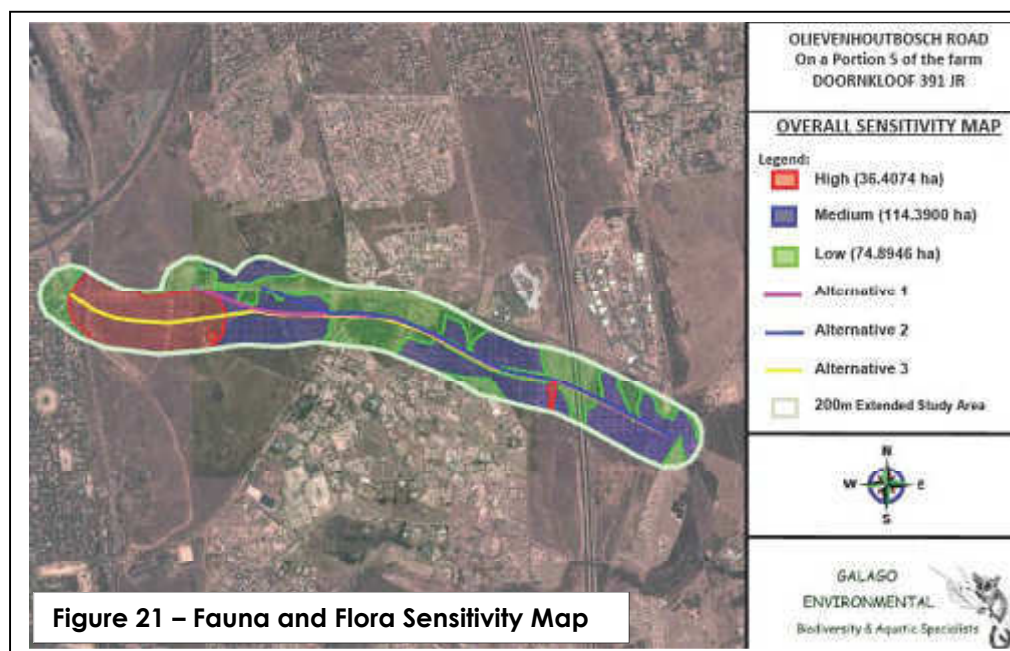
Figure 20: Mixed grassland on shallow dolomite

Findings by Galago Environmental and Potential Implications

From the vegetation assessment **six plant communities** were identified:

- *Eragrostis - Hyparrhenia* grassland;
- *Tristachya – Monocymbium Chert*;
- Mixed alien and indigenous vegetation;
- Quartz slope vegetation;
- Acacia Karroo woodland; and
- Mixed grassland on shallow dolomite.

The **vegetation study** stated that the Red List *Melolobium subspicatum* was found in the Mixed grassland on shallow dolomite study unit within 200 meters of the proposed route. The *Tristachya – Monocymbium Chert – Quartz* outcrop, the Quartz slope vegetation and the Mixed grassland on shallow dolomite study units were considered **sensitive** and construction activities within these areas should be kept strictly within the pipeline reserve. All Declared Weeds and invaders and other alien species in the vicinity of the proposed pipeline must be removed and a management plan for the continuing control of the aliens be implemented. **Alternative route 2** will have the least negative impact on the grassland of the study site and is the preferred route. **Refer to Figure 21, Fauna and Flora Sensitivity map.**



6.2.2 Fauna

6.2.2.1 Mammals

The mammal study conducted by Galago Environmental found that the alternative routes will not affect any significant mammal habitats warranting species consideration, or ecologically sensitive areas. The route along the suggested route, together with other roads under construction and suburbs under consideration will further partition the area into smaller and ecologically less viable units.

The local occurrences of mammals are, on the other hand, closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges. Sight records and information from residents or knowledgeable locals audit such deductions.

Even during historical times the three alternative routes together with their adjacent 500 meters extended study areas were depauperate of mammals, considering the absence of arboreal, rupicolous and wetland habitats providing 'lebensraum' for discerning species. With the advent of civilization and escalating land-use practices not conducive to nature conservation, natural biota declined dramatically and continuing to do so.

Mammal Habitat Assessment

According to Galago Environmental Terrestrial habitat dominates along the combined and individual alternative routes. Generally the basal cover existed of mature stands of indigenous grass, which judged by detritus on the ground are regularly subjected to winter fires. During the end of summer the grass cover provide ample cover and nourishment to small mammals. Within the 500 meters extended study area of Alternative 3 is a solitary wooded koppie. Considering the isolated nature of this habitat type only very robust

rupicolous species can be expected such as the Namaqua rock rat and rock elephant shrew. Galago stated that no Red Data species can be expected such as the rock dormouse. According to Galago there are no significant wetlands and/or permanent streams. Exotic trees predominate, whereas indigenous trees are solitary and geographically too isolated to allow for the occurrence of arboreal mammals.

There are no bat caves requiring special consideration.

Findings by Galago Environmental

The mammal study found that the alternative routes will not affect any significant mammal habitats warranting species consideration, or ecologically sensitive areas. It is recommended that Alternative 2 is selected since it is shorter and since it will not affect the isolated koppie.

6.2.2.2 Avifauna

Avifaunal Habitat Assessment

Two major avifauna habitat systems were identified:

- **Open grassland**

The largest portion of the study site consists of a mixture of disturbed and undisturbed grassland with scattered trees and rocky outcrops with hardy woody vegetation. Open grassland is the most important habitat type for South Africa's threatened bird species in the region with a proportional importance of 27%. The highest diversity of threatened bird species occurs within this grassland habitat of which many are in the highest category of threat (Barnes, 2000). The presence and abundance of bird species in this habitat will vary from season to season being lush and green in summer after summer rains and dry and

brown or burnt during winter. The area will favour ground living bird species such as lapwings, francolins, pipits, long claws, larks and chats that either hunt for insects or breed on the ground, in barrows in the ground or between the grasses. Weavers and widow-birds will make use of this area for feeding (seeds) during late summer and early winter when the grass is not burst and widow-birds and cisticolas will also breed in the tall grass during summer. Aerial feeding birds such as martins, swifts and swallows will hunt for insects over the grasslands.

- **Exotic vegetation**

Exotic alien tress species has taken over an area with open natural grassland vegetation, these alien species largely consisting of mainly *Eucalyptus* and Wattle Trees. Exotic vegetation usually does not offer a large variation in plant communities and these trees are mostly unpalatable in their growing and live stage for insect and game species. As a result only a few insect-eating bird species will occur within these plantations. A number of nectar feeding species such as white-eyes and sunbirds will feed on the nectar produced by the flowers of these trees. Some birds also make nest in these trees. A few bird of prey species, which requires tall trees for nest building, ranges have increased due to the presence of these trees. These include Black Sparrow Hawk and Ovambo Sparrow Hawk. No or little grass growth takes place on the ground where these trees grow and seed-eating species are few. These trees are known to extract large volumes of water daily and the surrounding ground is normally hard and dry.

Findings by Galago Environmental and Potential Implications

The **avifauna** assessment found that although the natural open grassland area offers habitat for Red Data avifaunal species (Lesser Kestrels), they are only likely to move through the area on rare occasions. This is attributed to disturbance of the area on and surrounding the study site due to human presence and human related activities and also development surrounding the study site and the fragmented state of the natural grassland.

This alternative 2 is recommended since this will have a minimum impact on the natural vegetation on the study site and the avifaunal species recorded on or that are likely to occur on the study site.

6.2.2.3 Invertebrate survey

The **herpetological** study found that the proposed development routes are relatively small, but there is a chance that at least one of the three Red Data herpetofaunal species of the Gauteng Province may occur on the site. The man-made dam/wetland adjacent to the study site is a potential breeding site for the giant bullfrog and there is a good possibility that giant bullfrogs may use the study site as a dispersal area, which combines feeding and aestivation.

If the proposed development should go ahead, an important indirect effect would be the likely impact that the proposed development might have on the surface water runoff and water quality of the catchment area. This could have a negative impact on the herpetofauna. This is especially true for the drainage line which flows into the Sesmyl Spruit.

The effects could be ameliorated by the construction of retention ponds, which would retard discharge into the catchment area and improve the water quality of the discharge.

6.2.2.3 Ecological conditions of the ridge

The **ecological conditions of the ridge** assessment found that transformation of vegetation owing to present excavations, scraping or other disturbances are clear at the site. Exotic weeds and annual pioneer grass species invade such disturbed patches.

- Overall Alternative 2 appears to be ecologically the least sensitive strip.
- Alternative 3 is not preferred. This proposed alternative 3 passes the quartzite ridge and the lower dolomitic slopes near areas where a Threatened plant species, *Melolobium subspicatum* are present. Furthermore alternative 3 crosses sensitive ecosystems notably the ***Acacia robusta – Panicum maximum as well as the Sporobolus festivus – Hyparrhenia hirta*** assemblages. The slopes of the quartzite koppie as well as the intersection between

the dolomite and chert approaches a habitat which may be suitable for the rare and threatened fruit chafer beetle, *Ichneustoma stobbiai*.

- *Ichneustoma stobbiai* is an endangered fruit chafer (Scarabaeidae: Cetoniinae) that occurs in small habitat fragments of South Africa (Kryger & Scholtz, 2008). The adults of this species are short-lived and the females are flightless. Thus, the vagility of these beetles is extremely low (Kryger & Scholtz, 2008). The species *I. stobbiai* (Holm, 1992) is thought to occur in a very restricted area in and around Gauteng Province and all habitat patches should be protected (Kryger & Scholtz, 2008; Deschodt, Scholtz & Kryger, 2009). Unlike most cetoniine larvae, the larvae of this species usually occur in dolomitic to cherty, well-drained soils (Deschodt, Scholtz & Kryger, 2009).

- A Class 3 rocky ridge is present at all the intersections of rocky ridges with the proposed strip allocated for the development.
- Fire and frost probably play an important role in maintaining the grassland at the ridge and therefore a burning programme is desirable.
- In an increasingly urbanised area, the possible conservation importance value of rocky ridges is underlined at the site both in terms of remarkable diversity and as refuge for threatened species.
- Though a class 3 rocky ridge is present it is believed that near pristine patches of rocky ridge may still be conserved at the site.
- Proper ecological planning and actions are urgent and include:
 - The eradication of invasive exotic plant species at the site.
 - Development of conservation infrastructure that would avoid the continuous trampling, excavations and informal dumping which are present in the area.
 - The zoning of habitats where threatened species occur as a no-go area for any developments.

It appears that Alternative 3 will have an undesirable impact on an ecosystem of high conservation priority and that Alternative 2 in terms of biodiversity and ecosystem functioning is the preferable option.

Recommended mitigation measures from Galago Environmental

- The appropriate agency should implement an ongoing monitoring and eradication program for all invasive and weedy plant species growing within the servitude.
- Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a specialist registered in terms of the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science.
- Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. As far as possible, indigenous plants naturally growing along the proposed route, but would otherwise be destroyed during construction, should be used for re-vegetation / landscaping purposes.
- Should hedgehogs be encountered during the construction phase, these should be relocated to natural grassland areas in the vicinity.
- Should Bullfrogs or any herpetological species be encountered during the construction phase of the proposed development, these should be relocated to natural grassland areas in the vicinity or the Rietvlei Nature Reserve nearby.
- The contractor must ensure that no herpetofaunal species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- Alien and invasive plants must be removed.
- All storm water structures should be designed so as to block amphibian and reptile access to the road surface.
- A comprehensive surface runoff and storm water management plan should be compiled, indicating how all surface runoff generated as a result of the road development (during both the construction and operational phases) will be managed (e.g. artificial wetlands / storm water and flood retention ponds) prior to entering any natural drainage system or wetland and how surface runoff will be retained outside of any demarcated buffer/flood zones and subsequently released to simulate natural hydrological conditions. This plan should form part of the EMP.

- Where the roads traverse the drainage line, an underpass should provide for the movement of aquatic as well as terrestrial species.
- A barrier (either prefab concrete wall or galvanized sheeting that extends as a continuous sheet above ground for at least 40cm and below ground for at least 30cm) that will physically block animals from accessing the road surface should be constructed for a distance of 200m on either side of all aquatic and terrestrial underpasses. Holes under barriers should be routinely filled in and areas directly adjacent to the barrier should be kept free of vegetation.

Table 23: Issues and Impacts – Flora and Fauna

	Issue/ Impact	Positive/ Negative / Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact - Not Necessary To Mitigate 🌞
14)	Impact on natural grassland areas	-	😊
15)	Impact on Sesmyl Spruit and associated wetland	-	😊
16)	The eradication of weeds and exotic invaders	+	🌞
17)	If the entire road alignment area is cleared at once, smaller birds, mammals and reptiles will not be afforded the chance to weather the disturbance in an undisturbed zone close to their natural territories.	-	😊
18)	Noise of construction machinery could have a negative impact on the fauna species during the construction phase.	-	😊
19)	During the construction and operational phase (if not managed correctly) fauna species could be disturbed, trapped, hunted or killed.	-	🟢
20)	Loss of habitat can lead to the decrease of fauna numbers and species.	-	🟡

6.2.2.a Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

14) Impact on natural grassland areas

The largest portion of the study site consists of a mixture of disturbed and undisturbed grassland with scattered trees and rocky outcrops with hardy woody vegetation. Alternative 2 is recommended since this will have a minimum impact on the natural vegetation.

Table 24: Significance of Issue 14 (Impact on natural grassland areas) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase P / C / O</p>	<p>Significance of Issue after mitigation Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P/C/O – No plants not indigenous to the area or exotic plant species, especially lawn grasses and other ground-covering plants should be used as soil-binding agents along new road verges as they will drastically interfere with the nature of the area. P/C/O – All Category 1 Declared Weeds and other alien species must be removed from the vicinity of the proposed route.</p>	<p>M -To be included in EMP M -To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

15) Impact on Sesmyspruit and associated wetland

The route slopes towards the Sesmyspruit situated to the south of the involved section of the route and associated wetland and will have an impact on the riparian vegetation in these areas.

Table 25: Significance of Issue 15 (Impact on Sesmyspruit and associated wetland) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P/C/O – It is suggested that where work is to be done close to the drainage lines, these areas be fenced off during construction to prevent heavy machines and trucks from trampling the plants, compacting the soil and dumping in the system.</p> <p>P/C - Care must be taken to ensure that construction activities remain within the boundary of the planned road reserve.</p> <p>P/C - Site offices, parking areas for construction vehicles, etc. should be confined to non-sensitive areas.</p>	<p>M -To be included in EMP</p> <p>M -To be included in EMP</p> <p>M -To be included in EMP</p>

	<p>P/C - No vehicles must be allowed to move in or across the wet areas or spruit and possibly get stuck. This leaves visible scars and destroys habitat. It is important to conserve areas where there are tall reeds or grass and areas where there are short grass and mud.</p> <p>P/C/O – No plants not indigenous to the area or exotic plant species, especially lawn grasses and other ground-covering plants should be used as soil-binding agents along new road verges as they will drastically interfere with the nature of the area.</p> <p>P/C/O – All Category 1 Declared Weeds and other alien species must be removed from the vicinity of the proposed route.</p>	<p>M -To be included in EMP</p> <p>H -To be included in EMP</p> <p>H -To be included in EMP</p>
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Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

16) The proposed development will result in the eradication of exotic invaders and weeds.

Category 1 Declared weeds, Category 2 Declared invaders and Category 3 Declared invaders were recorded in the vicinity of the proposed route. All Category 1 weeds and other alien species must be eradicated on a continuous basis.

Table 26: Significance of Issue 16 (The eradication of invasive species) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p>
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<p>Necessary To Mitigate ☼</p>	<p>planning phase, construction and/ or operational phase</p> <p style="text-align: center;">P / C / O</p>	<p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Positive Impact - Not Necessary To Mitigate ☼</p>	<p>P/C/O – All Category 1 weeds and other alien species must be eradicated prior to construction and throughout the operational phase of the road.</p> <p>P/C/O – No plants not indigenous to the area or exotic plant species, especially lawn grasses and other ground-covering plants should be used as soil-binding agents along new road verges as they will drastically interfere with the nature of the area.</p>	<p>L -To be included in EMP</p> <p>L -To be included in EMP</p>

Result: Positive impact, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

17) If the entire road alignment area is cleared at once, smaller birds, mammals and reptiles will not be afforded the chance to weather the disturbance in an undisturbed zone close to their natural territories

Due to the length of the proposed road it is unlikely that the entire area to be constructed will be cleared as once.

Table 27: Significance of Issue 17 (If the entire road alignment area is cleared at once, smaller birds, mammals and reptiles will not be afforded the chance to weather the disturbance in an undisturbed zone close to their natural territories) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P/C - Where possible, work should be restricted to one area at a time.</p>	<p>L -To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

18) Noise of construction machinery could have a negative impact on the fauna species during the construction phase

If not managed correctly, noise pollution (i.e. by machinery without noise muffing devices) could have a negative impact on the fauna and birds in the area. This will however only be a short-term impact and it is expected that many of the birds will return to the area during the operational phase.

Table 28: Significance of Issue 18 (Noise of construction machinery could have a negative impact on the fauna species during the construction phase) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p>
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	and/ or operational phase P / C / O	High H Not possible to mitigate, but not regarded as a fatal flaw NP
Medium ☹️	P / C - Noise should be kept to a minimum and the construction of the road should be done in phases to allow faunal species to temporarily migrate into the conservation areas in the vicinity.	L - To be included in EMP

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

19) During the construction phase (if not managed correctly) fauna species could be disturbed, trapped, hunted or killed.

There is always a risk that construction personnel may disturb, trap, hunt or kill fauna on the study area. This will have a detrimental impact on the local biodiversity and will decrease fauna numbers. The issue can be mitigated if this issue is included in conservation-orientated clauses that may be built into contracts of construction personnel and if council prosecutes offenders of these actions.

Caught animals should also be relocated to conservation areas in the vicinity.

Table 29: Significance of Issue 19 (During the construction and operational phase (if not managed correctly) fauna species could be disturbed, trapped, hunted or killed) After Mitigation/ Addressing of the Issue

Mitigation Possibilities High 🟢 Medium ☹️ Low 🟡 Positive Impact/ Neutral - Not	Mitigation Already achieved ✓ Must be implemented during	Significance of Issue after mitigation Low/ eliminated L / E
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<p>Necessary To Mitigate ☼</p>	<p>planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High ●</p>	<p>C/O - The integrity of remaining wildlife should be upheld, and no trapping or hunting by construction personnel should be allowed. Caught animals should be relocated to the conservation areas in the vicinity. Council shall prosecute offenders.</p> <p>C/O - Fencing or at least a suitable temporary barrier should be erected around the site before construction is initiated.</p> <p>C/O - The speed of vehicles around a breeding site should be restricted (by traffic calming measures etc.) to a maximum of 60km/h.</p> <p>P - Conservation-orientated clauses should be built into contracts for construction personnel complete with penalty clauses for non-compliance.</p>	<p>L -To be included in EMP</p> <p>M -To be included in EMP</p> <p>M -To be included in EMP</p> <p>L -To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

20) Loss of habitat can lead to the decrease of fauna numbers and species

All mitigation measures for impacts on the indigenous flora of the area should be implemented in order to limit habitat loss and maintain and improve available habitat, in

order to maintain and possibly increase numbers and species of indigenous fauna.

This impact is not expected to be of high significance with regard to loss of bird habitat due to lack of sufficient breeding and foraging habitat.

Table 30: Significance of Issue 20 (Loss of habitat can lead to the decrease of local fauna numbers and species) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ⚡</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Low 🔴</p>	<p>P / C / O – All mitigation measures for impacts on the indigenous flora of the area should be implemented in order to limit habitat loss as far as possible and maintain and improve available habitat, in order to maintain and possibly increase numbers and species of indigenous fauna.</p>	<p>M - In terms of local fauna population</p> <p>L - In terms of the global conservation status of fauna</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

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

7.1 Cultural and Historical

Leonie Marais-Botes was appointed to conduct a heritage impact study. **Refer to Annexure G2, for the Heritage Impact Assessment Report.** According to the Report the study area does not have any historical value.

In terms of the legation, 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 paleontological site or material.

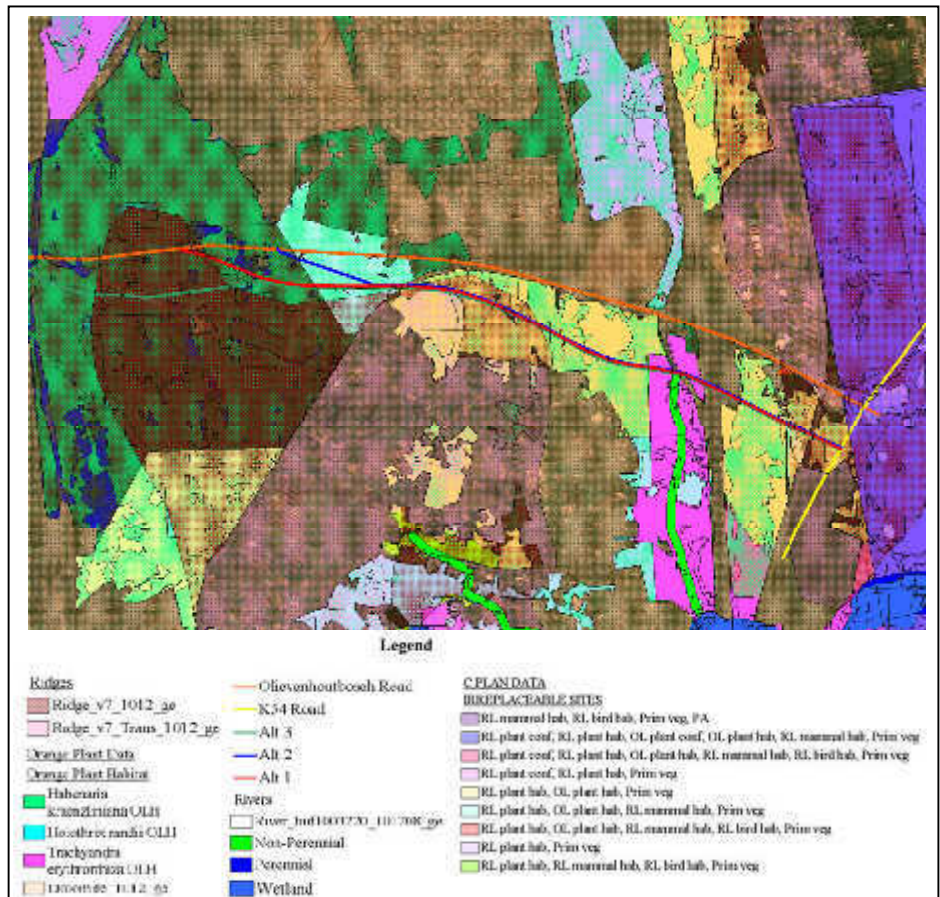


Figure 22: Sensitive Issues Map

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

As indicated on **figure 22, Sensitive Issues Map**, the proposed Olievenhoutbosch road from Main road to K54 does not traverse any cultural and historical features. **(Also Refer to Annexure H for correspondence from SAHRA)**

Comments from SAHRA

The development of the proposed road is approved by SAHRA subject to the following conditions:

- Anybody can appeal the decision within 30 days from receipt of the letter from SAHRA. The authorisation should be displaced on the site.
- The applicant must observe all heritage resource management recommendations as per page 6 of the Heritage Survey Report.
- The approval does not exempt the applicant from obtaining other necessary authority approvals as prescribed by other relevant legislation and regulations.

7.1.a Issues & Impact Identification – Cultural and Historical

Table 31: Issues and Impacts – Cultural and Historical

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact - Not Necessary To Mitigate 🌟
21)	Structures of cultural and historical significance may be destroyed.	-	🟢

7.1.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

21) Structures of cultural and historical significance may be destroyed.

As no sites, features or object of cultural significance were identified in the study area, there would be no impact resulting from the proposed alignment of Olievenhoutbosch Road.

If any archaeological sites or graves 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.

Table 32: Significance of Issue 21 (Structures of cultural and historical significance may be destroyed) After Mitigation/ Addressing of the Issue

Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨	Mitigation Already achieved ✓ Must be implemented during planning phase, construction and/ or operational phase P / C / O	Significance of Issue after mitigation Positive ✨ Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP
High 🟢	P / C / O - 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,	L – To be included in the EMP

	<p>excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or material</p> <p>P/C - 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.</p>	<p>L – To be included in the EMP</p>
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Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

7.2 Agricultural Potential

According to GAPA 3 the involved section of the route traverses areas ranging from **moderate to low agricultural potential soils (Refer to Figure 223)** and does not fall within an Agricultural Hub, an area identified for agricultural use by GDARD according to the **Draft Policy on the Protection of Agricultural Land (2006) (refer to Figures 24)**

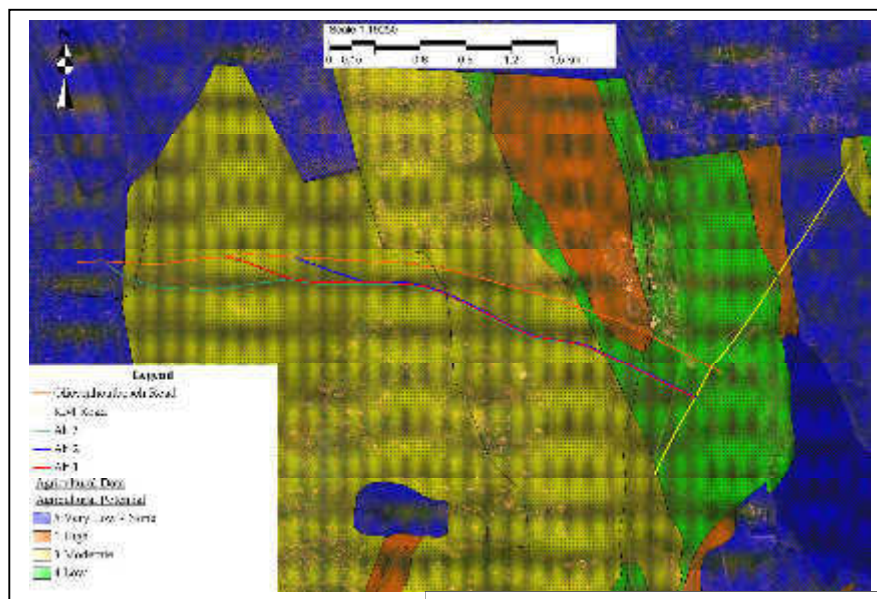


Figure 23 – GAPA 3 Agricultural Potential

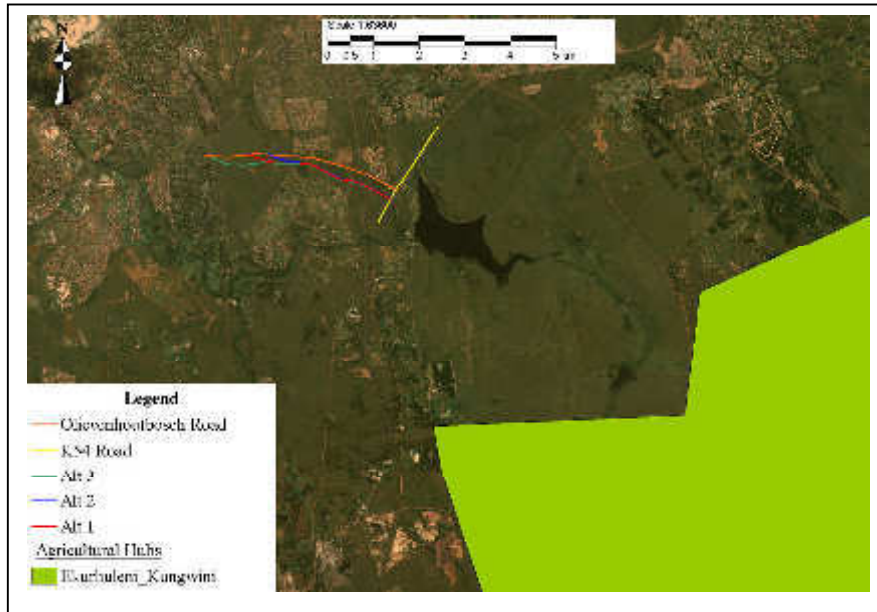


Figure 24 – Kungwini/Ekurhuleni Agricultural Hub

7.2.a Issues & Impact Identification – Agricultural Potential

Table 33: Issues and Impacts – Agricultural Potential

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact - Not Necessary To Mitigate ✨
22)	Loss of agricultural land	-	🔴

7.2.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

22) Loss of agricultural land

The soils along the proposed alignment of the involved section of the route range from very moderate to low agricultural potential and does not falls within the Kungwini/Ekurhuleni Agricultural Hub.

Table 34: Significance of Issue 22 (Loss of agricultural land) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Positive ✨</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P / C / O – Some agricultural land will be loss due to the proposed road.</p>	<p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>

Result: The significance of this impact need to be determined/confirmed and assessed in the Significance Rating Table

7.3 Institutional Environment [Regulation 29(e)]

The capital costs for the 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) and the environment.

The construction of Olievenhoutbosch Road is part of the Local Authority and Provincial Government's road network planning for the larger areas.

7.3.1 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).

7.3.2 On a National Level

National Environmental Management Act (NEMA), 1998 (Act No 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 construction of the proposed road.

NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

This Act formulates a set of general principles to serve as guidelines for land development and it is desirable that:

- The law develops a framework for integrating good environmental management into all development activities;
- The law should promote certainty with regard to decision-making by organs of state on matters affecting the environment;
- The law should establish principles guiding the exercise of functions affecting the environment;
- The law should ensure that organs of state maintain the principles guiding the exercise of functions affecting the environment;
- The law should establish procedures and institutions to facilitate and promote co-operative government and intergovernmental relations;
- The law should establish procedures and institutions to facilitate and promote public participation in environmental governance; and
- The law should be enforced by the State and that the law should facilitate the enforcement of environmental laws by civil society.

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).

The proposed development is listed under the activities as regulated under NEMA.

The Development Facilitation Act (DFA) 1995 (Act 67 of 1995)

This Act formulates a set of general principles to serve as guidelines for land development inter alia revolving around:

- The promotion of integration of the social, economic, institutional and physical aspects of land development;
- The promotion of integrated land development in rural and urban areas in support of each other;
- The promotions of the availability of residential land and employment opportunities in close proximity to or integrated with each other;
- The promotion of a combination of diverse land-uses, with each proposed land development area to be judged on its own merit and no specific use, whether residential, commercial, conservation etc., to be regarded as less important;
- Discouraging urban sprawl to promote more compact towns/ cities;
- Encouraging environmentally sound land development practices; and
- Promoting sustained protection of the environment.

Integrated Environmental Management

Integrated Environmental Management (IEM) is a philosophy, which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (Department of Environmental Affairs, 1992). The IEM guidelines intend endearing a pro-active approach to sourcing, collating and presenting information at a level that can be interpreted at all levels.

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

The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account, amongst other factors, the following:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Reducing and preventing pollution and degradation of water resources;
- Facilitating social and economic development; and
- Providing for the growing demand for water use.

In terms of the Section 21 of the National Water Act, the developer must obtain water use licenses if the following activities are taking place:

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

The proposed road cuts across a watercourse just before it traverses the R21 freeway in the east. This watercourse is not very prominent and has already been disturbed by former human activities, including the construction of the R21 Freeway.

According to the appointed engineers, culverts will be provided to accommodate the watercourse and to allow for the free flow of water to sustain the current hydrological regime.

Section 21 (c) and (i) water-use licenses will be required for this watercourse crossing.

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 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".

Water Services Act, 1997 (Act No 108 of 1997)

The purpose of this Act is to ensure the regulation of national standards and measures to conserve water taking into account, amongst other factors, the following:

- ❑ Basic sanitation;
- ❑ Basic Water supply;
- ❑ Interruption in provision of water services;

-
- ❑ Quality of potable water;
 - ❑ Control of objectionable substances;
 - ❑ Disposal of grey water;
 - ❑ Use of effluent; and
 - ❑ Quantity and quality of industrial effluent discharged into a sewerage system.

Interruption in provision of water services during the construction phase of Olievenhoutbosch Road must be according to national standards.

Mitigation measures must be implemented to prevent contamination of groundwater due to the construction and operational phase of the road.

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).

According to the available information no obvious features, sites or artefacts of cultural significance that would be impacted on by the proposed development is traversed by the proposed road

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 Act 28 of 1969.

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 were conducted for the study area. No red data fauna and flora species were identified, however the proposed route crosses a wetland and mitigation measures for the protection of this system must be implemented.

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 were conducted for the study area. No red data fauna and flora species were identified, however the proposed route crosses a wetland and mitigation measures for the protection of this system must be implemented.

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 were conducted for the study area. No red data fauna and flora species were identified, however the proposed route crosses a wetland and mitigation measures for the protection of this system must be implemented.

National Veld and Forest Fire Act, 1998 (Act No. 101, 1998)

The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic. Furthermore the Act provides for a variety of institutions, methods and practices for achieving the prevention of fires.

Mitigation measures for the prevention of fires must be implemented.

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This Act provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. The removal of Category 1 Declared Weeds is **compulsory** in terms of this Act.

The proposed route traverses sections of moderate agricultural potential soils (according to GAPA 3)

Category 1 Declared weeds must be removed on a continuous basis, as indicated in the EMP attached as **Annexure L**.

National Road Traffic Act, 1996 (Act No. 93 of 1996)

This Act provides for all road traffic matters which shall apply uniformly throughout the Republic and for matters connected therewith.

The design and construction of Olievenhoutbosch Road must comply with the National Road Traffic Act.

Mine Health and Safety Act, 1996 (Act 29 of 1996)

This Act introduced the concepts of risk assessment and occupational health and safety (OHS) management systems in the mining industry.

The alignment of Olievenhoutbosch Road must comply with the regulations of the Mine Health and Safety Act with regard to distance from mining operations.

7.3.3 On a Local Level

Planning Responsibilities of the Involved Local Authority

The prerogative to plan a development within its jurisdictional area has always constitutionally, 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 (Ekurhuleni Metropolitan Municipality and Kungwini Local Municipality), the relevant officials were involved in the planning of the project from the start.

Gauteng Spatial Development Framework (GSDF)

This document published by the Gauteng Department of Development Planning and Local Government provides a spatial development framework for the whole of the Gauteng Province, and focuses on growth and development on a broad level. This Document identifies several spatial development components, of which the following is relevant to the proposed development:

The GSDF also lists so-called interventions of which the following is applicable to the involved section of the proposed road:

- Containing and Compacting the City: The infill of vacant land contributes towards the optimizing of municipal infrastructure
- Access and Mobility: The easy access development areas, as well as the densification of the city, also encourage the optimizing of municipal resources.

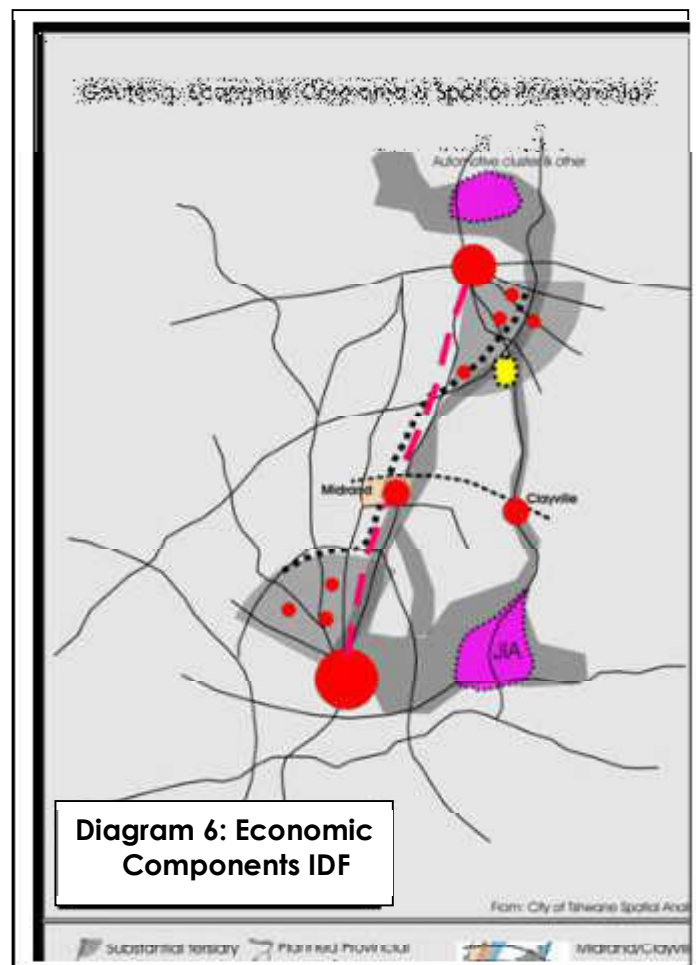
The Gauteng Integrated Development Framework (Phase 3)

This document provides a development framework Gauteng Province and focuses on growth and development on a broader level. Several spatial development components as so-called interventions were identified, of which the following are relevant to the proposed development:

- Centurion is identified as a Growth Area,
- The study area is situated within the provincial Urban Edge where growth should be stimulated and encouraged.
- Containing and Compacting the City: The infill of vacant land contributes towards the optimization of municipal infrastructure.

Diagram 6 is an illustration of the Economic components of the IDF:

- The projections are based on various blue IQ projects like the Gautrain, JIA, Automotive Cluster, etc. functioning



together within a regional context and plugging into the global economic thrust.

- The illustration indicates the strong relationships that exist between the

Tshwane east job opportunities and that of the Sandton / Randburg areas.

Areas situated along the N1-R21 within Centurion and the eastern Tshwane areas are residential focusing on tertiary related job opportunities developing over a wide front in the south.

-The policy also containing the two corridors linking the southern and northern urban agglomerations (Johannesburg / Ekurhuleni/ Tshwane). The two corridors merge in the vicinity of the study area, which adds to its desirability.

-The Midrand (on the N1 corridor) and Clayville (on the R21 corridor) nodes already strengthen the corridor concepts and create more job opportunities south of the application.

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.

GDARD C Plan , 2011

The environmental data contained in the GDARD C-Plan, 2011, was taken into consideration during the compilation of the scoping report. According to the GDARD

CPlan, 2011, the involved section of the proposed Olievenhoutbosch road traverses irreplaceable sites.

GDARD Draft Red Data Species Policy, 2001

According to the GDARD C-Plan 3, 2011, the involved section of the proposed Olievenhoutbosch road traverses irreplaceable sites.

GDARD Draft Ridges Policy, 2001

According to the GDARD Draft Ridges Policy no development should take place on slopes steeper than 8.8%.

The involved section of the proposed Olievenhoutbosch road cuts across a ridge according to GDARD C-Plan 3, 2011 and therefore the Draft Ridges Policy is regarded as applicable.

Environment Conservation Act, 1989 (Act No. 73 of 1989): Gauteng Noise Control Regulations

The proposed Olievenhoutbosch Road must comply with the Provincial Noise Control requirements as outlined in the Provincial Notice, 5479 of 1999: Gauteng Noise Control Regulations.

7.3.4 On a Local Level

Planning responsibilities of the involved Local Authority

The prerogative to plan development within its jurisdictional area has always constitutionally, in terms of the Development Facilitation Act, 1995, 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, the relevant officials were involved in the planning of the project from the start.

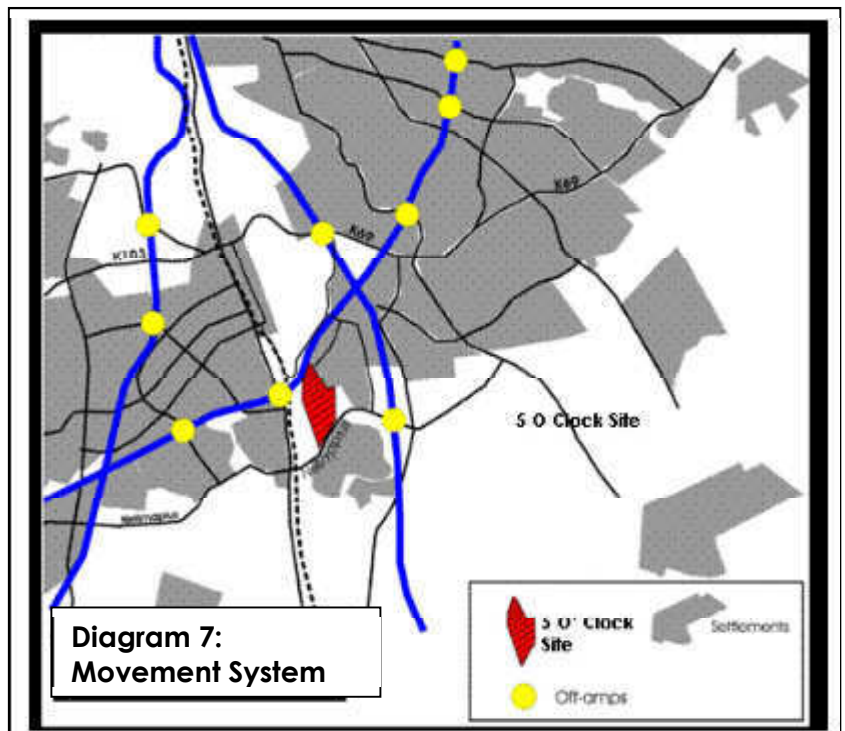
Municipal Systems Act – No. 32 of 2000)

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

City of Tshwane Spatial Development Framework (CTSDF)

This document includes valuable concepts regarding the movement system and the development lattice. According to the CTSDf the movement system in an urban environment is literally the arteries of the city and without these linkages there can be no economy and no inter-relatedness. Movement systems can be used to create access, structure settlements, and promote integration, diversity and mixed land use.

Movement (flows of people, finance, goods) defines the energy



networks of settlements and more continuous lines of movement represent planes of greater accessibility and, therefore, become the more desirable planes of connection for intensive use.

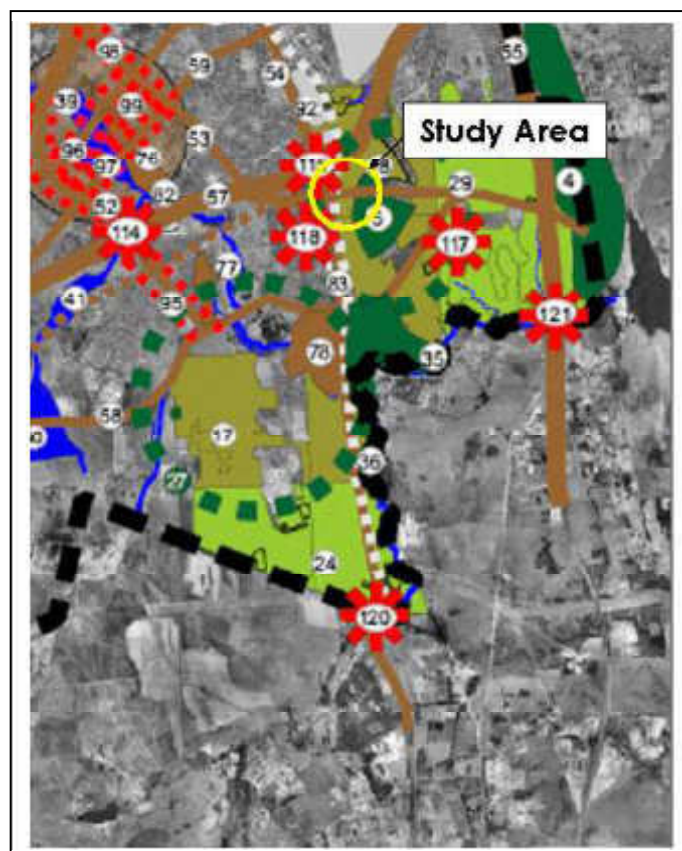
A complex and diverse pattern of accessibility offers all activities, both large and small, the opportunity to find a place within the structural system, depending on their need for accessibility and their ability to pay for it.

According to the CTSDf movement systems provide a powerful planning mechanism to bring about mixed, but broadly predictable, patterns of activity, provided activities are allowed to respond to them.

The present state of the movement system surrounding the study area is illustrated in Diagram 7.

The area is severely influenced by the existence of large interstitial areas (represented by white colour between areas of settlement) and interstitial elements like freeways. This affects the accessibility of certain areas by preventing connections on the lower planes of hierarchy. Although such areas are situated centrally within a large area their lower levels of accessibility prevent them from harbouring extensive economic opportunities.

The K103/K69 route (Hans Strijdom Ave) and Nellmapius Drive (Road 780) are



significant as they interconnect the major roads providing the local movement systems and provide access to the major motorways. It is only with these roads that the urbanisation of the suburbs can occur. Nellmapius Drive therefore plays a very important role: connecting origins and destinations of various local nodes and precincts of different types of land uses. Capacity for movement on this road should be encouraged, as it will stimulate local economic development. The involved section of the proposed Olievenhoutbosch road will strengthen the movement system.

7.3.a Issues & Impact Identification – Institutional

Table 35: Issues and Impacts – Institutional

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact - Not Necessary To Mitigate 🌞
23)	The proposed construction of the Olievenhoutbosch Road will be in line with the international, national, provincial and local legislation, planning frameworks, guidelines, policies etc.	+	🌞

7.4 Qualitative Environment

7.4.1 Noise Impact

The proposed section of the Olievenhoutbosch Road runs through an urban area which is regarded as a development hot-spot in Gauteng. The people that reside in the area and the surrounding businesses are aware of the proposed local, provincial and national road systems that are planned for the area and the surrounding residents are also aware of the important local role of the involved section of Olievenhoutbosch Road in the area. We received no objections against the road, in fact, the residents of the Cornwall Hill Residential Estate and the Cornwall Hill College insisted that Olievenhoutbosch Road be constructed as a matter of urgency if the Irene x 89, 90, 91 and 92 developments were to be approved.

The proposed Olievenhoutbosch Road will have some noise impacts, but the road will mainly cut through a development site with development rights, but the structures must still be erected and planned. This enables the developer to apply the principle of pro-active planning, because the intention is to design the proposed buildings and structures adjacent to Olievenhoutbosch Road in such a way that the noise levels will be mitigated to acceptable levels. The other aspect to take into consideration is the fact that buyers and tenants of offices, residential buildings etc. in the Irene x 89,90,91 and 92 developments will be aware of the close proximity of a busy road before they buy or rent and in many cases such properties are sold at cheaper prices. There are also many people that enjoy it to stay in cities and urban areas where they are surrounded by the rumbling noises of a city.

This road will accommodate a large amount of the traffic that is currently accommodated on the section of Nelmaphius Road that runs adjacent to the Cornwall Hill College and Estate and this will lead to a decrease of noise levels on that section of Nelmaphius Road.

Thus, pro-active planning in the area had already taken place around the proposed road alignment. The involved section of the route was taken into consideration during the layout designs of proposed new developments in the area.

7.4.1.a Issues & Impact Identification – Noise Impact

Table 36: Issues and Impacts – Noise Impact

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact - Not Necessary To Mitigate 🌟
24)	Noise impact	-	🟡

7.4.1.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

24) Noise Impact

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

A noise impact assessment is not regarded as necessary due to pro-active planning in the area adjacent to the Olievenhoutbosch Road.

Table 37: Significance of Issue 24 (Noise Impact) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Positive ✨</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Low 🔴</p>	<p>P / C / O – The layout designs of proposed new developments in the area must take the noise impact from the route into consideration and mitigation measures must be implemented if necessary i.e. strategic placement of vegetation, berms etc.</p>	<p>M – to be included in the EMP</p>

Result: *Although the impact can be mitigated, the significance of this impact still need to be determined/confirmed and assessed in the Significance Rating Table*

7.4.2 Visual Environment

The following visual assessment criteria (**see Table 38**) 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:

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 Irene x 89, 90, 91 and 92 developments. **Refer to Figure 13, Visual Assessment.**

As in the case of the noise impacts, the buyers and tenants at the Irene x 89, 90, 91 and 92 developments will be aware of the road when they purchase or rent their properties. The undulating landscape of the study area however assist with the visual screening of the road and it will therefore not be very visible from the existing Irene Village or the Cornwall Hill Estate. The eastern section of the road will however be more visible, especially from the Cornwall Hill Estate, because the Estate is situated on a hill with views onto the study area. It is however important to note that the affected section of the Estate is already experiencing views onto the R21 freeway, the Irene Village Mall, Nelmaphius Road and this additional road will not appear out of context. It will run through the approved Irene x 89, 90 and 91 townships, which will also act as screen for the road when development takes place around the road.

Table 38: 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	The ability of the landscape to less easily accept visually a particular type of	The ability of the landscape to easily accept visually a particular type of

	of a uniform texture, flat slope and limited vegetation cover	development because of less diverse landform, vegetation and texture	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

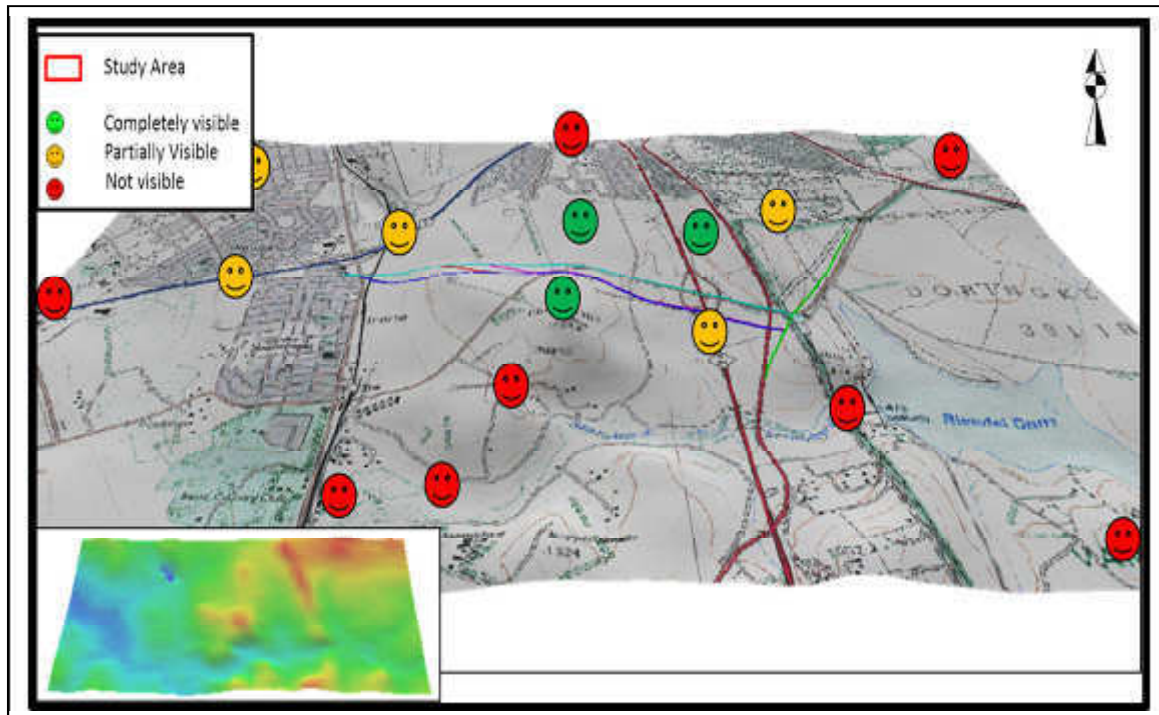


Figure 13: Visual Assessment

7.4.2.a Issues & Impact Identification – Visual

Table 39: Issues and Impacts – Visual

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴 Positive Impact - Not Necessary To Mitigate 🌟
25)	Due to the topography 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 5'o Clock Site Development.	- / +	🟡

7.4.3. “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 Irene and Cornwall area is one of the areas in Pretoria with the best-defined image. People immediately think of the Irene Dairy, Irene Country Lodge, the Smuts House, and Irene Village, the Stonewalls, neat streets and lots of trees. This all contribute to a sense of an established fine balance and well-being within a special landscape where landscapes blend in with a vibrant loci urban life where each individual and element plays its role.

It should be noted that the area will not remain rural much longer due to developments planned in the area. With pro-active planning, the developments in the area (including the proposed roads) could help to improve the “Sense of Place” of the area and timeless architectural themes, landscaping concepts and finishes could help to create an area with a unique character.

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.

7.4.3.a Issues & Impact Identification – “Sense of Place”

Table 40: Issues and Impacts – “Sense of Place”

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact - Not Necessary To Mitigate 🌞
26)	If not planned and managed 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.	-	🟢

6.4.3.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

26) If not planned and managed 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.

Table 41: Significance of Issue 26 (If not planned and managed correctly, the proposed development could have a negative impact on the “Sense of Place” of the study area and its surroundings) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ⚡</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High 🟢</p>	<p>P/C/O - Landscaping guidelines should be provided for the linear strips of land adjacent to the proposed road.</p>	<p>L/E – To be included in the EMP</p>

Result: Although the impact can be mitigated, the significance of this impact still need to be determined/confirmed and assessed in the Significance Rating Table

7.4.4 Services and Infrastructure

The Olievenhoutbosch road is a Metropolitan Class 2 road that will link the Samrand interchange on the N1 highway with the R21 route in the east. Services that are visible in the area include ESKOM overhead power lines that cross the study area and overhead TELKOM lines along existing roads. The involved section of Olievenhoutbosch road intersect with other

important routes including N1-21, PWV6, K105, Nellmapius Drive, River Road and the Pretoria-Germiston railway line. **(Refer to Annexure I: for the Storm water Master Plan)**

Services information available for the section of the proposed Olievenhoutbosch road crossing the Irene Extension 91 Development was compiled with the **Service Scheme report** conducted by **Vela VKE Engineers (Pty) Ltd** for the Irene 91 Development. **(Refer to Annexure J: Service Scheme Report)**

The traffic impact study proposes that Olievenhoutbosch Drive be developed as a one-way couplet. The eastbound leg of this one-way couplet adjacent to the Irene x91 township will follow the alignment of the existing Nellmapius Drive. The westbound leg of the one-way couplet passes through the Irene x91 township inside a 40m road reserve. The required road reserve widths for the two legs of the one-way couplet must be confirmed by the City of Tshwane.

The Irene x91 township layout makes provision for the road reserve of the future Olievenhoutbosch/R21 split diamond interchange. A public class 4 road will be constructed inside a 25m road reserve form an intersection on the westbound Olievenhoutbosch drive to a cul-de-sac at the entrance to erf 13.

The Olievenhoutbosch Road one-way is a Class 3 road and is therefore allocated to the City of Tshwane. A two lane single carriageway inside the westbound Olievenhoutbosch road reserve, between the Link Road and the Class 4 public access road, will provide sufficient access to Irene x91.

7.4.4.a Issues and impacts identification - services and infrastructure

Table 42: Issues and Impacts – Services and Infrastructure

	Issue/ Impact	Positive/	Mitigation
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		Negative/ Neutral ±	Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact - Not Necessary To Mitigate ☀️
27)	Impact on existing infrastructure and services during the construction of the proposed road.	-	😊
28)	The proposed Olievenhoutbosch road will improve regional accessibility in the area. The extension of the road links with the R21 and provides access to the surrounded developments.	+	☀️
29)	The proposed Olievenhoutbosch road will divert traffic from existing road network links and thereby alleviate congestion on the existing road network system.	+	☀️
30)	The construction phase of the proposed road will supply a number of temporary job opportunities.	+	☀️
31)	The developer will deliver a large contribution to the infrastructure in the area	+	☀️

7.4.4.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

27) Impact on existing infrastructure and services during the construction of the proposed road

The construction of roads often requires the relocation of services and/or temporary disruptions to existing services such as access roads, electricity, water, Telkom services, sewage etc.

Table 43: Significance of Issue 27 (Impact on existing infrastructure and services during the construction of the proposed road) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ⚡</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during planning phase, construction and/ or operational phase</p> <p>P / C / O</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>High 🟢</p>	<p>P / C – Determine areas where services will be upgraded and relocated well in advance. Discuss possible disruptions with affected parties to determine most convenient times for service disruptions and warn affected parties well in advance of dates that service disruptions will take place.</p> <p>C - It is important to erect proper signs indicating the operations of heavy vehicles in the vicinity of dangerous crossings and access roads.</p> <p>C – Construction vehicles must avoid peak hour traffic, i.e. between 7am and 9am and again between 4pm and 6pm on weekdays. Routes should be planned to avoid construction vehicles travelling through residential areas where possible.</p> <p>C – It is important to erect warning signs on existing roads when impacted on by the construction of the Olievenhoutbosch road (i.e. construction of</p>	<p>M – To be included in the EMP</p> <p>M – To be included in the EMP</p> <p>M – To be included in the EMP</p> <p>M – To be included in the EMP</p>

	<p>intersections/bridges).</p> <p>C – Traffic on existing roads should be controlled during construction activities impacting on these roads (i.e. construction works at intersections, construction of bridges). At least one lane should be open for traffic or alternatively a detour route must be available at all times. A traffic points man should be appointed.</p>	<p>M – To be included in the EMP</p> <p>M – To be included in the EMP</p>
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Result: *Although issue can be mitigated, the significance of the impact should still be determined / confirmed assessed in the Significance Rating Table*

7.4.5 Affected Properties

The following properties area affected by the involved section of the proposed Olievenhoutbosch Road:

- Portion 1, Portion 188 and the Remainder of Portion 330; Portion 335 and Portion 5 of the Farm Doornkloof 391-JR.
- The road reserve of Nellmapius Drive/M31 and;
- The Road servitude of the R21.

7.4.5.a Issues and Impacts – Affected Properties

Table 44: Issues and Impacts – Affected Properties

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 🟡 Low 🔴

			Positive Impact/ Neutral - Not Necessary To Mitigate ☀
32)	Expropriation of properties	-	☒
33)	Impact on agricultural land and agricultural holdings	-	☒
34)	Impact on property values	-/+	☒/☀
35)	Access to local roads and properties	-	😊

7.4.5.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

32) Expropriation of properties

The construction of the involved section of Olievenhoutbosch road will require the expropriation of a number of properties.

Table 45: Significance of Issue 32 (Expropriation of properties) After Mitigation/ Addressing of the Issue

Mitigation Possibilities High 🟢 Medium 😊 Low ☒	Mitigation	Significance of Issue after mitigation
Positive Impact/ Neutral - Not Necessary To Mitigate ☀	Already achieved ✓ Must be implemented during Planning phase, Construction and/ or Operational phase P/ C / O Mitigation	Low/ eliminated L / E Medium M High H Not possible to mitigate,

		but not regarded as a fatal flaw NP
Low 🟡	P – The expropriation of properties must be finalised prior to the construction of the road.	M - To be included in EMP

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

33) Impact on agricultural land and agricultural holdings

The study area has moderate to low agricultural potential. As the proposed road travels through some potential agricultural land, the potential is low. Currently there are no agricultural holdings in this study area that will be affected by the development.

Table 46: Significance of Issue 33 (Impact on agricultural land and agricultural holdings) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🟠</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during Planning phase, Construction and/ or Operational phase</p> <p>P / C / O Mitigation</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
Low 🟡	P – Expropriation of properties should be finalised prior to construction of the road.	M - To be included in EMP

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

34) Impact on property values

Although the proposed road could have negative impacts on the property values in the short and medium term, there is a possibility that the long-term impact of the route will be positive.

Offices, commercial and retail properties adjacent to this type of route are much sought after by developers and property owners are often supplied with very high offers for their land.

Table 47: Significance of Issue 34 (Impact on property values) After Mitigation/ Addressing of the Issue

Mitigation Possibilities	Mitigation	Significance of Issue after mitigation
High 🟢 Medium 🟡 Low 🔴 Positive Impact/ Neutral - Not Necessary To Mitigate ✨	Already achieved ✓ Must be implemented during P lanning phase, C onstruction and/ or O perational phase P / C / O Mitigation	Low/ eliminated L / E Medium M High H Not possible to mitigate, but not regarded as a fatal flaw NP
Low 🔴	P – The properties affected by the proposed alignment must be taken into consideration during the planning phases.	High H

Result: This issue could be negative in the short term but could turn positive in the long term, the significance of the impact should be determined / confirmed and assessed in the Significance Rating Table

35) Access to local roads and properties

The proposed road could have an impact on access to local roads and properties during the construction and operational phase.

Mitigation measures must be implemented to ensure access to local roads and properties during the construction phase. The design of Olievenhoutbosch road must make provision for access to local roads and properties as well as future roads.

Table 48: Significance of Issue 35 (Access to local roads and properties) After Mitigation/ Addressing of the Issue

<p>Mitigation Possibilities</p> <p>High 🟢 Medium 🟡 Low 🔴</p> <p>Positive Impact/ Neutral - Not Necessary To Mitigate ✨</p>	<p>Mitigation</p> <p>Already achieved ✓</p> <p>Must be implemented during Planning phase, Construction and/ or Operational phase</p> <p>P / C / O Mitigation</p>	<p>Significance of Issue after mitigation</p> <p>Low/ eliminated L / E</p> <p>Medium M</p> <p>High H</p> <p>Not possible to mitigate, but not regarded as a fatal flaw NP</p>
<p>Medium 🟡</p>	<p>P – The design of the route must make provision for access to local roads and properties as well as future roads.</p> <p>P/C – Mitigation measures must be implemented to ensure access to local roads and properties. If access is restricted, alternative access/routes must be provided.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

7.4.6 Public Participation

(Refer to Annexure K 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 on-going 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&APs) 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&APs) were notified of the Environmental Evaluation Process during the Scoping Phase through:

- 1)** A site notice that was erected (at prominent points on and around the study area) on 18 October 2011 **(Refer to Annexure K i)**.
- 2)** Notices were distributed to the surrounding land-owners and interested and affected parties by means of faxes, hand delivery and e-,mail on the 18 October 2011 **(Refer to Annexure K ii)**

- 3) An advertisement was placed in the Beeld newspaper on 18 October 2011 (**Refer to Annexure Kiii**)
- 4) Refer to **Annexure K iv** for a list of the registered I&AP's and **Annexure K v** for the Issues Report.
- 5) The Scoping Report was available for review by I&AP's for a period of 21 days.
- 6) A site notice for the EIA phase was erected (at prominent points on and around the study area) on 22 October 2013 (**Refer to Annexure K vi**).
- 7) Notices were distributed to the surrounding land-owners and interested and affected parties by means of faxes, hand delivery and e-mail on the 22 October 2013 (**Refer to Annexure K vii**)
- 8) The draft EIA Report was available for review by I&AP's for a period of 40 days.

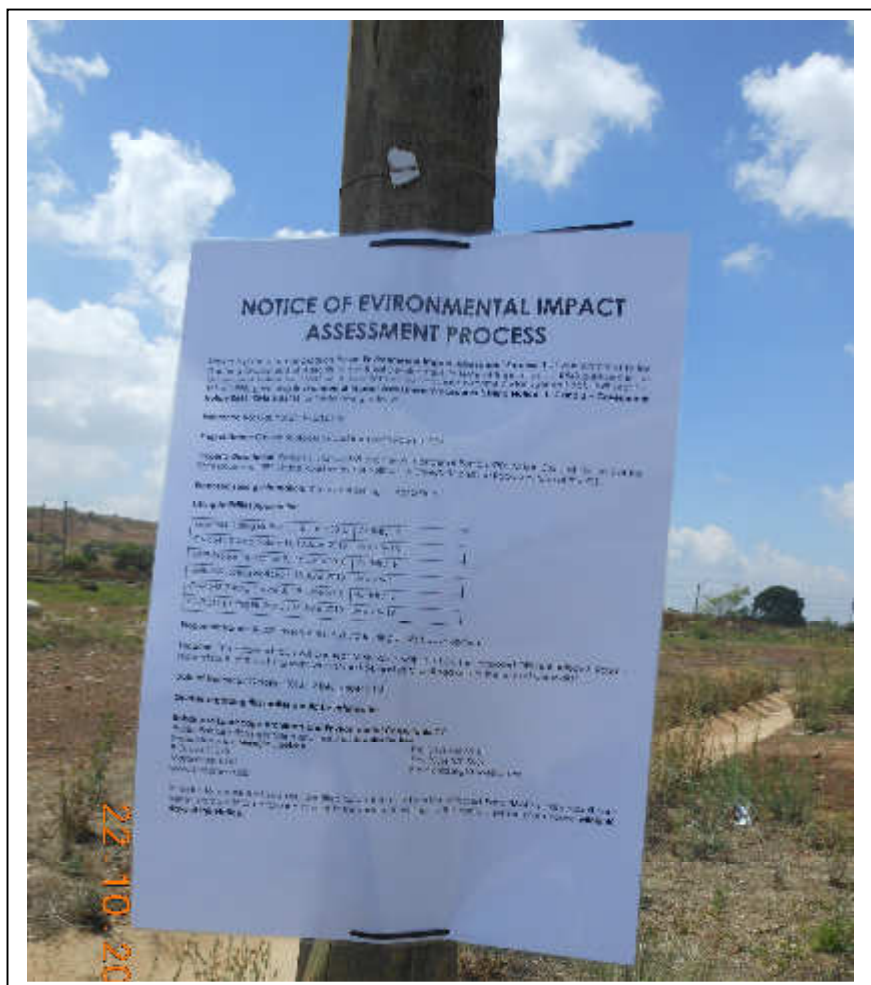


Figure 25: Site Notice EIA Phase

The following persons/organisations registered as I & AP:

Table 49: List of registered interested and affected parties

	Name	Contact Details	Address
1	James AH Cambell	james.ah.cambell@gmail.com 083 457 3724 012 667 5187	9 Lotus Street, Irene
2	Ross Howarth	rhowarth@gmail.com	68 Main Rd, Irene
3	Beverley Wulff	tph@tph.co.za 012 809 2229 012 809 2090 (f)	98 Pony Street Tijger Vallei Office Park
4	Brian & Jenny Melvill-Smith	Brian.Melvill-Smith@barlowworldmotor.com 011 552 9344 083 645 1504 012 667 2379	37 Alexandra Road, Irene
5	Chris Grobler	chrisg@bibletruths.co.za 083 415 7549	
6	Craig Comrie	ccomrie@mhg.co.za 011 381 2060	
7	Dirk Heyns	manager@cornwallhill.co.za 012 667 2938	
8	Gill Udal	gill.udal@telkomsa.net	16B Iris Lane, Irene
9	Gerard O' Rourke	gorourke@chieftain.ie 083 313 9671	75 Jean Avenue, Doringkloof
10	Wisani Justice Maluleke	MalulekeJ@dwa.gov.za 012 392 1409	
11	Cllr Christa Spoelstra	mwcspoel@mweb.co.za 082 880 5300	
12	Riaan Marais CoT Rietveli Nature Reserve	RiaanM@tshwane.gov.za	
13	Kobus Knoetze	kobus@dhkthinkspace.co.za 021 421 6803	1 Clifford Road, Irene
14	Hilton Bothma	hiltb@telkomsa.net 076 729 6931	31 Pioneer Rd, Irene
15	Dawie Gouws	dawie@qs2.co.za 083 635 6515 012 667 4630	1 Lesley Road, Irene
	SANRAL	schmidk@nra.co.za	

16	Malcolm Fawkes	FawkesMG@eskom.co.za 011 655 2552 082 652 7581	
17	Michelle Marais	michelle.marais@angloamerican.com 012 679 2058 083 608 0998	PO Box 129 Irene
18	David Larsen Salbu	dkoa@salbu.co.za	
19	Robert Hartman	robert@multicat.co.za 012 663 4660 083 414 4197	Cornwall Hill Estate
20	Lisa Trublet de Nermont	trublet@global.co.za 082 885 1554	Cornwall Hill Residents
21	Roger Trublet de Nermont	082 885 1554	Cornwall Hill Residents
22	Carlo Machinè	carlomach@absamail.co.za 082 521 1115	350 Donderry Way Cornwall Hill Estate
23	Tom Hannay	tomhannay.sa@gmail.com 083 447 9442 012 667 4520	15 Alexandra Road, Irene
24	Sonya Semmelink	semmelink@webmail.co.za	
25	Mara Temple	Mara.Temple@gpa.gov.za 012 319 1004 012 319 3812 (f)	
26	Nina Strydom Nina Phillip	Nina.Strydom@up.ac.za 083 636 1399 072 449 1012	3C Iris Lane, Irene
27	Councillor Casper McDonald	CasperM@tshwane.gov.za 082 563 4570 086 503 5231	
28	Manda Botha	manda@soundandimage.co.za 083 760 4385	PO Box 227 Cornwall Hill, 0178
29	Mr Roux Shabangu	roux@rouxprops.co.za 012 667 2772	Erf 122, Irene
30	Marese Herbst	marese@rouxprops.co.za 012 667 2772	Erf 122, Irene
31	Bea Fletcher The Town Planning Hub (TPH)	bea@tph.co.za tph@tph.co.za	Erf 122, Irene
32	Natalie Koneight Rand Water	nkoneigh@randwater.co.za 011 724 9366	
33	James AH Cambell	james.ah.cambell@gmail.com 083 457 3724 012 667 5187	9 Lotus Street, Irene
34	Lizette Visser Moo Zoo	visserliz@mweb.co.za 083 400 2804 012 667 2638	7 Alexandra Road, Irene
35	Raj Shunmugam	raj@glencarol.co.za	428 Shillingford Road Cornwall Hill

36	Cllr Christa Spoelsta Ward Councillor	mwcspoel@mweb.co.za 082 880 5300	
37	Eduard H.H. Meyer	edumeyer@iburst.co.za 012 667 5996 082 940 2958	2 Wellington Road, Irene
38	Richard Schuster	Rschuster@barloworld-equipment.com 083 625 6136 011 898 0000	29 Queen Street, Irene
39	Magda Oosthuizen	Magda.oosthuizen@seeff.com 082 411 7637 Magdafick@yahoo.co.uk	
40	Af van Niekerk Irene Farm Village HOA	estatemanager@irenefarmvillages.co.za 012 662 3505 079 525 9281	
41	Jaco Vd Westhuizen	jaco.vdwesthuizen@me.com Cell: 082 460 2526	
42	Willem Hart Ward councillor	willem6060@gmail.com 082 900 8292	
43	Lizelle De Beer	wildebeer@gmail.com Cell: 082 805 5242/3	

The following comments were received from I & APs during the public participation phase of the Scoping and EIA Process:

SAHRA

The following comments were received from **Andrew Salomon** from **SAHRA (refer to Annexure K viii)**:

In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or paleontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.

The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.

Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Paleontological resources – or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Paleontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary.

If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority to indicate that there is no necessity for any further assessment.

Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscape or view scapes must also be assessed.

The following comments were received from **J. Prinsloo** from **City of Tshwane (refer to Annexure K viii)**:

In reviewing the application the Department made the following findings:

a) According to the Tshwane Open Space Framework the proposed site is situated within and adjacent to the following open space typologies:

- A **Blue Node** namely Sesmylspruit and associated Wetlands (Linear Ecological Open space system associated with water) of Metropolitan significance. Blue nodes have a secondary socio-economic and place making function, therefore they must be conserved.
- A **Blue Way**, namely Sesmylspruit and associated wetlands. Blue ways are the most important elements in the provisioning of environmental goods and services, the protection of biodiversity, endangered species and ecological systems as well as eco-based activity. Blue ways must therefore be conserved.
- A Green Node, namely GDARD Important site: Between R21, Cornwall Hill and GDARD Irreplaceable Site: 5 O'Clock Site and Green nodes are the most important elements in the provisioning of environmental goods and services, the protection of biodiversity endangered species and ecological systems, as well as eco-based activity. Green nodes must be protected for conservation purposes.
- A **Green Way** namely Cornwall Hill and Rietvlei Nature Reserve Ridges. These are protected areas which forms part of the strategically important ecological Structuring Elements within the Tshwane Open Space Network and must be conserved.
- A **Red Node**, namely the R21/Nellmapius Road Offramp, Nellmapius Road, R54 & Goedehoop Road, Boeing Road Intersection. The value of red Nodes lies in their place-making function and in creating a high quality urban environment that supports the image of a capital city.
- Gauteng Department of Agriculture and Rural Development Conservation Plan Version 3.
- Transformed Ridges.

b) According to the Bioregional Plan for the Gauteng Metropolitan Municipalities the proposed site is situated within and adjacent to the following area:

- **Formal Protected Areas:** Protected Areas include Provincial Nature Reserves (protected by the National Environment Management: Protected Areas Act 57 of

2003); Municipal Nature Reserves (including Bird Sanctuaries); other state protected areas (Meteorite Crater Reserve & portion of Botanical Gardens); and Private Nature Reserves and Natural Heritage Sites. Importantly, the areas include both areas that are formally proclaimed and protected by appropriate legislation and managed as such, as well as those that are either appropriately proclaimed and protected or that are managed primarily for biodiversity purposes according to a management plan.

- **Critical Biodiversity Area 1:** Any terrestrial or aquatic area required to meet biodiversity pattern and/or process thresholds. These include any area that is required for meeting pattern thresholds, namely remaining areas of Critically Endangered vegetation types and areas required to protect threatened species; any area that is required for meeting process thresholds such as areas important for climate change adaptation; and hydrological process areas such as high priority wetlands and catchments, pan clusters and pans within priority catchments. In addition to the above areas where there is little or no choice of area identified, CBAs include all 'best design' sites in terms of meeting pattern and process thresholds, identified by the iterative conservation planning process. 'Best design' refers to an identified network of natural sites that meet pattern and process thresholds in all vegetation types and features in a spatially efficient and ecologically robust way, and aim to avoid conflict with other activities (e.g. economic activity) where it is possible to achieve biodiversity thresholds elsewhere.
- **Ecological Support Areas 1 & 2:** Supporting zone required to prevent degradation of Critical Biodiversity Areas and Protected Areas. These include remaining corridor, catchment, wetland and other process areas that are required to prevent degradation of Critical Biodiversity Areas and formal Protected Areas; and areas which would otherwise have been identified as Critical Biodiversity Areas except that have been transformed or degraded, but which are currently or potentially still important for supporting ecological processes e.g. floodplain areas that have transformed or degraded. These areas are a focus for rehabilitation rather than the intensification of land uses.

-
- c) According to the Report the proposed road will be additional lanes to the existing approved Olievenhoutbosch Road which is already in construction.
 - d) The Report indicated that the proposed road is needed to alleviate congestion on the approved Olievenhoutbosch Road.
 - e) The Report indicated that Olievenhoutbosch Road is a Metropolitan Class 2 Road that will link the Samrand Interchange on the N1 Highway with the R21 route in the east.
 - f) The Report indicated that 600, additional from the section of road will be scanned to ensure that the alignment extension will be possible to proceed without any environmental sensitivity.
 - g) According to the Report detailed surveys for the 600m node extensions to the south of the involved section of Olievenhoutbosch is regarded as necessary as the section to the east is identified as an irreplaceable site.
 - h) The Report indicated that should the road extension in future be extended from the proposed section of road, the road can terminate and act as an independent road should the extension be regarded as a "fatal flaw".
 - i) According to the Report the proposed alignment will only direct traffic from east to west. The already approved Olievenhoutbosch Road will direct traffic from west to east.
 - j) The Report indicated for the first phase the proposed section of road will consist of only one lane. If needed, an additional lane will be added in future.
 - k) According to the Report the proposed road route proposal are located on dolomite soils.
 - l) GDARD Biodiversity requested additional specialist studies for possible red data flora. Fauna and avi-fauna species.
 - m) The Report indicated that according to the GDARD, GIDS, 2011 the proposed road traverses a ridge.

According to the Report Alternative 1 and 2 is less sensitive than Alternative 3 which traverses larger areas of grassland and ridge systems.

7.4.6.a Issues and Impacts – Affected Properties

Table 50: Issues and Impacts – Affected Properties

	Issue/ Impact	Positive/ Negative/ Neutral ±	Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact/ Neutral - Not Necessary To Mitigate ✨
36)	Safety during construction	-	😊

7.4.6.b Discussion of issues identified, possible mitigation measures and significance of issue after mitigation

36) Safety during construction

Mitigation measures must be in place to ensure the safety of surrounding residents and businesses, pedestrians, motorists etc.

Table 51: Significance of Issue 36 (Safety during construction) After Mitigation/ Addressing of the Issue

Mitigation Possibilities High 🟢 Medium 😊 Low 🟡 Positive Impact/ Neutral - Not Necessary To Mitigate ✨	Mitigation	Significance of Issue after mitigation
	Already achieved ✓ Must be implemented during P lanning phase, C onstruction and/ or O perational phase	Low/ eliminated L / E Medium M High H

	P / C / O Mitigation	Not possible to mitigate, but not regarded as a fatal flaw NP
Medium ☹️	<p>C - Although regarded as a normal practice, it is important to erect proper signs indicating the operations of heavy vehicles in the vicinity of dangerous crossings and access roads.</p> <p>C - With the exception of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included)</p> <p>C - Construction vehicles and activities to avoid peak hour traffic times</p> <p>C - Surrounding residents must be informed of blasting exercises one week in advance. Blasting operations should be carefully controlled and the necessary safety precautions must be implemented.</p>	<p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p> <p>M - To be included in EMP</p>

Result: Although issue can be mitigated, the significance of the impact should still be determined / confirmed and assessed in the Significance Rating Table

8 Comparative Assessment between Alternative 1, 2 and Alternative 3

The route is underlain by Dolomite, which poses the risk of formation of sinkholes and dolines. Case could also be present due to underlying dolomite. According to GDARD C-Plan 3, 2011 the proposed road traverses a ridge. Ground water pollution potential due to underlying dolomite. As storm water management plan must be implemented during the construction and operational phase of the propose road.

According to GDARD C-Plan 3, 2011 the proposed alignments traverse irreplaceable sites. The proposed alignments of Olievenhoutbosch road could have noise impacts on existing and proposed developments. The proposed alignments could have visual impacts on the surrounding view sheds during the construction

The results of the environmental scan indicated that there are not any “fatal flaws” associated with the relevant section of the proposed Olievenhoutbosch route (Alternative 2 – proposal) and this was confirmed in the environmental impact assessment, as indicated in Sections 6, 7 and 9 of this report.

8.1 Anticipated impacts, including cumulative impacts

The impacts/ aspects (beneficial and adverse) of the proposed section of the Olievenhoutbosch road (Alternative 1,2 “Proposal” and Alternative 3) on the receiving environment were identified. The above impacts, as well as the affected environmental characteristics, are indicated in **Tables 52 and 53** below.

Table 52: Comparative Assessment between impacts of Alternatives 1, 2 and 3 before Mitigation

Environmental Aspects Key to impacts: ☺ 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	☹ m	☹ m	☺	☹ l	☹ m	☹ m	☹ l	☺ m	☺	☺ h	☺	☹ m	☺ h	☺	☹ m	☺ h	☺ h	☺ h	☺ h	☹ x 4 ☺ h x 6 ☺ m x 1 ☹ m x 6 ☹ l x 2
Alternative 2	☹ m	☹ m	☺	☹ l	☹ m	☹ m	☹ l	☺ m	☺	☺ h	☺	☹ m	☺ h	☺	☹ m	☺ h	☺ h	☺ h	☺ h	☺ x 4 ☺ h x 6 ☺ m x 1

																					⊖ m x 6 ⊖ l x 2
Alternative 3	⊖ h	⊖ h	⊖ l	⊖ l	⊖ m	⊖ m	⊖ m	⊕ m	⊖	⊕ h	⊖	⊖ m	⊕ h	⊖	⊖ m	⊕ h	⊕ h	⊕ h	⊕ h		⊕ x 3 ⊕ h x 6 ⊕ m x 1 ⊖ h x 2 ⊖ m x 5 ⊖ l x 2

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	⊖ m	⊖	⊖ m	⊖ m	⊖ m	⊖ l	⊕ m	⊕ h	⊕ h	⊕ h	⊕ l	⊕ m	⊖	⊖ m	⊕ h	⊕ h	⊕ h	⊕ h		⊖ x 2 ⊕ h x 7 ⊕ m x 2 ⊕ l x 1

																				☹ h x 1 ☹ m x 5 ☹ l x 1
Alternative 2	☹ h	☹ m	☺	☹ m	☹ m	☹ m	☺ m	☺ h	☺ h	☺ h	☺ l	☺ m	☺	☹ m	☺ h	☺ h	☺ h	☺ h		☺ h x 7 ☺ m x 1 ☺ l x 2 ☺ x 2 ☹ h x 1 ☹ m x 6
Alternative 3	☹ h	☹ m	☺	☹ m	☹ m	☹ h	☺ l	☺ h	☺ h	☺ h	☺ l	☺ m	☺	☹ h	☺ h	☺ h	☺ h	☺ h		☺ h x 7 ☺ m x 2 ☺ l x 2 ☺ x 2 ☹ h x 2 ☹ m x 4

Table 53: Comparative Assessment between impacts of Alternative 1, 2 and 3 after Mitigation

Environmental Aspects Key to impacts: ☺ 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	☹ l	☹ l	☹ l	☹ l	☹ m	☹ m	☹ l	☺ m	☺	☺ h	☺	☺	☺	☺	☺	☺	☺ h	☺ h	☺ h	☺ h	☺ h x 5 ☺ m x 1 ☺ x 6 ☹ l x 5 ☹ m x 2
Alternative 2	☹ l	☹ l	☹ l	☹ l	☹ m	☹ m	☹ l	☺ m	☺	☺ h	☺	☺	☺	☺	☺	☺	☺ h	☺ h	☺ h	☺ h	☺ h x 5 ☺ m x 1 ☺ x 6

Alternative 2	☺	☺	☺	☹ l	☹ l	☹ m	☹ m	☺ m	☺ h	☺ h	☺ m	☺ l	☺ h	☺	☺	☺ h	☺ h	☺ h	☺ h	☺ h x 7 ☺ m x 2 ☺ l x 1 ☹ x 5 ☹ l x 2 ☹ m x 2
Alternative 3	☺	☺	☺	☹ l	☹ m	☹ h	☹ l	☺ m	☺ h	☺ h	☺ m	☺ l	☺ h	☺	☺	☺ h	☺ h	☺ h	☺ h	☺ h x 7 ☺ m x 2 ☺ l x 1 ☹ x 5 ☹ l x 2 ☹ m x 1 ☹ h x 1
Preferred Alternative	Based on the comparative impact assessment Alternative 1 is regarded as the preferred alternative.																			

8.2 Comparative Assessment between Alternative 1, 2 and Alternative 3

The Tables above are preliminary comparative assessments based on the issues identified in the EIA phase.

The comparative assessment will assist the EAP with the identification of the preferred alternative.

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 preferred alternative for the project.

Table 54: Summary - Comparative Assessment between Alternative 1, 2 and 3 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 4 😊 h x 0	😊 l x 0 😊 m x 3 😊 h x 5	😊 l x 0 😊 m x 0 😊 h x 8
	😞 l x 1 😞 m x 4 😞 h x 1	😞 l x 0 😞 m x 0 😞 h x 0	😞 l x 2 😞 m x 3 😞 h x 0	😞 l x 0 😞 m x 0 😞 h x 0
	😊 x 2	😊 x 0	😊 x 4	😊 x 0
	Alternative 2	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 4 😊 h x 0	😊 l x 0 😊 m x 3 😊 h x 5

	☹️ l x 1 ☹️ m x 4 ☹️ h x 1	☹️ l x 0 ☹️ m x 0 ☹️ h x 0	☹️ l x 2 ☹️ m x 3 ☹️ h x 0	☹️ l x 0 ☹️ m x 0 ☹️ h x 0
	😊 x 2	😊 x 0	😊 x 4	😊 x 0
Alternative 3	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 4 😊 h x 0	😊 l x 2 😊 m x 1 😊 h x 5	😊 l x 0 😊 m x 0 😊 h x 8
	☹️ l x 2 ☹️ m x 2 ☹️ h x 3	☹️ l x 0 ☹️ m x 0 ☹️ h x 0	☹️ l x 0 ☹️ m x 2 ☹️ h x 2	☹️ l x 0 ☹️ m x 0 ☹️ h x 0
	😊 x 1	😊 x 0	😊 x 4	😊 x 0

Table 55: Summary - Comparative Assessment between Alternative 1, 2 and 3 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 2 😊 h x 3	😊 l x 0 😊 m x 0 😊 h x 8
	☹️ l x 5 ☹️ m x 0 ☹️ h x 0	☹️ l x 0 ☹️ m x 3 ☹️ h x 0	☹️ l x 2 ☹️ m x 2 ☹️ h x 1	☹️ l x 0 ☹️ m x 0 ☹️ h x 0
	😊 x 3	😊 x 0	😊 x 8	😊 x 0
Alternative 2	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 0 😊 h x 0	😊 l x 0 😊 m x 2 😊 h x 3	😊 l x 0 😊 m x 0 😊 h x 8

	<p>☹ l x 5</p> <p>☹ m x 0</p> <p>☹ h x 0</p>	<p>☹ l x 1</p> <p>☹ m x 3</p> <p>☹ h x 0</p>	<p>☹ l x 0</p> <p>☹ m x 2</p> <p>☹ h x 1</p>	<p>☹ l x 0</p> <p>☹ m x 0</p> <p>☹ h x 0</p>
	<p>😊 x 3</p>	<p>😊 x 0</p>	<p>😊 x 8</p>	<p>😊 x 0</p>
Alternative 3	<p>😊 l x 0</p> <p>😊 m x 0</p> <p>😊 h x 0</p>	<p>😊 l x 0</p> <p>😊 m x 0</p> <p>😊 h x 0</p>	<p>😊 l x 1</p> <p>😊 m x 2</p> <p>😊 h x 3</p>	<p>😊 l x 0</p> <p>😊 m x 0</p> <p>😊 h x 8</p>
	<p>☹ l x 5</p> <p>☹ m x 0</p> <p>☹ h x 0</p>	<p>☹ l x 0</p> <p>☹ m x 2</p> <p>☹ h x 2</p>	<p>☹ l x 1</p> <p>☹ m x 1</p> <p>☹ h x 1</p>	<p>☹ l x 0</p> <p>☹ m x 0</p> <p>☹ h x 0</p>
	<p>😊 x 3</p>	<p>😊 x 0</p>	<p>😊 x 8</p>	<p>😊 x 0</p>

Summary

From the comparison of the three alternatives it can be concluded that the ecological impact of Alternative 1 and 3 is higher than that of Alternative 2 since a large section of route traverses irreplaceable site, natural grassland areas and a large part of a ridge. **Alternative 1** follows the alignment of a proposed road in approved township **Irene x92, Irene x91 and Irene x89 and** is regarded as the preferred alternative, but from an ecological point of view most of the appointed specialist prefer **Alternative 2**.

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

All three alternatives are in line with the institutional environment including the IDP, the Gauteng Densification Strategy Policy and the Development Facilitation Act.

To conclude, **Alternative 2** is the preferred alternative from a bio-physical and economical point of view and the fauna and flora specialists as well as the land and

environmental planning division of the local authority indicated that they support **Alternative 2.**

9. SIGNIFICANCE ASSESSMENT

9.1 Description of Significance Assessment Methodology

The significance of Environmental Impacts was assessed 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 disfunctional - 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:

$$\begin{aligned} \text{The Severity factor} &= \text{Intensity factor X Duration factor} \\ &= 2 \times 3 \\ &= 6 \end{aligned}$$

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

TABLE 56: 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 GDARD some officials were 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 Ms. Lizelle Gregory, has extensive experience in the field of impact assessments.

9.2 Significance Assessment of Anticipated Impacts

Impacts indicated under each section of the environment were each assessed according to the above methodology. **Table 54** below contains the results of the significance assessment.

TABLE 57: RESULT OF SIGNIFICANCE ASSESSMENT OF IMPACTS IDENTIFIED TO BE ASSOCIATED WITH THE PROPOSED ROAD K220 (AFTER MITIGATION)

Impact	Probability Rating	Severity Rating		Severity Factor	Severity Rating	Significance Rating
		Intensity	Duration			
CONSTRUCTION PHASE						
Beneficial Impacts						
16. The eradication of weeds and exotic invaders	5	4	3	12	4	20 High
30. Creation of temporary Job opportunities.	4	4	2	8	3	12 Medium
Adverse Impacts						
1. Risk for formation of sinkholes and dolines if precautionary measures for construction on dolomite are not followed and if an effective storm water management plan is not implemented.	4	4	4	16	5	20 High
2. Stability of structures	3	4	4	16	5	15 Medium
3. Excavatability problems are foreseen and some blasting exercises may be required	3	4	4	16	5	15 Medium
4. Potential damage to metallic elements placed underground due	3	4	4	16	5	15 Medium

to corrosive soils in dolomitic areas						
5. Erosion	3	4	4	16	5	15 Medium
6. Stockpile areas for construction materials and topsoil	3	4	4	16	5	15 Medium
7. Siltation, erosion and water pollution could occur in the Sesmyl Spruit and associated wetlands as well as systems lower down in the catchment area if a stormwater management plan is not implemented.	3	4	4	16	5	15 Medium
8. Groundwater pollution and contamination of the Sesmyl spruit and associated wetlands.	3	4	4	16	5	15 Medium
9. Perched water conditions	4	2	4	8	3	12 Medium
10. Increased storm water runoff from road into surrounding natural areas	3	4	4	16	5	15 Medium
11. Due to the topography only sections of the proposed Olievenhoutbosch road will be visible from view sheds in the flatter areas around the study area.	4	2	4	8	3	12 Medium
12. 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.	2	2	4	8	3	6 Low
13. If dry and windy conditions occur during the construction phase, dust pollution could become a problem. Although this impact will only be a short term impact, mitigation will be necessary during the construction phase.	2	2	4	8	3	6 Low
14.	3	4	4	16	5	15

Impact on natural grassland areas						Medium
15. Impact on riparian vegetation of the Sesmyl spruit and associated wetland	3	2	4	8	3	6 Low
17. If the entire road alignment area is cleared at once, smaller birds, mammals and reptiles will not be afforded the chance to weather the disturbance in an undisturbed zone close to their natural territories.	2	4	2	8	3	6 Low
18. Noise of construction machinery could have a negative impact on the fauna species during the construction phase.	2	4	2	8	3	6 Low
19. During the construction and operational phase (if not managed correctly) fauna species could be disturbed, trapped, hunted or killed.	3	4	4	16	5	15 Medium
20. Loss of habitat can lead to the decrease of fauna numbers and species.	3	4	4	16	5	15 Medium
21. Structures of cultural and historical significance may be destroyed.	2	4	4	16	4	8 Medium
22. Loss of agricultural land	3	2	4	8	3	9 Medium
27. Impact on existing infrastructure and services (i.e. electricity, water, damage to Telkom cables) during the construction of the proposed road.	3	4	4	16	5	15 Medium
32. Expropriation of properties	5	4	4	16	5	25 High
33. Impact on agricultural land and agricultural holdings	3	4	4	16	5	15 Medium
35.	3	4	4	16	5	15

Access to local roads and properties						Medium
36. Safety during construction	3	4	4	16	5	15 Medium
OPERATION PHASE						
Beneficial Impacts						
25. The proposed construction of the involved section of Olievenhoutbosch road will be in line with the international, national, provincial and local legislation, planning frameworks, guidelines, policies etc.	5	4	4	16	5	25 High
28. The proposed Olievenhoutbosch road will improve regional accessibility in the area. The extension of the road links with the R21 and provides access to the surrounded developments.	5	4	4	16	5	25 High
29. The proposed route will divert traffic from existing road network links and thereby alleviate congestion on the existing road network system.	5	4	4	16	5	25 High
31. The developer will deliver a large contribution to the infrastructure in the area	5	4	4	16	5	25 High
Adverse Impacts						
1. Risk for formation of sinkholes and dolines if precautionary measures for construction on dolomite are not followed and if an effective storm water management plan is not implemented.	4	4	4	16	5	20 High
2. Stability of structures	3	4	4	16	5	15 Medium
8. Siltation, erosion and water pollution could occur if a stormwater management plan is	4	4	4	16	5	20 High

not implemented.						
11. Due to the topography only sections of the proposed Olievenhoutbosch road will be visible from view sheds in the flatter areas around the study area.	4	2	4	8	3	12 Medium
26. If not planned and managed 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.	2	2	4	8	3	6 Low
32. Expropriation of properties	5	4	4	16	5	25 High
33. Impact on agricultural land and agricultural holdings	4	4	4	16	5	20 High
24. Noise impact	5	2	4	8	3	15 Medium
34. Impact on property values	3	4	4	16	5	15 Medium
35. Access to local roads and properties	5	2	4	8	3	15 Medium

9.3 Discussion of Significance Assessment

Six beneficial impacts associated with the proposed road are anticipated, of which five have a high significance rating. The Environmental Management Plan (**Refer to Annexure L**) contains measures to achieve maximum gain from the above beneficial impacts. Five of the anticipated beneficial impacts are Socio-economic related, and one relate to the physical environment. This indicates that the proposed development should contribute to an improvement in the quality of life of the people residing in the broader area and the quality of the physical environment.

Of the thirty-six anticipated adverse impacts associated with the construction and operational phases of the proposed road six of the anticipated impacts have a high significance rating, twenty four impacts have a medium significance rating and six have a low significance rating.

Measures that are recommended in this report and the Environmental Management Plan could mitigate the medium and high-anticipated adverse impacts to an acceptable level. No “fatal flaw” adverse impacts, or adverse impacts that cannot be adequately mitigated, are anticipated to be associated with the proposed construction of the involved section of Olievenhoutbosch road.

10 CONCLUSION

The purpose of the EIA (Environmental Impact Assessment) process was to investigate the Biophysical and Socio-economic environments further by means of specialist studies to identify further issues/impacts of the proposed Olievenhoutbosch road on these environments. Further, to provide mitigation measures for adverse impacts and to assess the significance of these impacts over the short and long term.

In this specific case the proposed road will traverse a site/ areas that incorporate sensitive vegetation species, but the need for the road in the area is regarded as equally important. The implementation of the proposed road will improve the quality of the life's of the people that reside around the road and that uses this busy road network system on a daily basis. At present the traffic congestion problems experienced are unbearable and such traffic congestion problems also create conditions that make it almost impossible for emergency vehicles to move through the area.

As environmental consultants Bokamoso feel satisfied that all site sensitivities were taken into consideration when the alignment was finalised and it is recommended that the proposed alignment (Alternative 2) be accepted as the alignment for the road.

The most significant environmental issues that were identified are the following (**refer to Figure 22, Sensitivity Map**):

- **Geotechnical:** A large portion of the route underlain by dolomite which poses the risk of formation of sinkholes and dolines. There is also the possibility of caves present due to the underlying dolomite.
- **Hydrology:** All three alignments slope towards the Sesmyl Spruit and associated wetland. Groundwater pollution due to the underlying dolomite. The eastern section of the road will traverse a small watercourse, which is already severely affected by human intervention (i.e. the construction of the R21 Freeway) and the road must incorporate a bridge structure/ sufficient culverts to allow for the free flow of water in order to sustain the hydrological and ecological regime. Section 21 (c) and (i) licenses will be required for this watercourse crossing.
- **Ridges:** This proposed alternative 3 passes the quartzite ridge and the lower dolomitic slopes near areas where a Threatened plant species, *Melolobium subspicatum* are present.
- **Fauna and flora:** The Red list *Melolobium subspicatum* was found in the Mixed grassland on shallow dolomite study unit within 200 meters of the proposed route. The *Tristachya – Monocymbium chert-* Quartz outcrop, the Quartz slope vegetation and the Mixed grassland on shallow dolomite study units were considered sensitive. From all the biodiversity studies undertaken it is clear that the north-eastern section which mostly covers Alternative 3 of the route is highly sensitive.
- **Impact on agricultural land and agricultural holdings:** None of the alignments cut through agricultural land and the Kungwini/Ekurhuleni Agricultural Hub. However, the route traverses areas ranging from moderate to low agricultural potential.

- **Relocation of services:** The involved section of route will require the relocation of services.
- **Visual Impact:** Due to the topography only sections of the proposed road will be visible from surrounding view-sheds.
- **Noise Impact:** Pro-active planning in the area had already taken place around the Olievenhoutbosch road alignment. The involved section of the route was taken into consideration during the layout designs of proposed new developments in the area. If planned correctly, the proposed route should therefore not have a significant noise impact on the surrounding environment (currently and in future).
- **Access to local and Provincial roads and properties:** Access to local and provincial roads and properties could be restricted during the construction of the road. Links and access to existing local and Provincial roads as well as future Provincial roads must be provided according to requirements.
- **Access to properties:** The involved section of Olievenhoutbosch road intersect with other important routes including N1-R21, PWV6, K105, Nellmapius Drive, River Road and the Pretoria-Germiston railway line. These access routes will provide access to the surrounding properties as well as the approved Irene x91 development.
- **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 Olievenhoutbosch road will provide access to the approved Irene x91 development as well as the surrounding residential areas and will establish another element to facilitate a more balanced road network as well as improve regional access to the area.

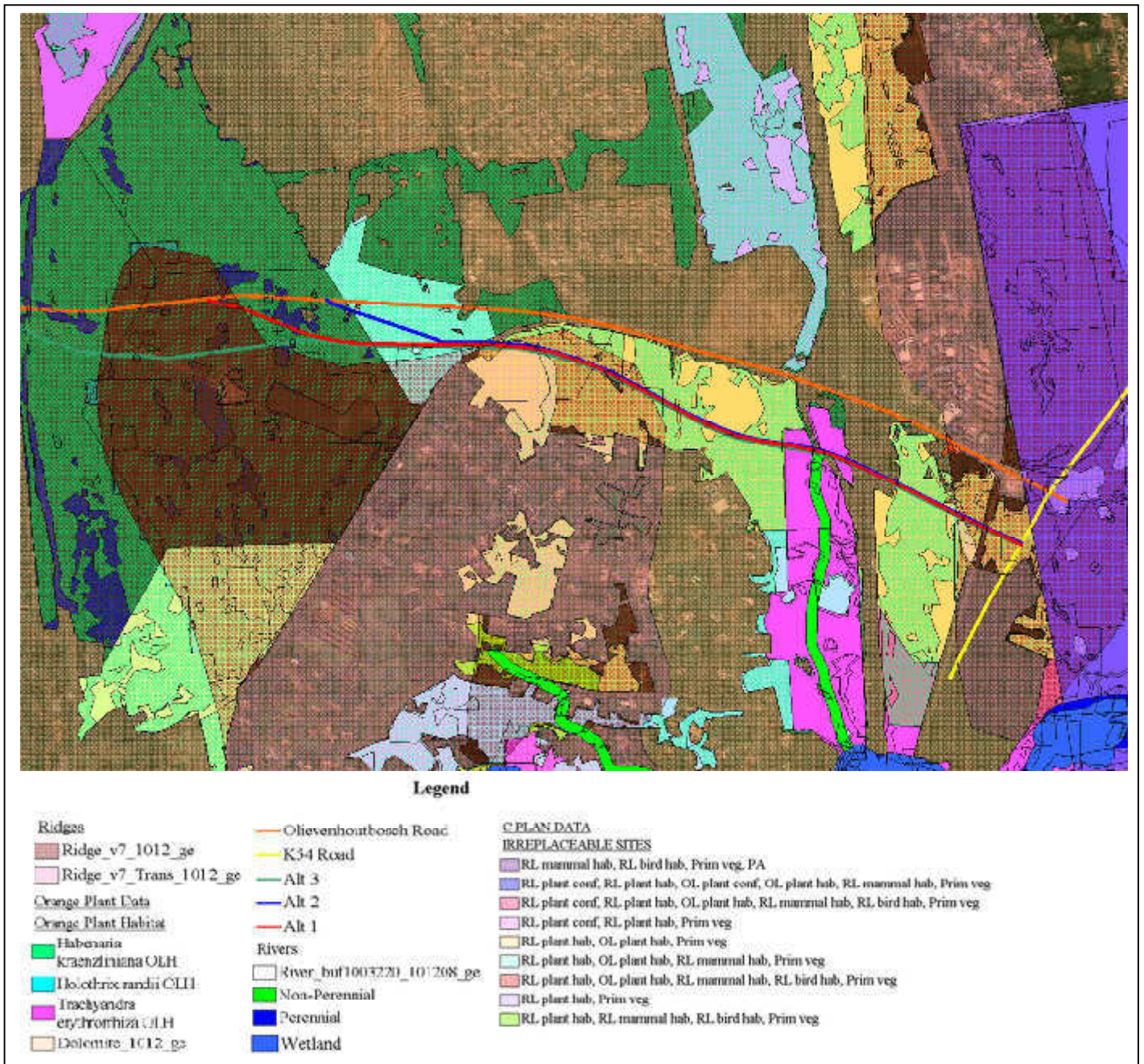


Figure 22 – Sensitivity Map

11. RECOMMENDATIONS

It is believed that the impacts identified have not been of such a nature that short and long term mitigation cannot occur and therefore it is recommended that the **Route Determination and Preliminary Design Phases** of the proposed road be approved subject to:

- 1) The implementation of the mitigation measures contained in the Environmental Management Plan (**Annexure L**) to achieve maximum advantage from beneficial impacts, and sufficient mitigation of adverse impacts;
- 2) The finalization of the access / interchanges during the detail design phase of the road;
- 3) The finalization of culvert/ridge details during the detail design phase of the road and such bridge or culvert details must be approved by the Department of Water and Sanitation (DWS) and copies of the approvals must be supplied to GDARD for record keeping purposes;
- 4) The applicant must obtain the necessary Section 21 Water-Use licenses from the Department of Water and Sanitation (DWS);
- 5) A detailed geotechnical study and the comments from the Council for Geosciences during the detail design phase of the road.

Annexure A

Enlargement of Figures



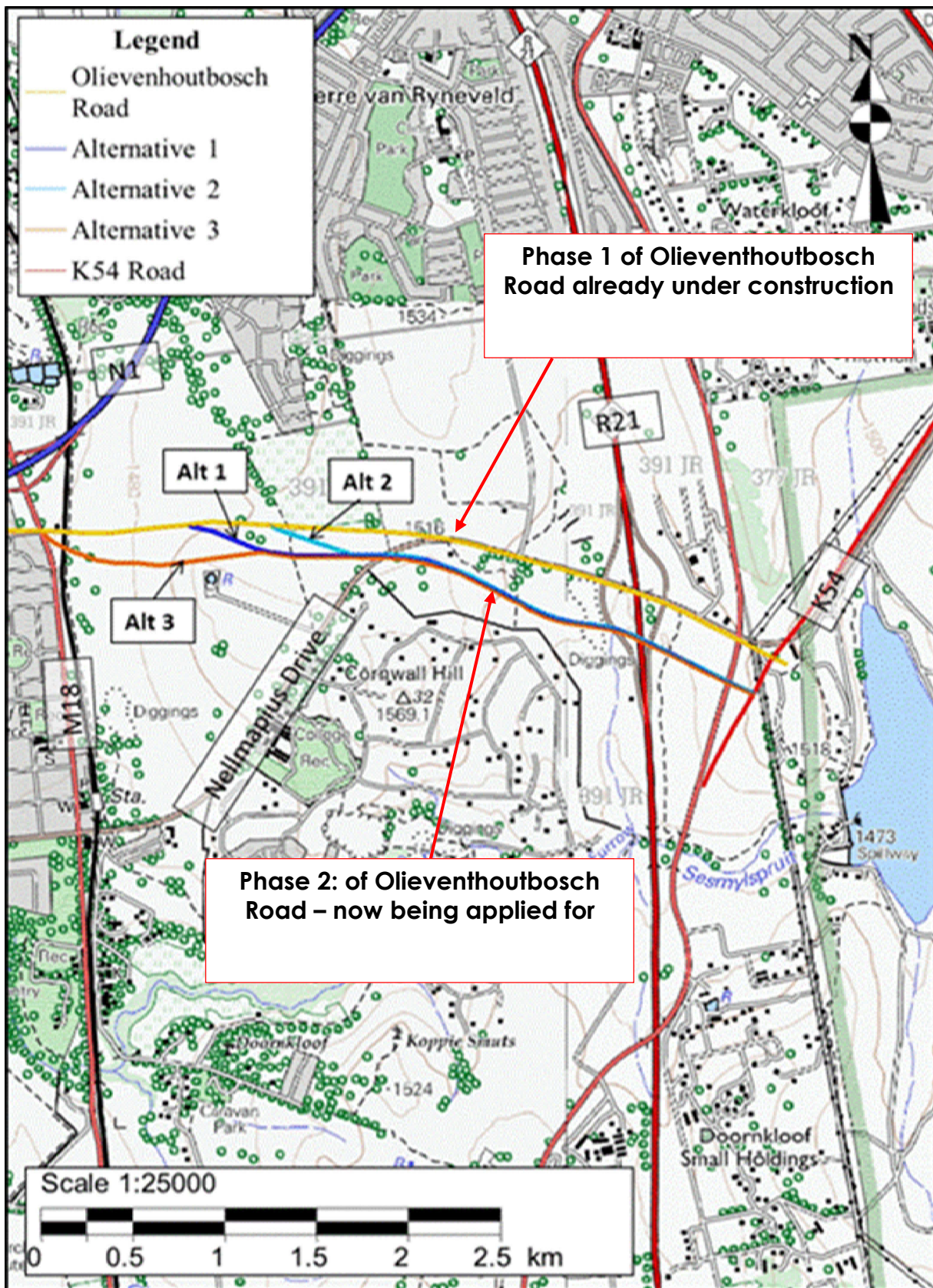


Fig 1: Locality Map

**Olievenhoutbosch Road
(Main Road to K54)**



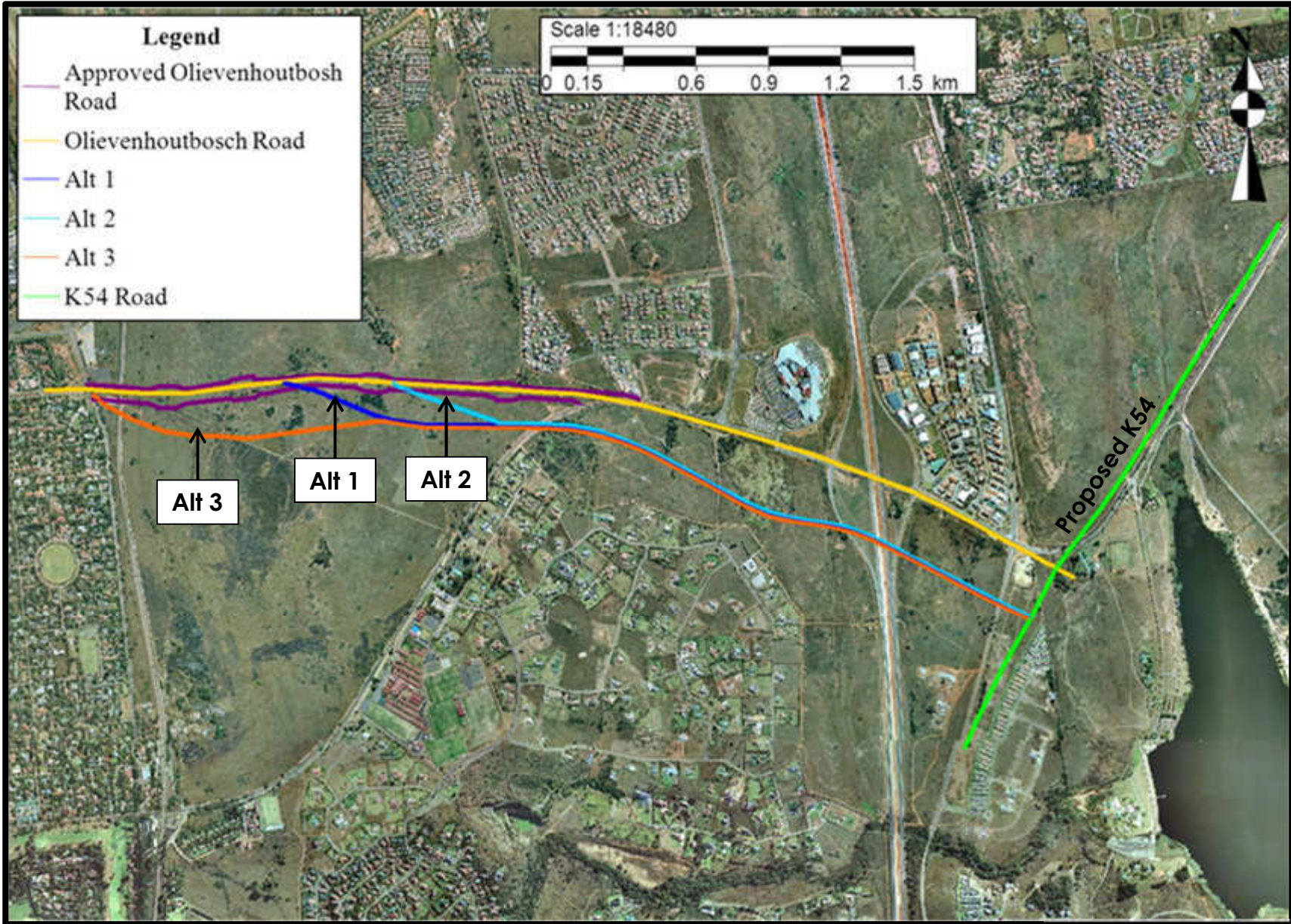
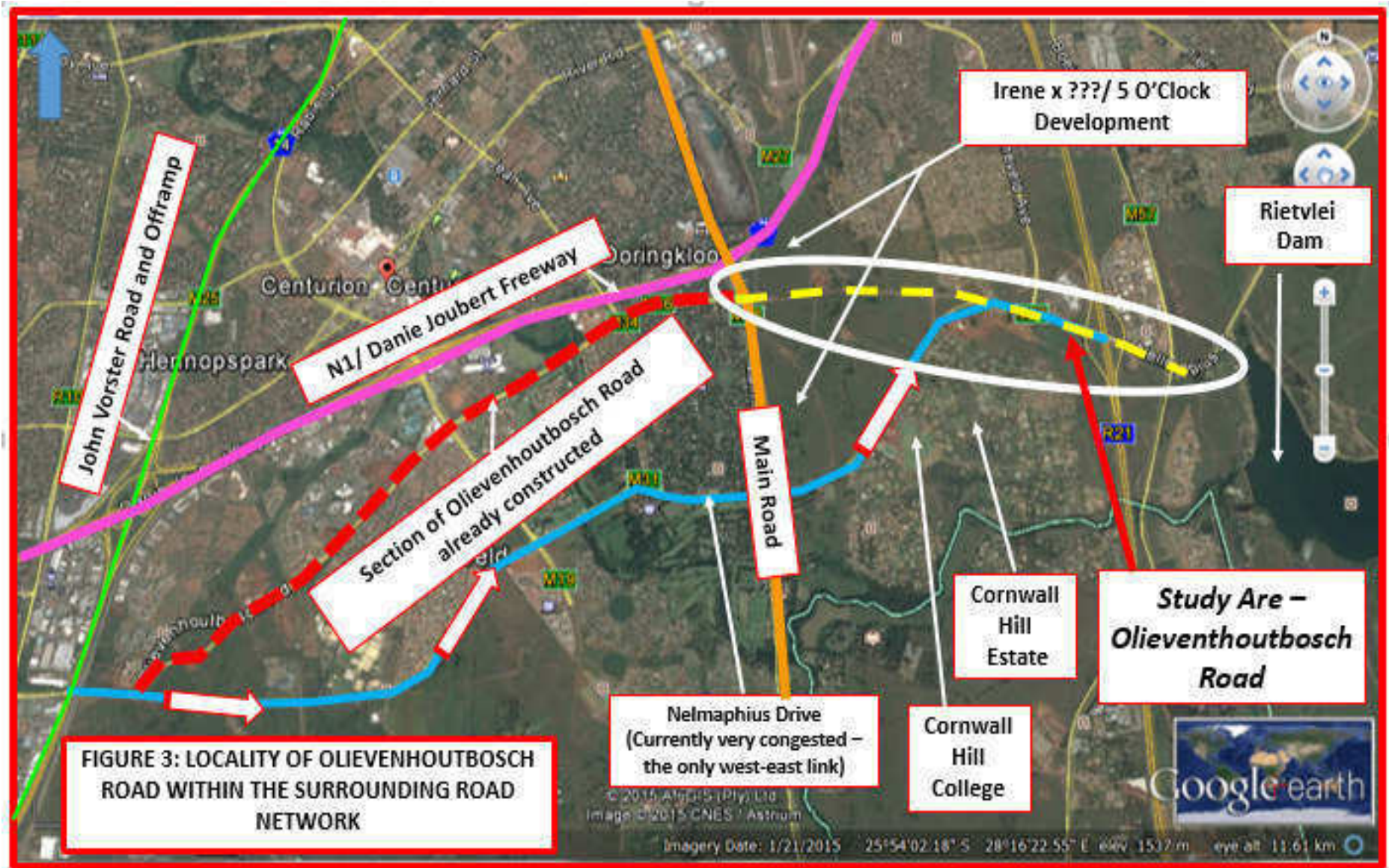


Fig 2: Aerial Map

Olievenhoutbosch Road
(Main Road to K54)







FRAMEWORK : IRENE X92 ROD APPROVALS

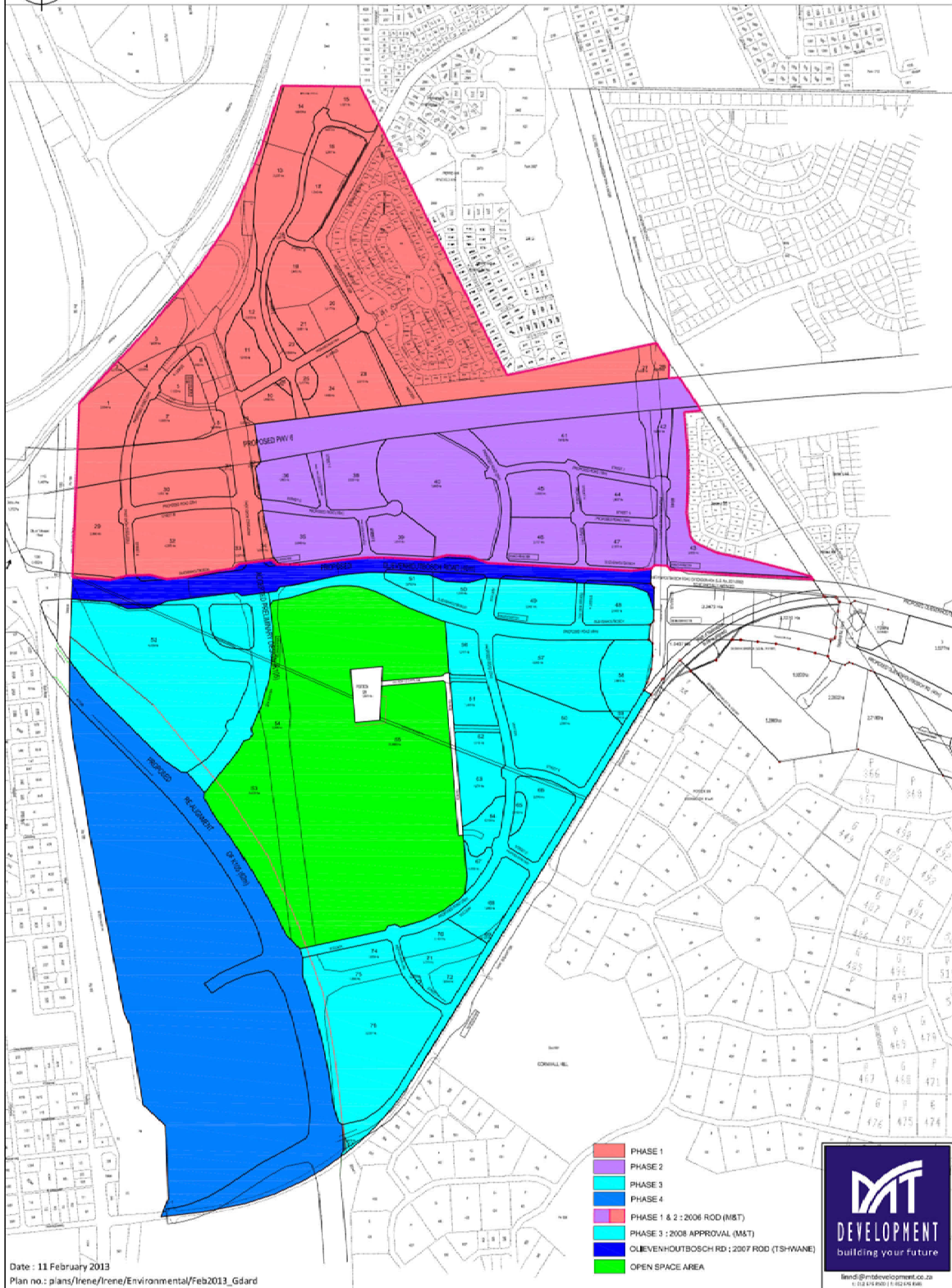


Fig 5: Approved Irene X 92
Layout Map

Olievenhoutbosch Road
(Main Road to K54)



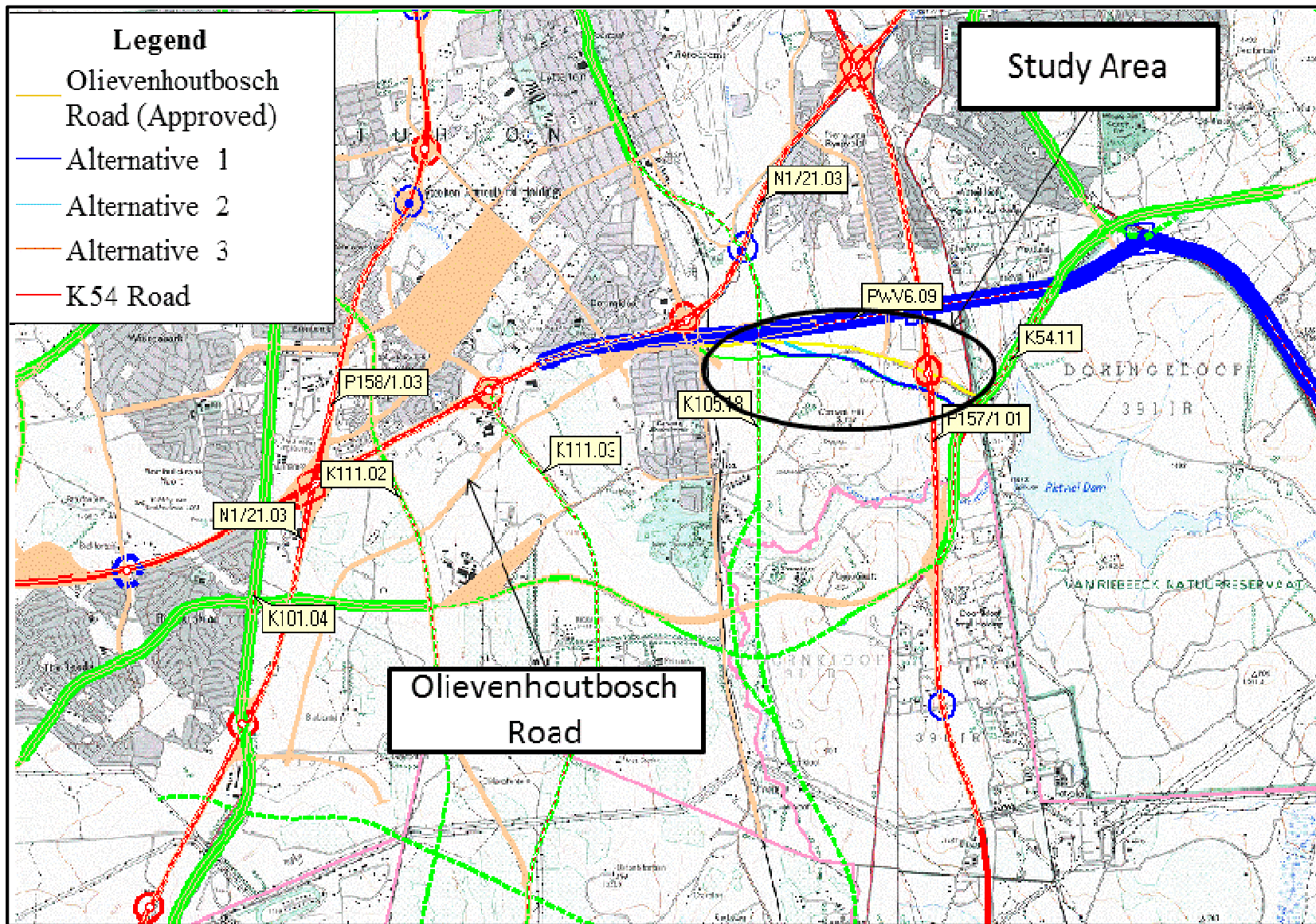
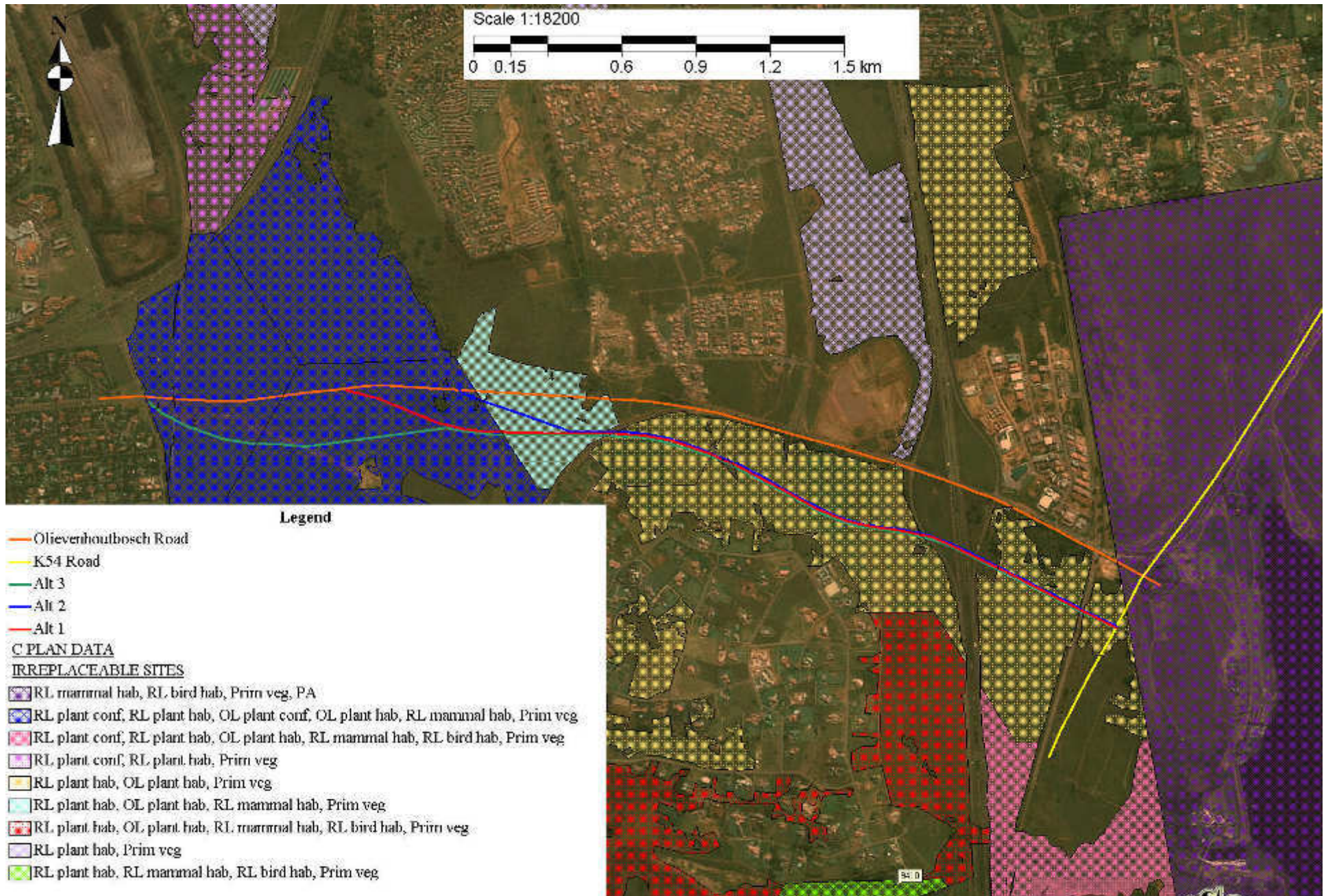


Fig 6: Future road network

**Olievenhoutbosch Road
(Main Road to K54)**





**Fig 7: Irreplaceable Sites
Map**

**Olievenhoutbosch Road
(Main Road to K54)**



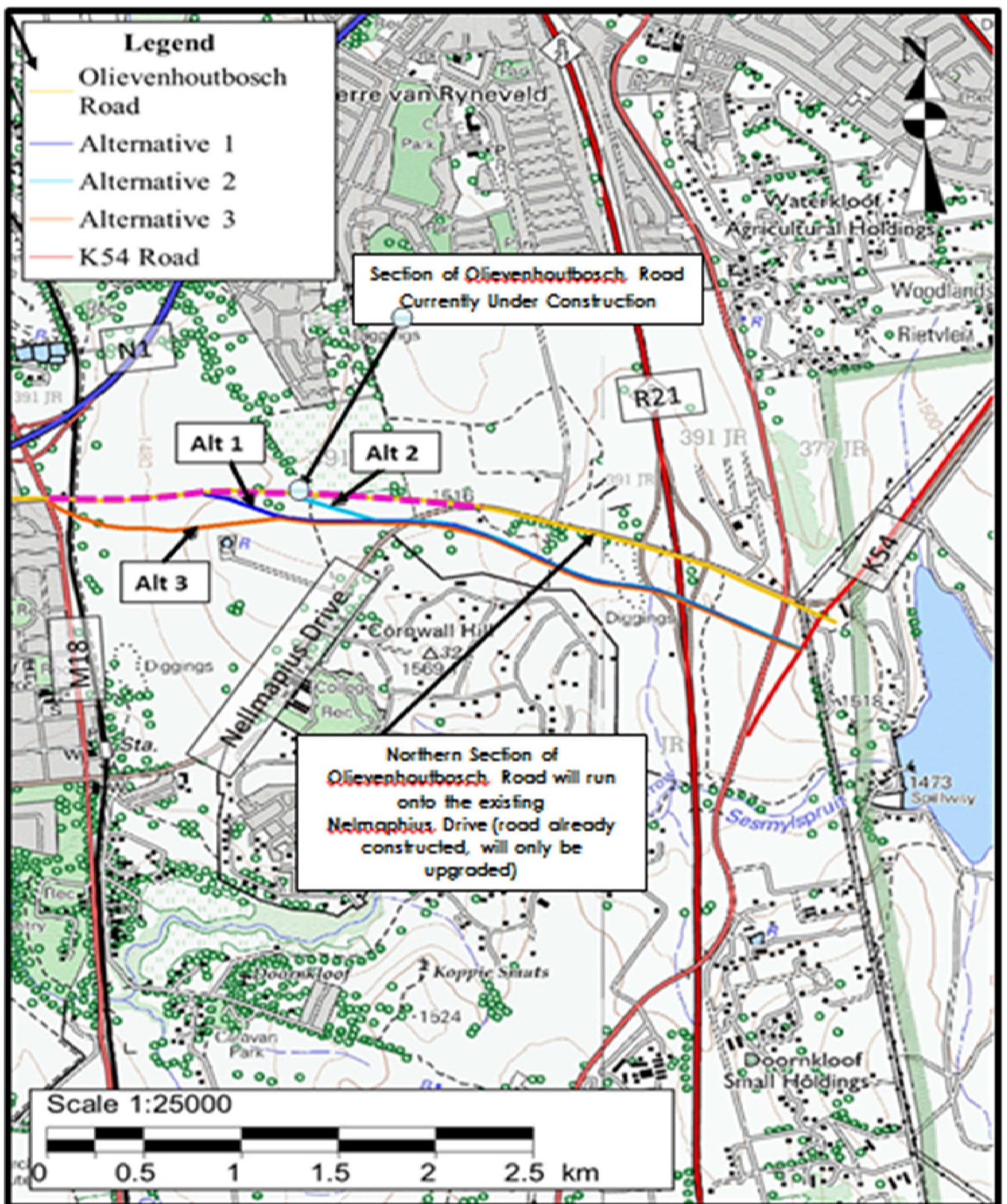


Fig 8a: Alternative Alignments

Olievenhoutbosch Road
(Main Road to K54)



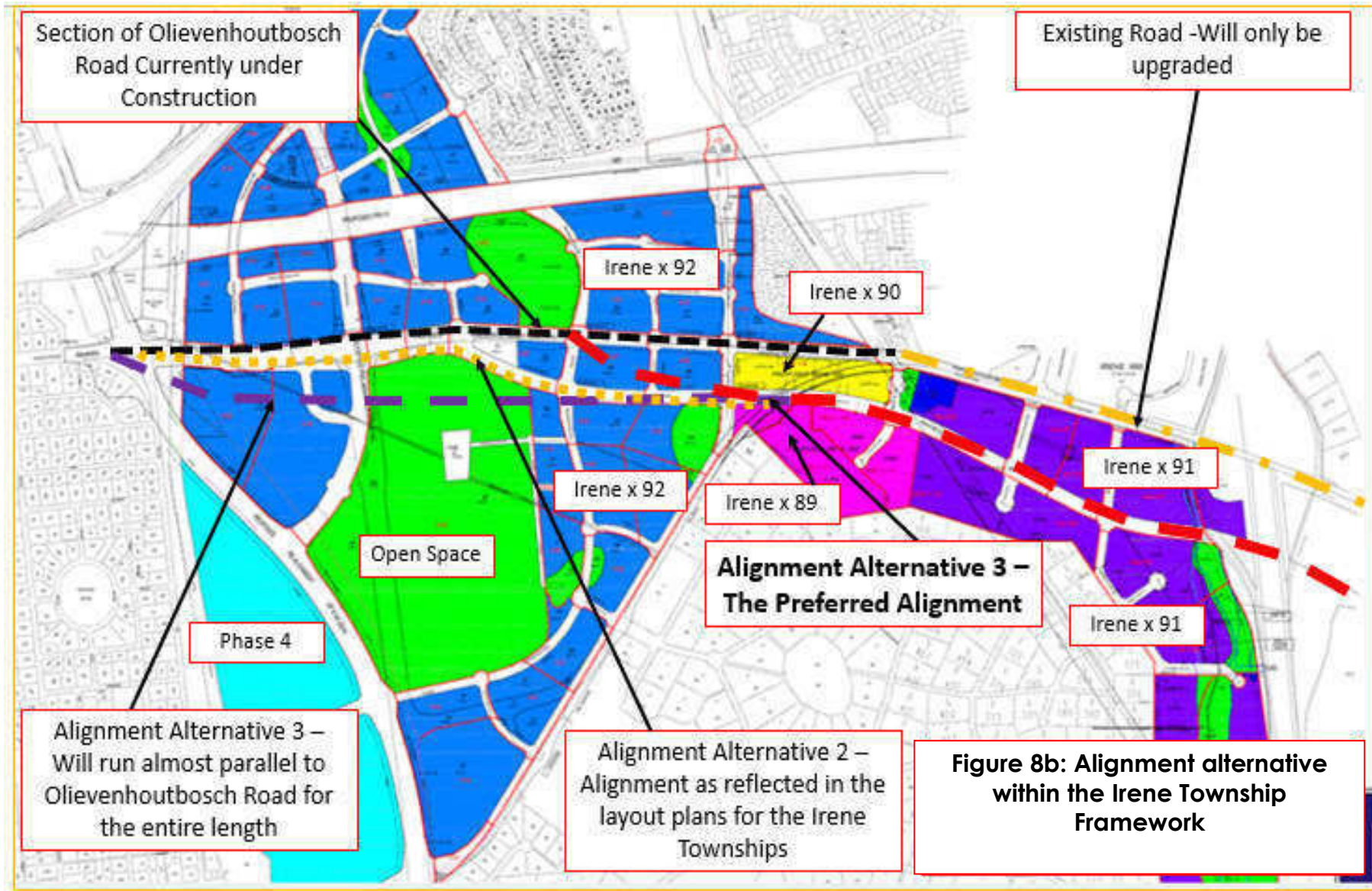


Figure 8b: Alignment alternative within the Irene Township Framework

Fig 8b: Alternative Alignments

Olievenhoutbosch Road
(Main Road to K54)



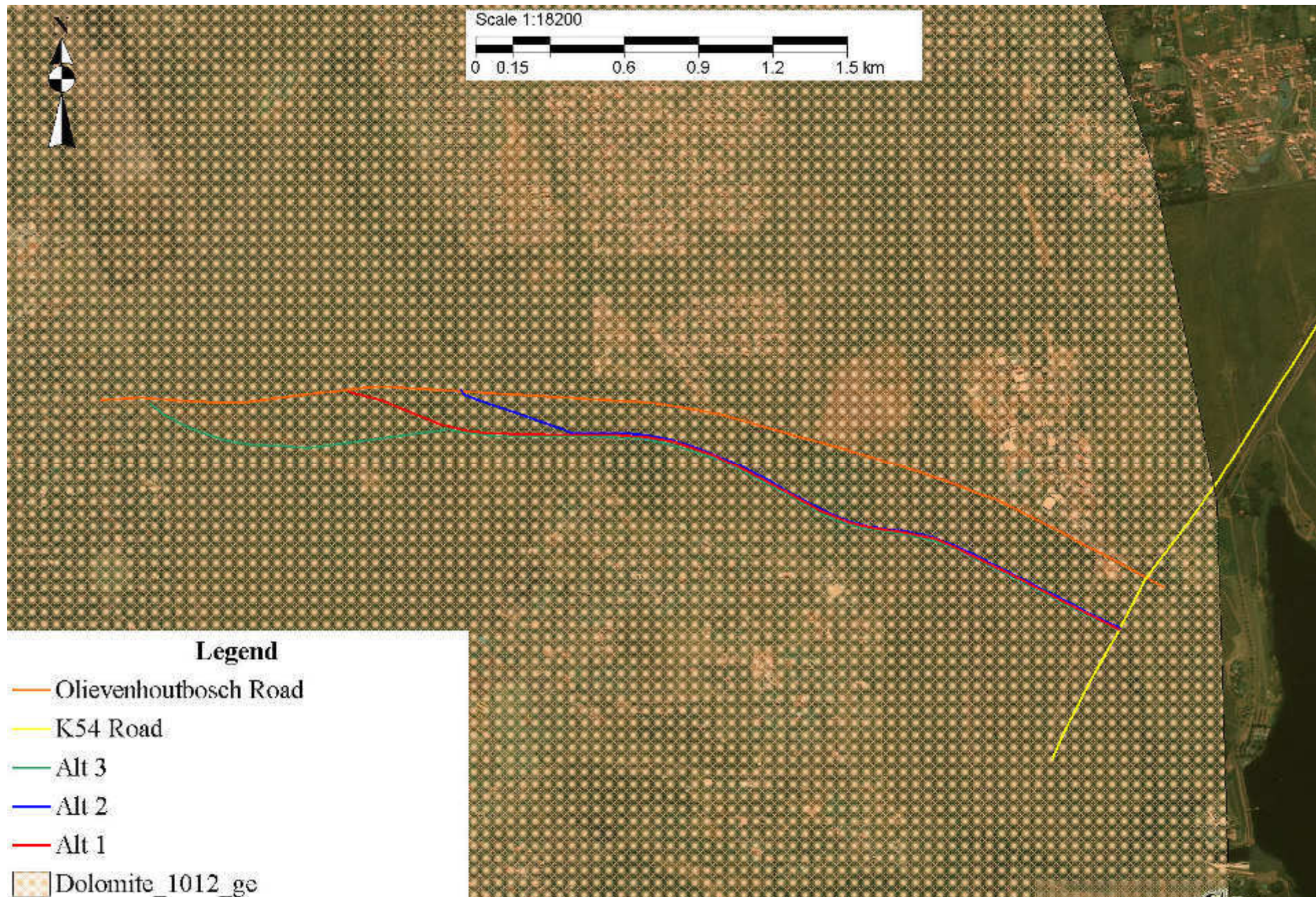


Fig 9: Dolomite Map

Olievenhoutbosch Road
(Main Road to K54)



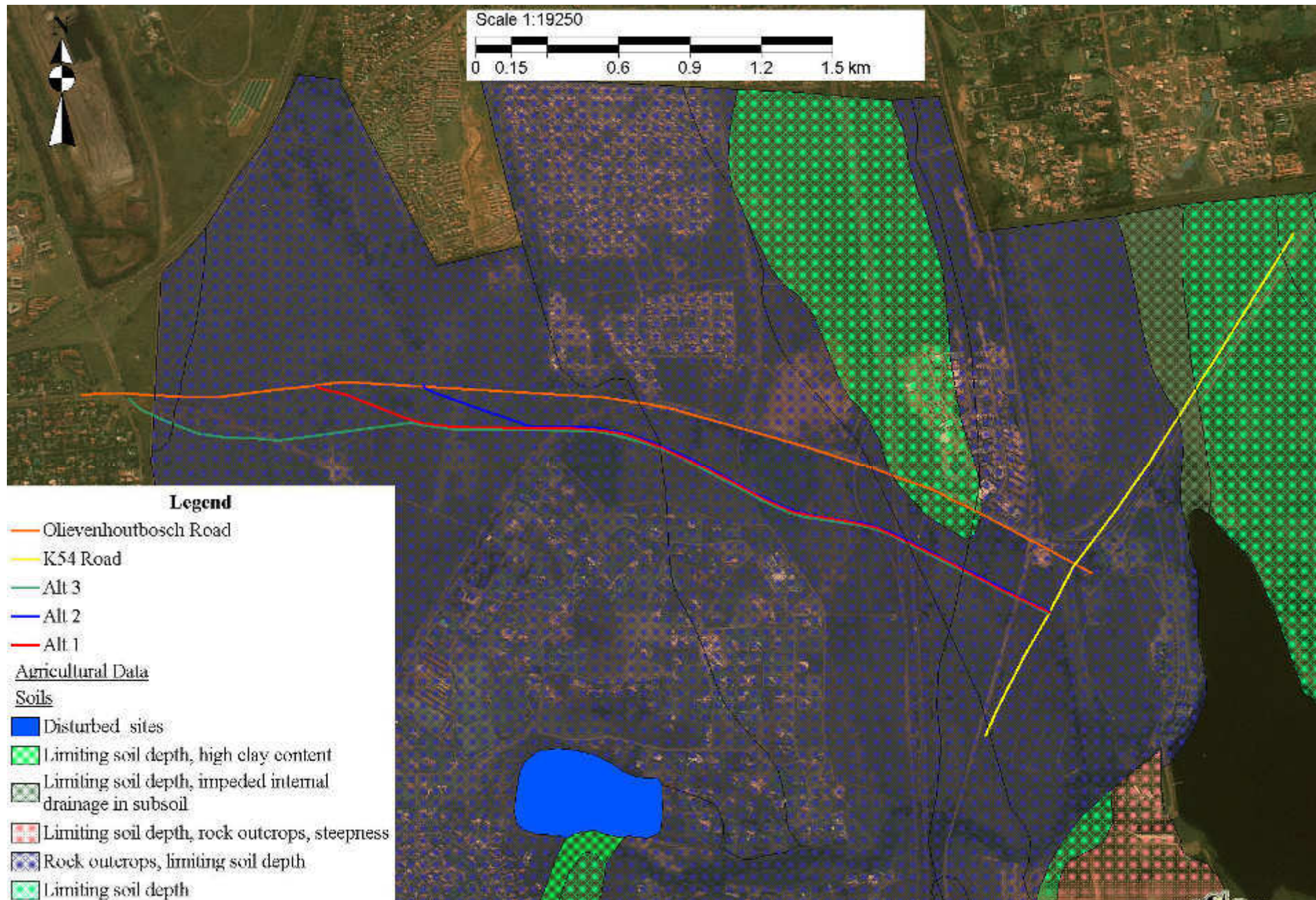


Fig 9: Soils Map

**Olievenhoutbosch Road
(Main Road to K54)**



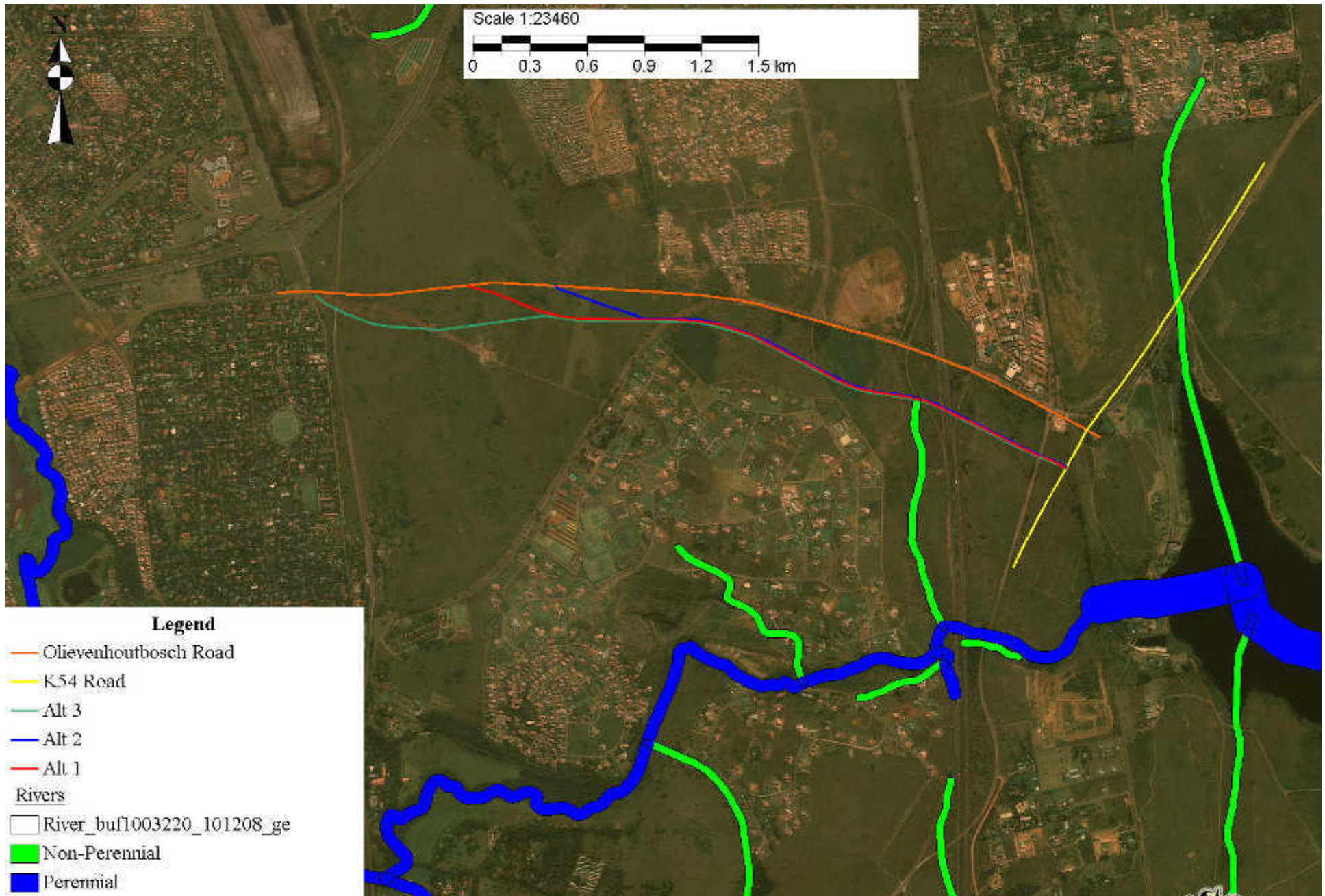
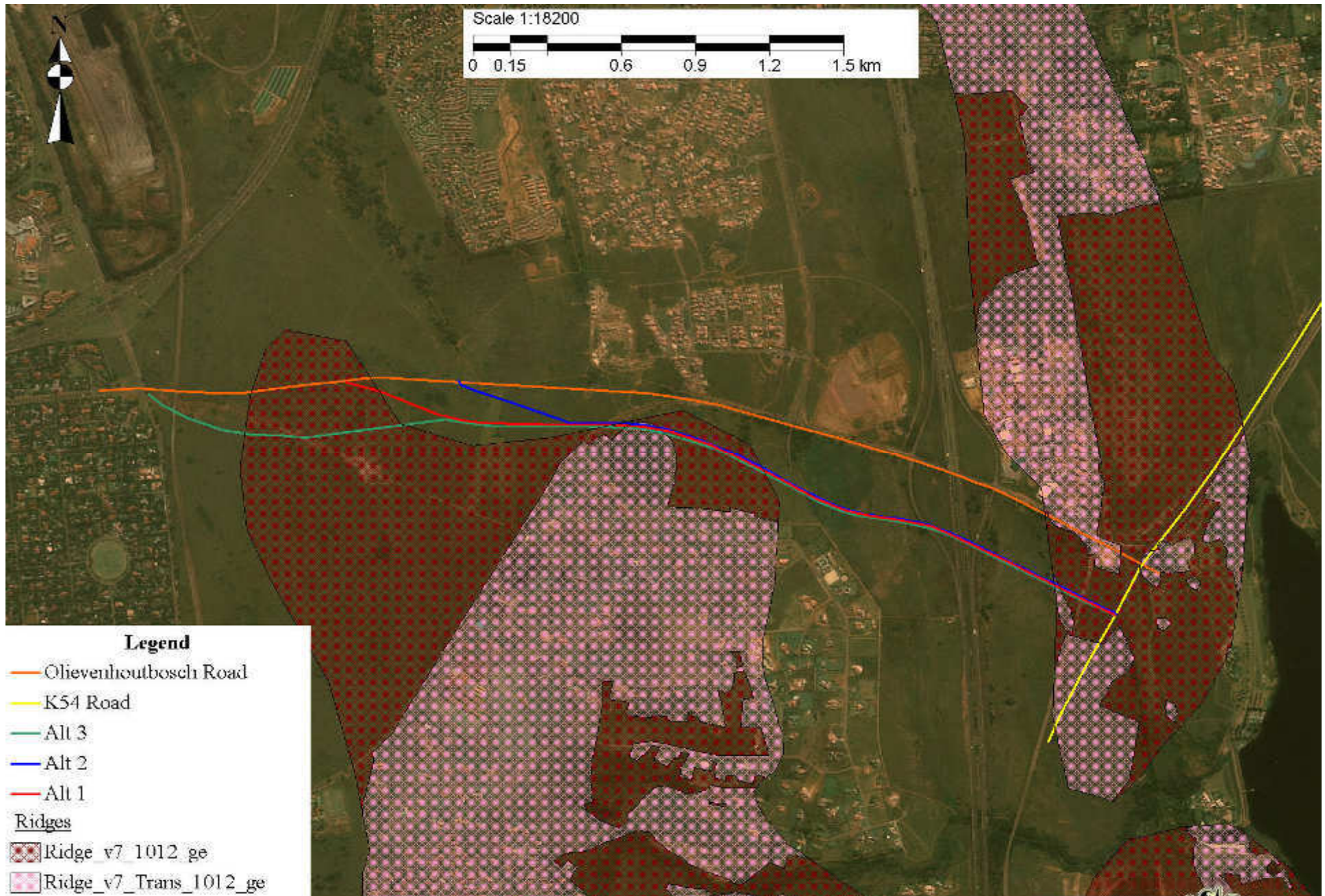


Fig 11: Hydrology Map

Olievenhoutbosch Road (Main Road to K54)





**Fig 12: GDARD C-Plan
Ridges Map**

**Olievenhoutbosch Road
(Main Road to K54)**



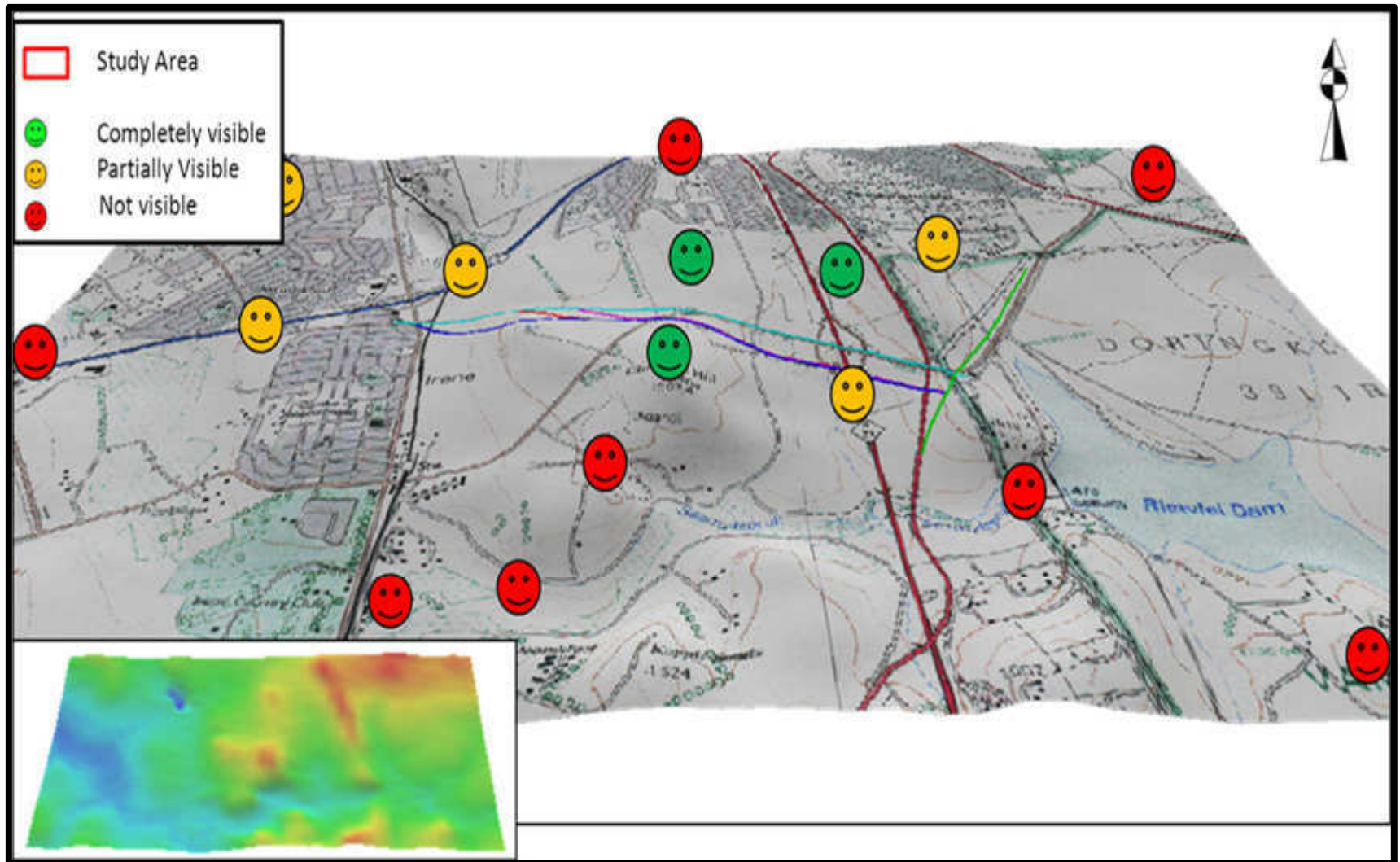


Fig 13: Visual Assessment Map

**Olievenhoutbosch Road
(Main Road to K54)**





**Fig 15: *Eragrostis* - Hyparrhenia
grassland east of the highway R21**

**Olievenhoutbosch Road
(Main Road to K54)**





**Fig 16: *Tristachya* – *Monocymbium*
Chert south of Nellmapuis Road**

**Olievenhoutbosch Road
(Main Road to K54)**





Fig 17: Mixed alien and indigenous vegetation

**Olievenhoutbosch Road
(Main Road to K54)**





**Fig 18: Quartz slope vegetation
on reservoir koppie**

**Olievenhoutbosch Road
(Main Road to K54)**





**Fig 19: Copes of trees in the
Acacia karroo woodland**

**Olievenhoutbosch Road
(Main Road to K54)**





Fig 20: Mixed grassland on shallow dolomite

**Olievenhoutbosch Road
(Main Road to K54)**



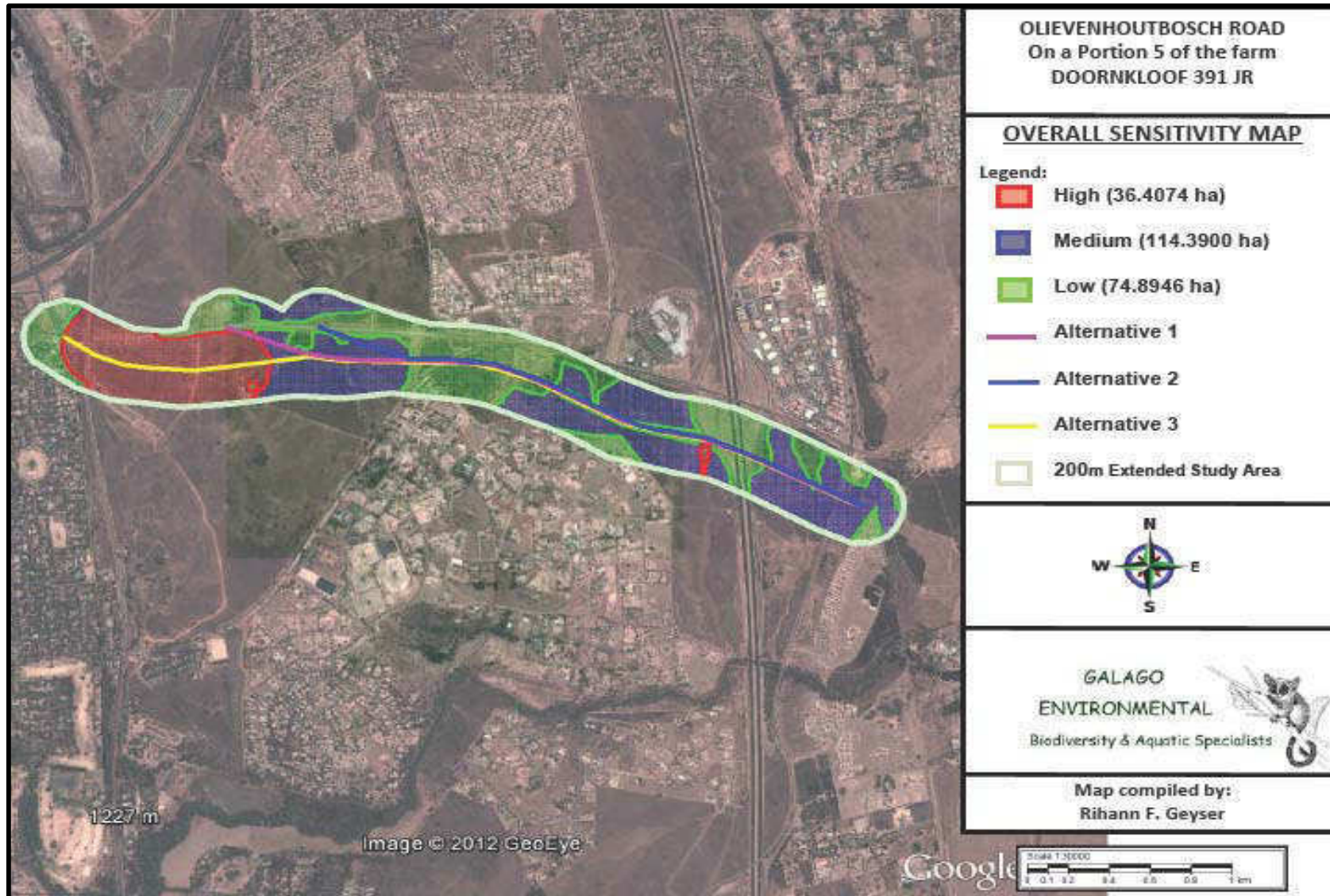
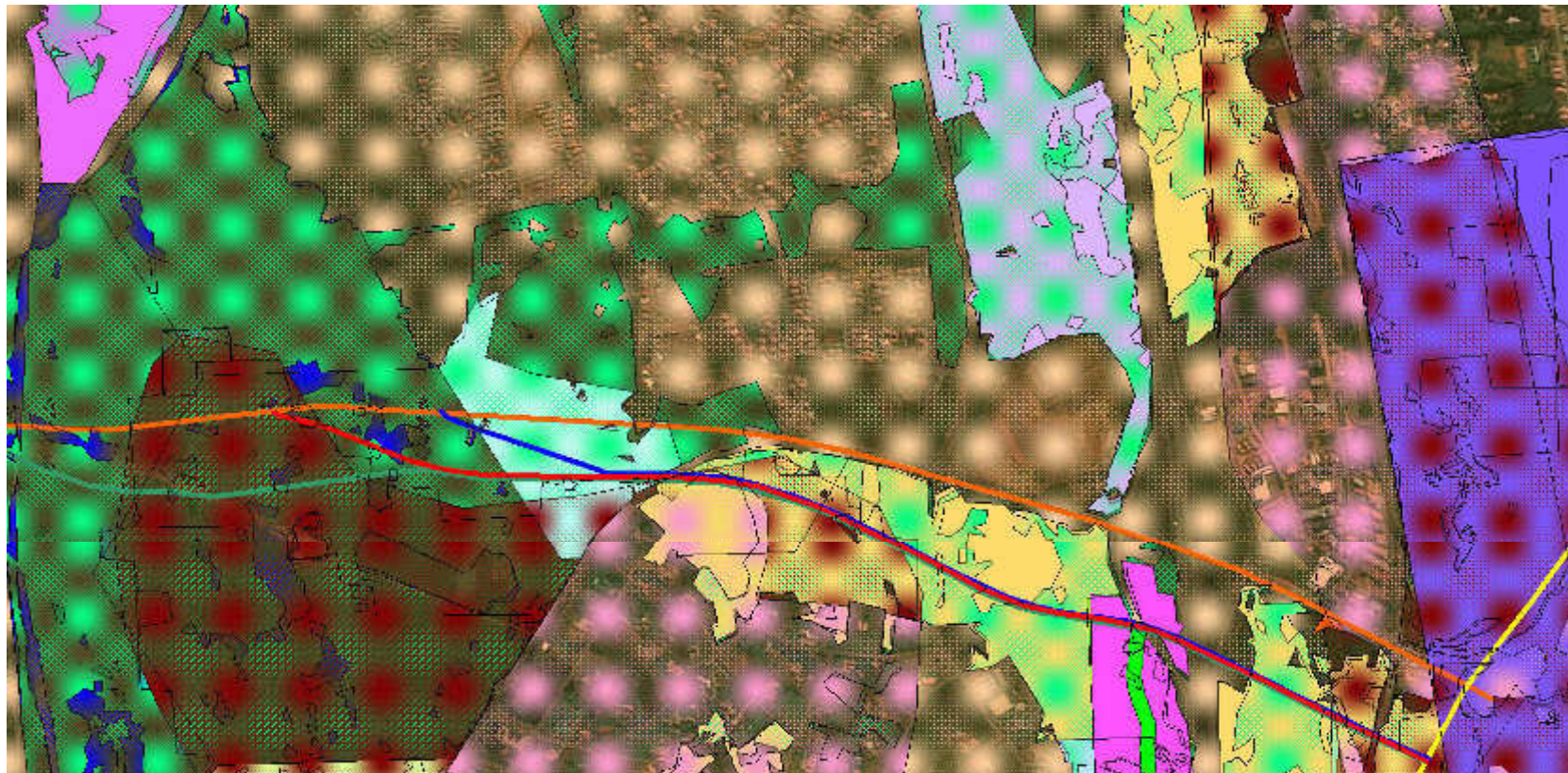


Fig 21: Fauna and Flora Sensitivity Map

**Olievenhoutbosch Road
(Main Road to K54)**





Legend

Ridges

- Ridge_v7_1012_ge
- Ridge_v7_Trans_1012_ge

Orange Plant Data

Orange Plant Habitat

- Habenaria kraenzliniana OLH
- Helictrix randii OLH
- Trachyandra erythromiza OLH
- Dolomite_1012_ge

- Olievenhoutbosch Road

- K54 Road

- Alt 3

- Alt 2

- Alt 1

Rivers

- River_buf1003220_101208_ge
- Non-Perennial
- Perennial
- Wetland

C PLAN DATA

IRREPLACEABLE SITES

- RL mammal hab, RL bird hab, Prim veg, PA
- RL plant conf, RL plant hab, OL plant conf, OL plant hab, RL mammal hab, Prim veg
- RL plant conf, RL plant hab, OL plant hab, RL mammal hab, RL bird hab, Prim veg
- RL plant conf, RL plant hab, Prim veg
- RL plant hab, OL plant hab, Prim veg
- RL plant hab, OL plant hab, RL mammal hab, Prim veg
- RL plant hab, OL plant hab, RL mammal hab, RL bird hab, Prim veg
- RL plant hab, Prim veg
- RL plant hab, RL mammal hab, RL bird hab, Prim veg

Fig 22: Preliminary Sensitivity Map

**Olievenhoutbosch Road
(Main Road to K54)**



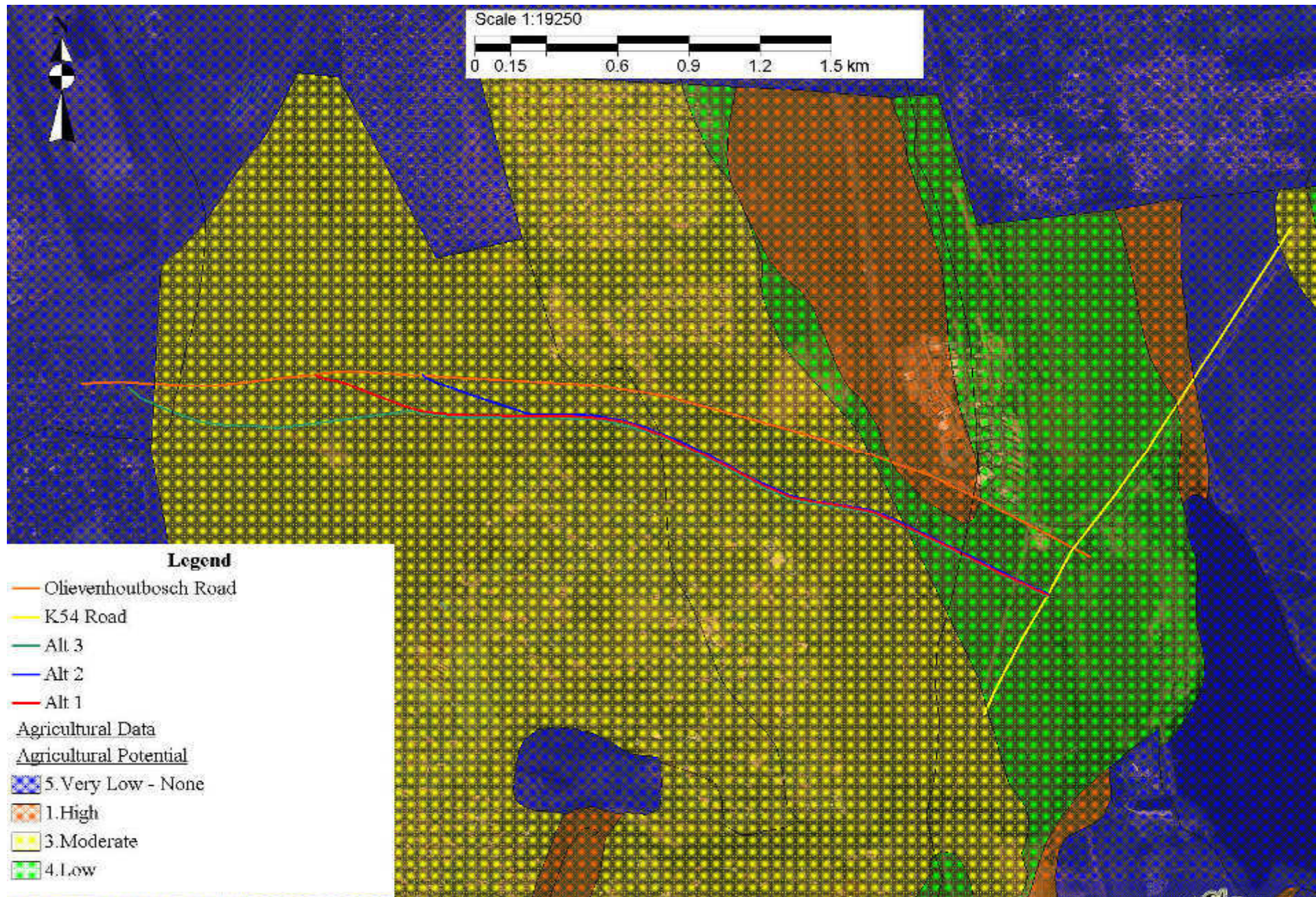


Fig 23: GAPA 3 Agricultural Potential Map

**Olievenhoutbosch Road
(Main Road to K54)**



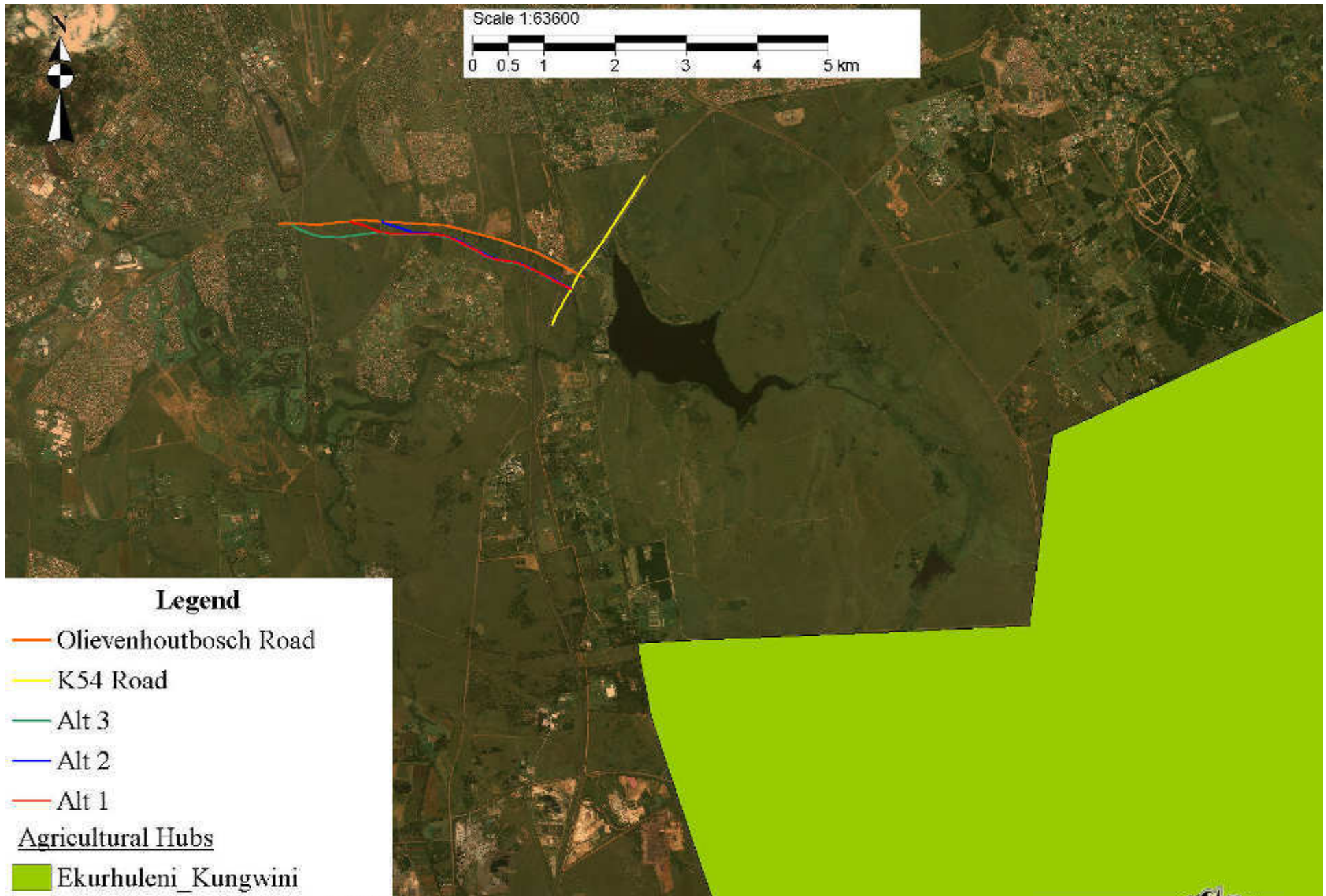


Fig 24: Agricultural Hubs

**Olievenhoutbosch Road
(Main Road to K54)**



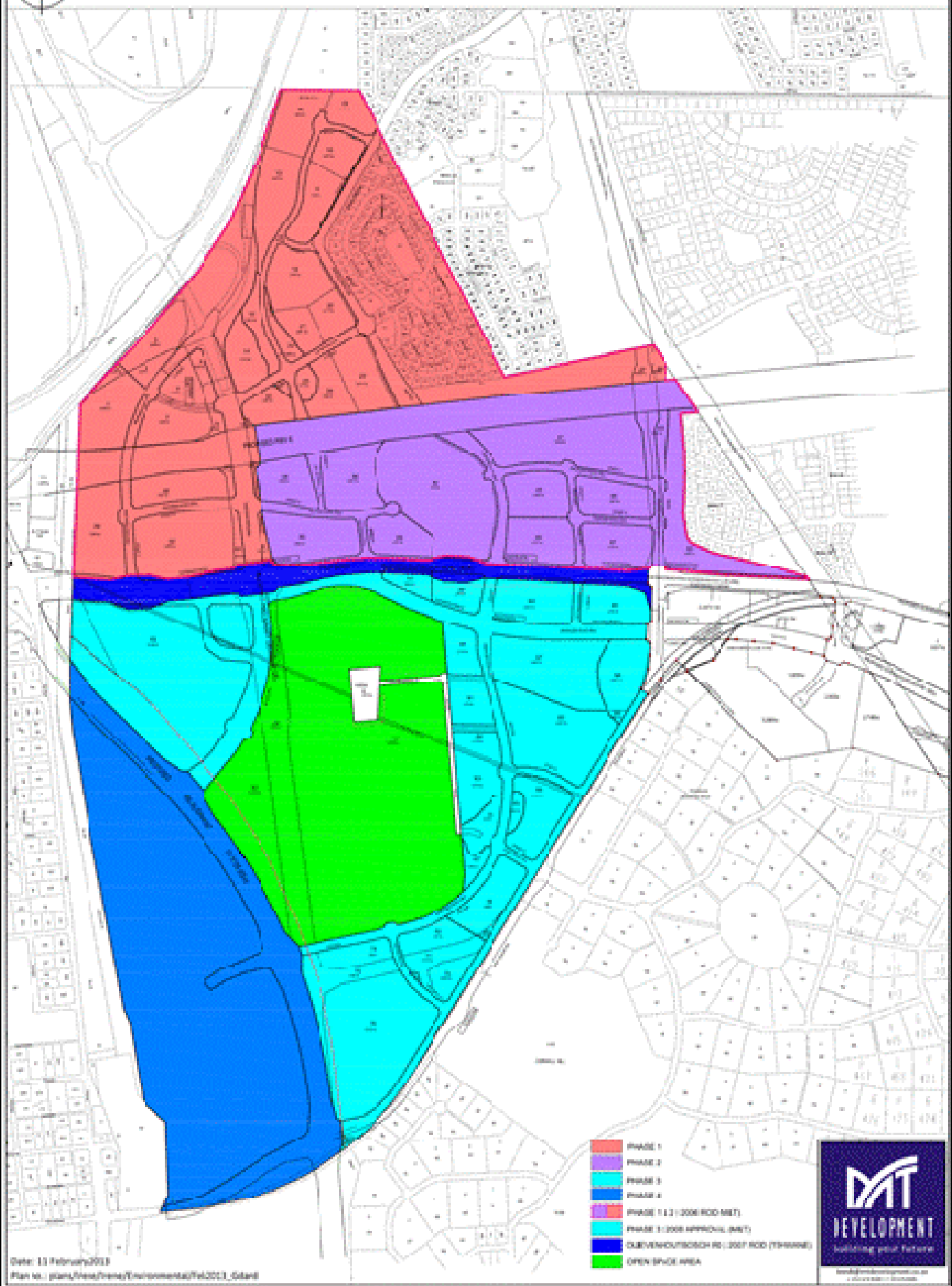
Annexure B

Approved Irene x92 layout





FRAMEWORK : IRENE X92 ROD APPROVALS

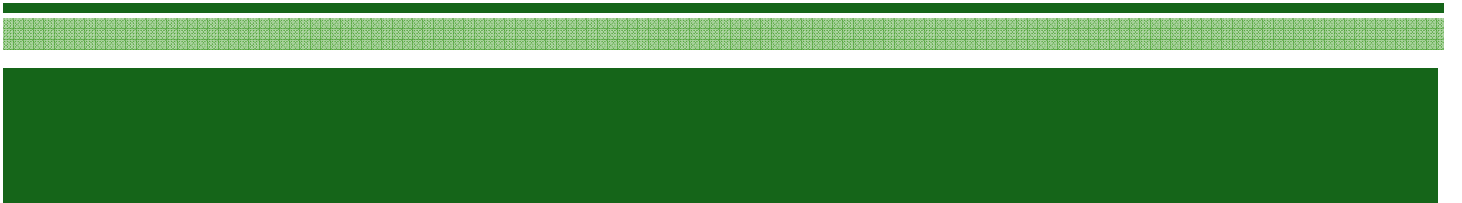


Date: 13 February 2013
Plan no.: plans/area/frames/Environmental/Fe0211_Gland



Annexure C

Framework: Irene x92, x91, x90 and 89



Annexure D

GDARD Correspondance





agriculture and rural development

Department: Agriculture and Rural Development
GAUTENG PROVINCE

Diamond Building, 11 Diagonal Street, Johannesburg
P O Box 8769, Johannesburg, 2000

Telephone: (011) 240 2500

Fax: (011) 240 2700

Website: <http://www.gdard.gpg.gov.za>

Reference:	Gaut: 002/11-12/E0135
Enquiries:	Justine Chan
Telephone:	(011) 240 3048
Email:	Justine.Chan@gauteng.gov.za

Bokamoso Landscape Architects and Environmental Consultants

Email/Fax: lizelleg@mweb.co.za

Dear Sir / Madam

Draft Environmental Impact Assessment Report: Olievenhoutbosch Road from Main Road to K54

The Department acknowledges having received the Draft Environmental Impact Assessment Report for environmental authorisation of the above-mentioned project on 28/11/2014.

You are required to submit five (5) copies (3 full colour hard copies and 2 CDs-PDF) of the Final Environmental Impact Assessment Report.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Boniswa Belot

Deputy Director: Strategic Administration Support

Date: 12/12/2014

CC: JR 209 Investments (Pty) Ltd

Att:

Mr B Hertzog

Email/Fax:

barry@mtdevelopment.co.za



GAUTENG PROVINCE

ACHTERSKURIE EN OORLOGSRECHTERSKAP
REPUBLIC OF SOUTH AFRICA

Diamond Corner Building, 66 Eloff & Market Street, Johannesburg
P O Box 8769, Johannesburg, 2000

Telephone: (011) 355-1900
Fax: (011) 355-1000
Website: <http://www.gdard.gpg.gov.za>

FAX COVER SHEET

Receiver's Details		Sender's Details	
To:	Lizelle Gregory	From:	Tjatja Mosiu
Company:	Bokamoso Landscape Architects and Environmental Consultants	Section:	EPIA
Fax no.	086 570 5659	Floor:	4 th Floor, Diamond Corner
Tell no.	(012) 676 8594	Tel:	(011) 355-1447
Date:		Pages:	03 including fax cover sheet
SUBJECT:	GAUT : 002/11-12/0135 SCOPING REPORT AND PLAN OF STUDY FOR EIA ACCEPTED FOR PROPOSED ZITHOBENI EXT 8 HOUSING DEVELOPMENT ON PORTION 11 AND THE REMAINDER OF THE FARM HONDSRIVIER 508-JR.		

CC City of Tshwane Metropolitan Municipality

Attn: Rudzani Mukheli
Tel: (012) 358-8731
Fax: (012) 358-8934

JR 200 Investments (Pty) Ltd

Attn: Mr. Barry Hartog
Tel: (012) 676-8594
Fax: (012) 570-5659

NER-EPIA

Attn: Hlabisile M'langa
Tel: (011) 355-1836
Fax: 086 765 7212



GAUTENG PROVINCE

AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Reference: Gaut 002/11-12/E0135
Enquiries: Tjatja Mosla
Telephone: (011) 355-1447
Email: Tjatja.Mosla@gauteng.gov.za

Bokamoso Landscape Architects & Environmental Consultants
P. O. Box 11375
Maroelana
0043

Attn: Lizelle Gregory
Fax no: 086 570 5659
Tel no: (012) 346-3810

PER FACSIMILE / REGISTERED MAIL

Dear Madam

SCOPING REPORT AND PLAN OF STUDY FOR ELA ACCEPTED FOR THE PROPOSED CONSTRUCTION OF A SECTION OF OLIEVENHOUTBOSCH ROAD FROM MAIN ROAD TO K54.

The Scoping Report and Plan of Study for Environmental Impact Assessment (ELA) which was submitted in respect of the above-mentioned application and received by the Department on 26 June 2013 has been accepted. You may accordingly proceed with undertaking the ELA in accordance with the tasks that are outlined in the plan of study.

Please note that the Department also requires that the following be considered as an amendment to the Plan of Study for ELA undertaken during the ELA process for submission to the Department accompanying the ELA report:

1. The Ecological Sensitivity Study must cover both fauna and flora and must meet the Department's Directorate of Biodiversity Management requirements for Biodiversity assessments.
2. The EIR must report on the possible impacts on the subject site, which in terms of Conservation Plan Version 3.3 part of the proposed sites is designated as an important and irreplaceable area with patches of suitable habitat for *Hebenaria mossii* which is a red listed plant, *Hebenaria harbertoni* which is an orange listed plant, *Rhinolophus clivosus* which is a priority red listed mammal and *Gauteng grassland* which is a primary vegetation.
3. Sensitivity map reflecting all good natural vegetation, including any form of habitat and ridge systems along the entire alignment of the proposed road must be provided for the Department to determine the extent of impacts associated with the proposed road.
4. The road designs must show the interconnection with the proposed and existing township(s). It must also be overlaid with a sensitivity map and must be clear and legible and be printed on a readable scale map with distinctive legend in solid colours.
5. An assessment of alternatives must include a comparative assessment of all alternative and must reflect environmental and socio-economic impact of each alternative along the entire route alignment. Further, the assessment of alternatives must be discussed in relation to the approved Olievenhoutbosch road alignment traversing the sensitive 5 O'clock site and how is it going to affect the other phased activities in the area.
6. It must be noted that there are areas which, as a result of environmental sensitivities, were excluded from 5 O'clock development and this road and any of its proposed alternative alignments must not begin to start new discussion to encroach on such areas.

7. It was noted that a storm water management plan will also be undertaken as part of EIA; the plan must indicate all points of inlet and outlet as well as connections with the existing municipal systems (if there are any) and must comply with the standard and requirements of the City of Tshwane Roads and Stormwater Division.
8. The Department noted with great concern that the plan of study for EIA is very vague owing to the view that there are studies that have been done not long ago in the area and information from such studies will be used for this activity. The Department will like to draw your attention to the fact that each activity is decided on its own merits and as such the evaluation of this activity will be done based on the information collected specifically for this activity. Should there be any deviation from this principle, kindly ensure that such information is updated and is relevant to make a decision on this activity. Further, the Department expects an EIA process to be undertaken using all accepted methods of impact assessment and not according to the subject plan of study contained in the scoping report submitted for this road and all relevant stakeholders (which you are fully aware of) must be directly consulted during all phases of the EIA process.
9. All issues raised by interested and affected parties must be addressed during EIA process.
10. A detailed project and site specific Environmental Management Plan (EMP) must be compiled and included in the ER.

Notwithstanding the above, your attention is drawn to the fact that the success of the application may be prejudiced by the perceived lack of thorough impact assessment using credible method(s) as required in terms of the EIA process.

If you have any queries regarding the contents of this letter, please contact the official of the Department at the number indicated above.

Yours faithfully



Mr. M. Nkosi

Director: Environmental Impact Management (NER)

Date: 15/10/13

Annexure E

Copy of CV of Lizelle Gregory and Company
Profile





Bokamoso

**Landscape Architects &
Environmental consultants**

**P.O. BOX 11375
Maroelana
0161**

**Tel: (012) 346 3810
Fax: (086) 570 5559**

**E-mail: lizelle@mweb.co.za
Website: www.bokamoso.net**

- 01** Executive Summary
- 02** Vision, Mission & Values
- 03** Human Resources
- 04** Services
- 05** Landscape Projects
- 06** Corporate Highlights
- 07** Environmental Projects
- 08** Indicative Clients
- 09** Tools

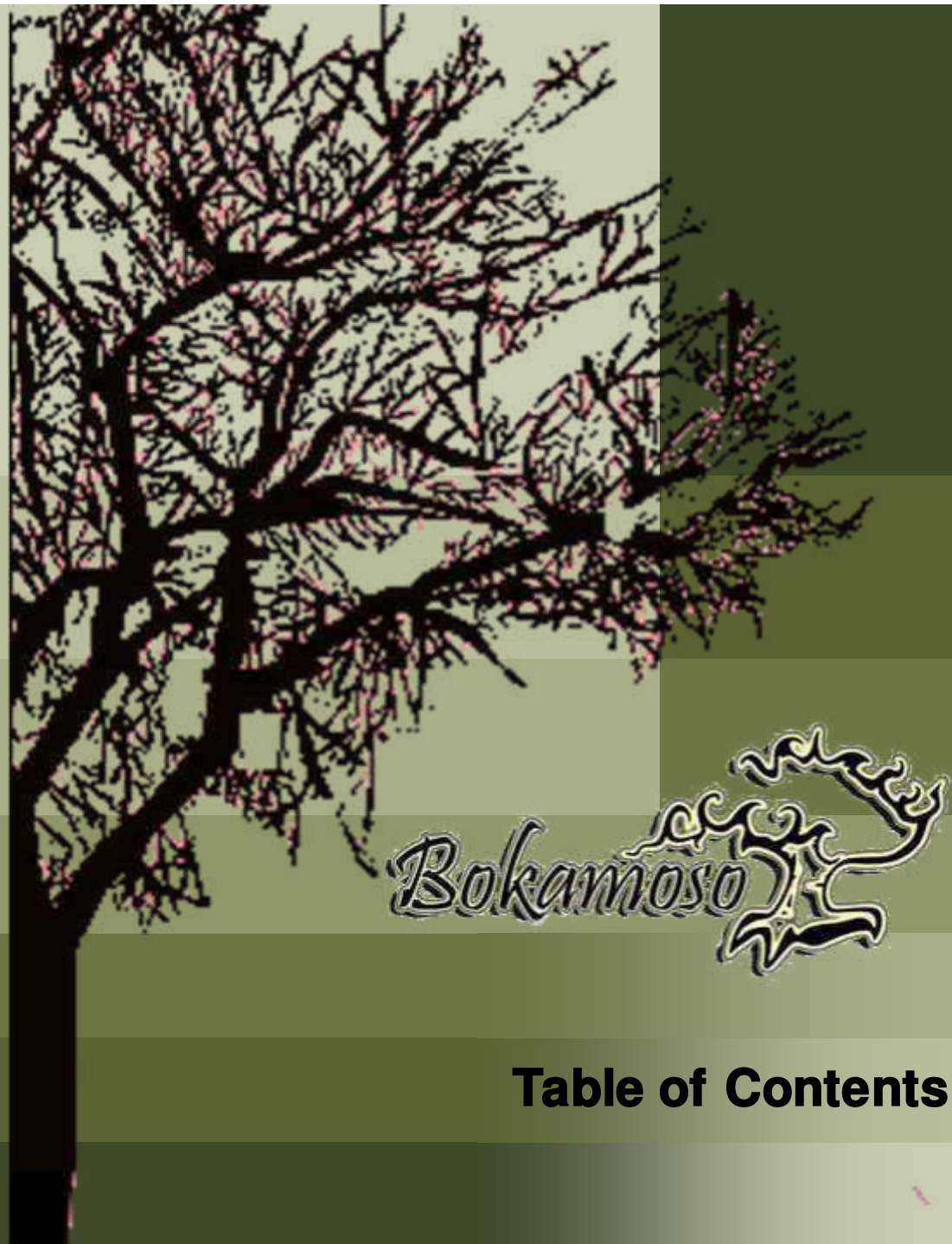


Table of Contents

Bokamoso specialises in the fields of Landscape Architecture and all aspects of Environmental Management and Planning. Bokamoso was founded in 1992 and has shown growth by continually meeting the needs of our clients. Our area of expertise stretches throughout the whole of South Africa. Our projects reflect the competence of our well compiled team. The diversity of our members enables us to tend to a variety of needs. Our integrated approach establishes a basis for outstanding quality. We are well known to clients in the private, commercial as well as governmental sector.

At Bokamoso we stand on a firm basis of environmental investigation in order to find unique solutions to the requirements of our clients and add value to their operations.



01 Executive Summary

011 Company Overview



Vision:

At Bokamoso we strive to find the best planning solutions by taking into account the functions of a healthy ecosystem. Man and nature should be in balance with each other.

Mission:

We design according to our ethical responsibility, take responsibility for successful completion of projects and constitute a landscape that contributes to a sustainable environment. We add value to the operations of our clients and build long term relationships that are mutually beneficial.

Values:

Integrity

Respect



Bokamoso stands on the basis of fairness. This include respect within our multicultural team and equal opportunities in terms of gender, nationality and race.

We have a wide variety of projects to tend to, from complicated reports to landscape installation. This wide range of projects enables us to combine a variety of professionals and skilled employees in our team.

Bokamoso further aids in the development of proficiency within the working environment. Each project, whether in need of skilled or unskilled tasks has its own variety of facets to bring to the table.

We are currently in the process of receiving our BEE scorecard. We support transformation in all areas of our company dynamics.



03 Human Resources

031 Employment Equity

Lizelle Gregory (100% interest)

Lizelle Gregory obtained a degree in Landscape Architecture from the University of Pretoria in 1992 and passed her board exam in 1995.

Her professional practice number is PrLArch 97078.

Ms. Gregory has been a member of both the Institute for Landscape Architecture in South Africa (ILASA) and South African Council for the Landscape Architecture Profession (SACLAP), since 1995.

Although the existing Environmental Legislation doesn't yet stipulate the academic requirements of an Environmental Assessment Practitioner (EAP), it is recommended that the Environmental Consultant be registered at the International Association of Impact Assessments (IAIA). Ms. Gregory has been registered as a member of IAIA in 2007.

Ms. Gregory attended and passed an International Environmental Auditing course in 2008. She is a registered member of the International Environmental Management and Assessment Council (IEMA).

She has lectured at the Tshwane University of Technology (TUT) and the University of Pretoria (UP). The lecturing included fields of Landscape Architecture and Environmental Management.

Ms. Gregory has more than 20 years experience in the compilation of Environmental Evaluation Reports:

Environmental Management Plans (EMP);

Strategic Environmental Assessments;

All stages of Environmental input ;

EIA under ECA and the new and amended NEMA regulations and various other Environmental reports and documents.

Ms. Gregory has compiled and submitted more than 600 Impact Assessments within the last 5-6 years. Furthermore, Ms. L. Gregory is also familiar with all the GDARD/Provincial Environmental policies and guidelines. She assisted and supplied GAUTRANS/former PWV Consortium with Environmental input and reports regarding road network plans, road determinations, preliminary and detailed designs for the past 12 years.



03 Human Resources

032 Members

Consulting

Anè Agenbacht

Introduction to Sustainable Environmental Management—An overview of Principles, Tools, & Issues (Potch 2006)
Leadership Training School (Lewende Woord 2010)
BA Environmental Management (UNISA 2011)
PGCE Education (Unisa 2013) - CUM LAUDE
Project Manager
More than 10 years experience in the compilation of various environmental reports

Mary-Lee Van Zyl

Msc. Plant Science (UP)
BSc (Hons) Plant Science (UP)
BSc Ecology (UP)
2years 7months working experience in the Environmental field
Specialises in ECO works, Basic Assessments, EIA's, and Flora Reports
Compilation of various Environmental Reports

Dashentha Naidoo

BA Honours Degree in Environmental Management (UNISA) - CUM LAUDE
Bachelor Social Science in Geography & Environmental Management (UKZN)
More than 4 years experience in WUL Application & Integrated Environmental Management within water resource management.
Senior Environmental Practitioner & Water Use Licences Consultant
Specialises in Water Use License & Compilation of various Env. Reports

Ben Bhukwana

BSc Landscape Architecture (UP)
More than 5 years experience in the field of Landscape Architecture (Design, Construction, and Implementation).
Specialises in Landscape Design, ECO, Rehabilitation Plans and Compilation Basic Assessment Reports
Compilation of Tender documents



03 Human Resources

033 Personnel

Anton Nel

B-Tech Landscape Technology (TUT)
N Dip Landscape Technology (TUT)
Hazardous Waste Management Short Course
2 years experience in ECO.
Specialises in Basic Assessment Reports.

Juanita de Beer

Diploma Events Management and Marketing (Damelin)
Specializes in Public relations and Public Participation Processes (3 years experience)

Alfred Thomas

CIW Foundation & Internet Marketing (IT Academy)
12 years experience in GIS and IT in general.
GIS Operator and Multimedia Specialist.

Bianca Reyneke

Applying SHE Principles and Procedures (NOSA)
Intro to SAMTRAC Course (NOSA)
SHEQ Coordinator and compilation of environmental reports
Specialises in compiling various environmental reports



03 Human Resources

034 Personnel

Elsa Viviers

Interior Decorating (Centurion College)
(Accounting/ Receptionist) and Secretary to Lizelle Gregory

Loura du Toit

N. Dip. Professional Teacher (Heidelberg Teachers Training College)
Librarian and PA to Project Manager

Merriam Mogalaki

Administration Assistant with in-house training in bookkeeping

Landscape Contracting

Elias Maloka

Site manager overseeing landscape installations.
Irrigation design and implementation.
Landscape maintenance
18 years experience in landscape contracting works.

The contracting section comprises of six permanently employed black male workers. In many cases the team consists of up to 12 workers, depending on the quantity of work.



03 Human Resources

035 Personnel



01 Environmental Management Services

- Basic Assessment Reports
- EIA & Scoping Reports
- Environmental Management Plans
- Environmental Scans
- Strategic Environmental Assessments
- EMP for Mines
- Environmental Input and Evaluation of Spatial Development Frameworks
- State of Environmental Reports
- Compilation of Environmental Legislation and Policy Documents
- Environmental Auditing and Monitoring
- Environmental Control Officer (ECO)
- Visual Impact assessments
- Specialist Assistance with Environmental Legislation Issues and Appeals
- Development Process Management
- Water Use License applications to DWA
- Waste License Application



04 Services

041 Consulting Services

02 Landscape Architecture

- Master Planning
- Sketch Plans
- Planting Plans
- Working Drawings
- Furniture Design
- Detail Design
- Landscape Development Frameworks
- Landscape Development Plans (LDP)
- Contract and Tender Documentation
- Landscape Rehabilitation Works

03 Landscape Contracting

Implementation of Plans for:

- Office Parks
- Commercial/ Retail / Recreational Development
- Residential Complexes
- Private Residential Gardens
- Implementation of irrigation systems



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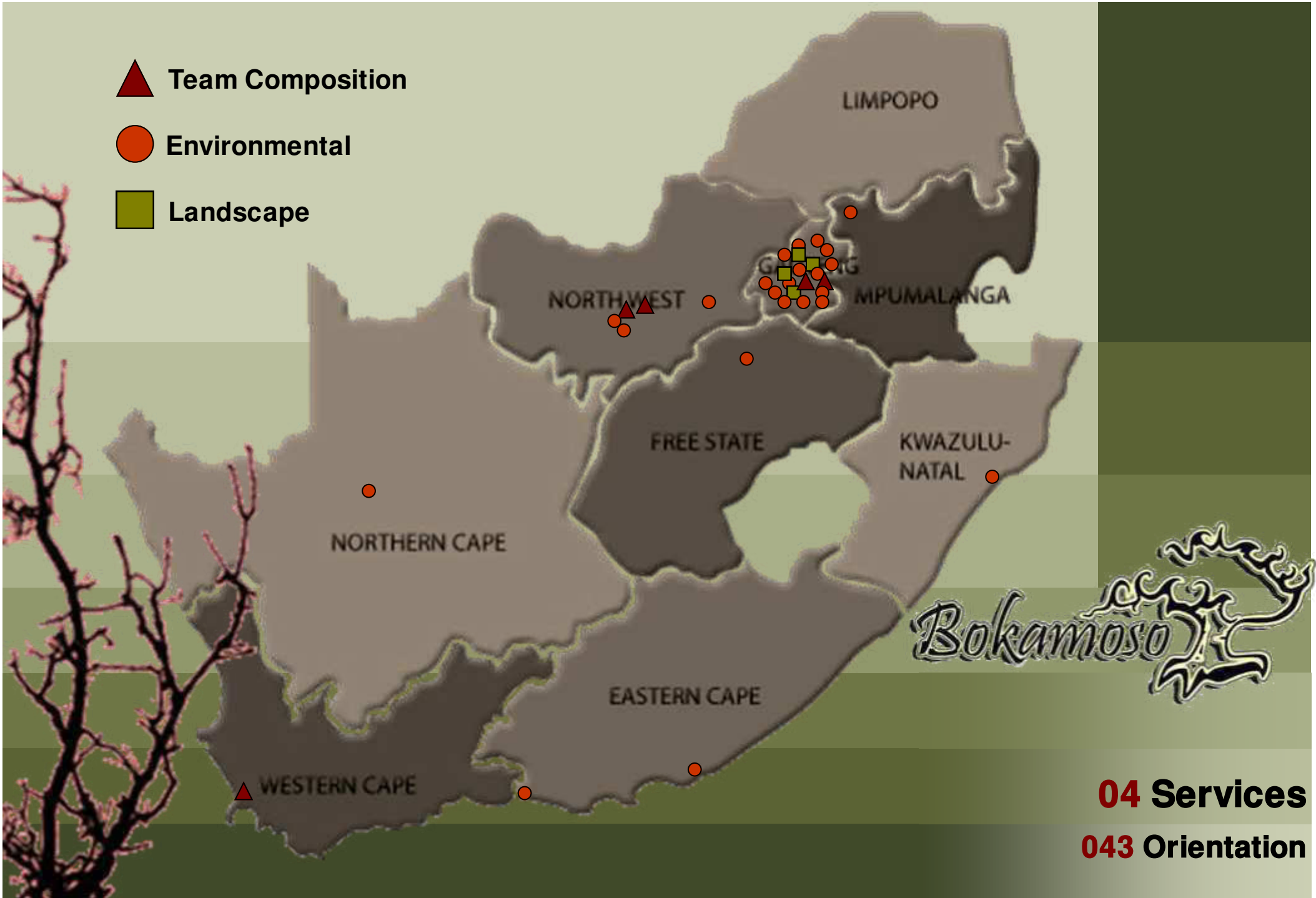
04 Services

042 Contracting Services

▲ Team Composition

● Environmental

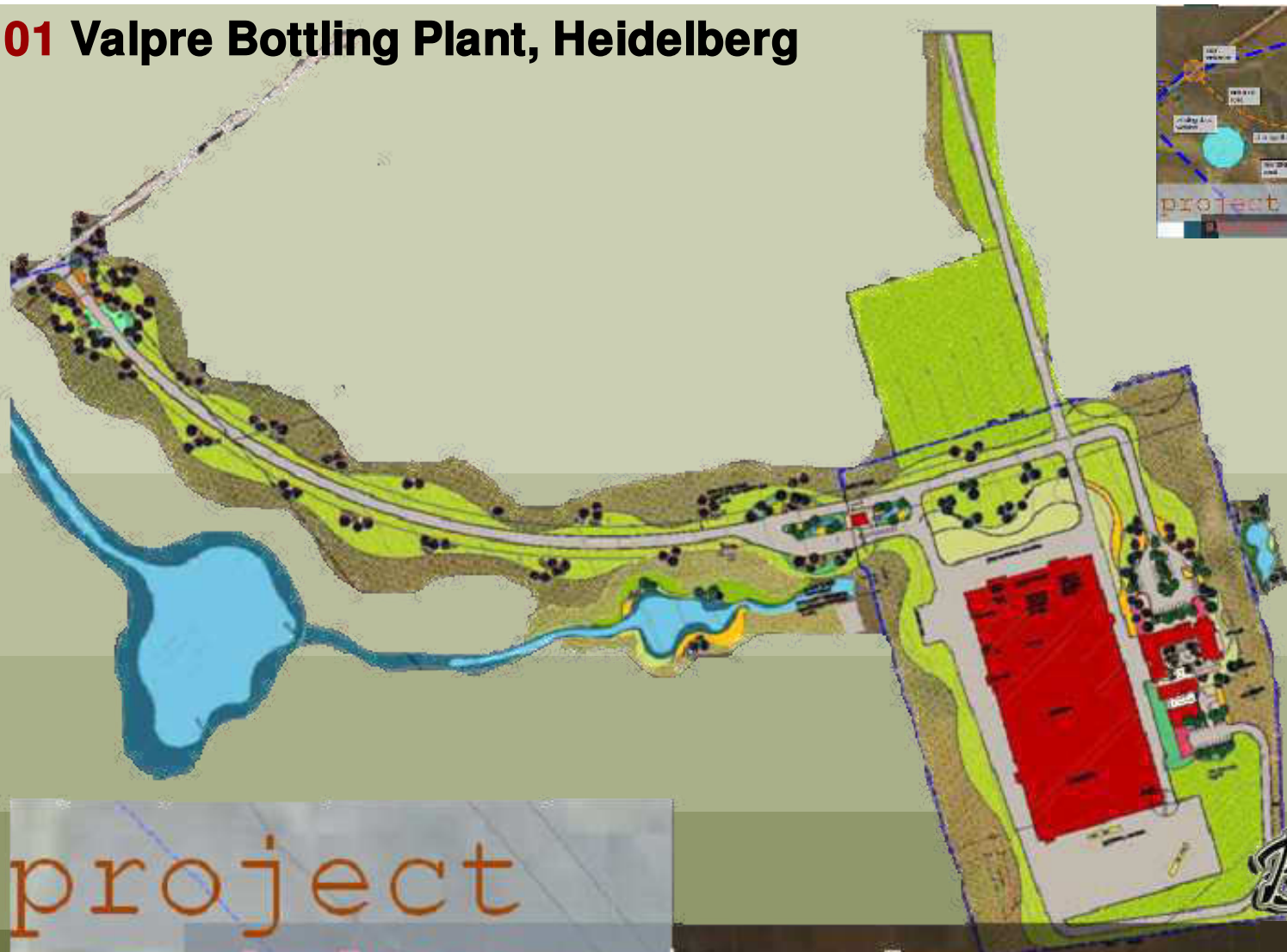
■ Landscape



04 Services

043 Orientation

01 Valpre Bottling Plant, Heidelberg



project
shelter- site plan

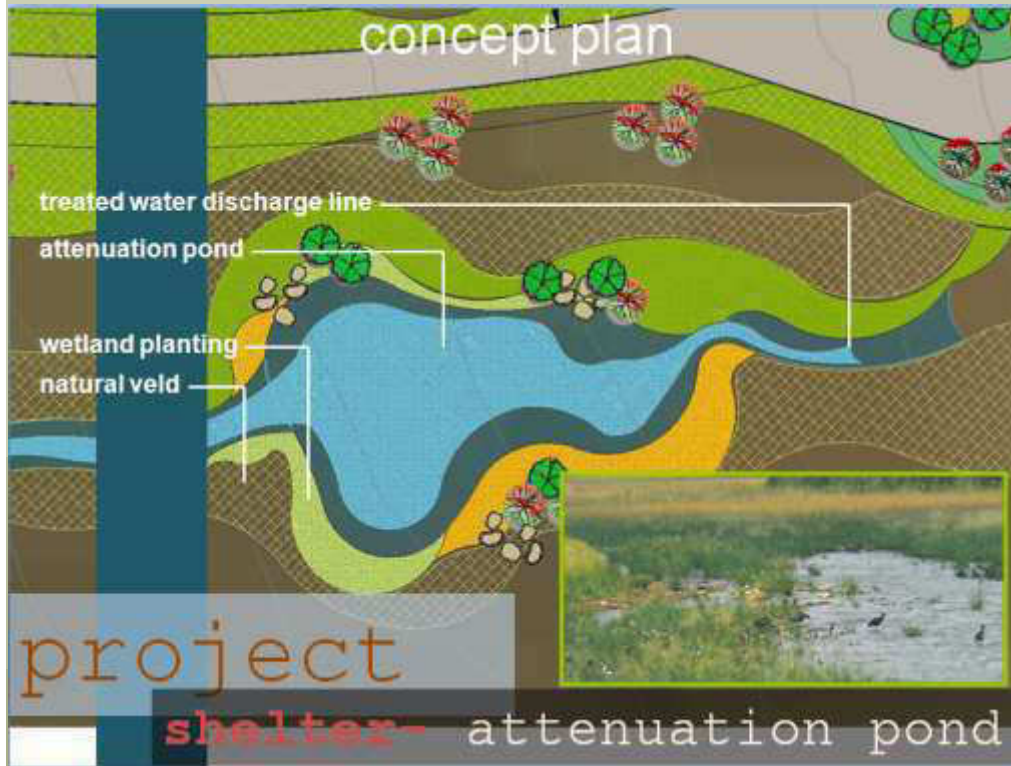


05 Landscape Projects- Current

051 Commercial



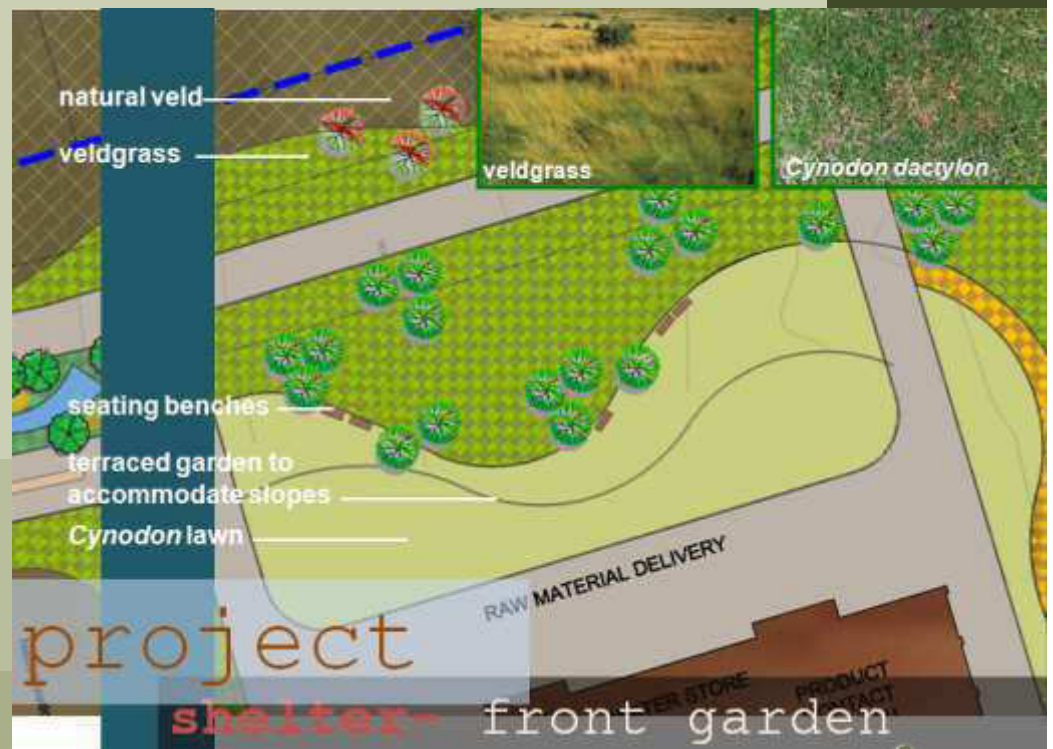
01 Valpre Bottling Plant, Heidelberg



05 Landscape Projects- Current

051 Commercial

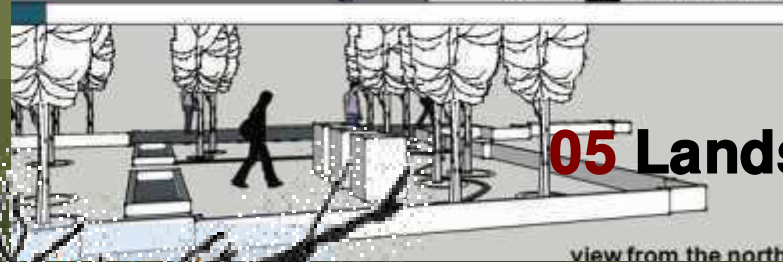
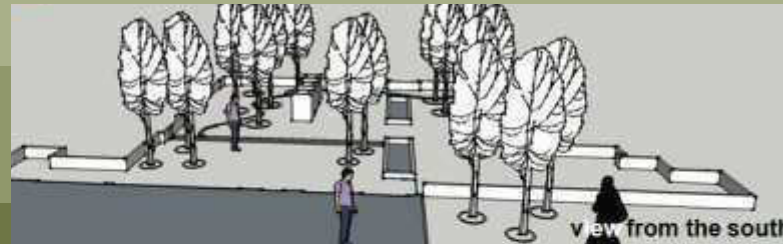
01 Valpre Bottling Plant, Heidelberg



05 Landscape Projects— Current

051 Commercial

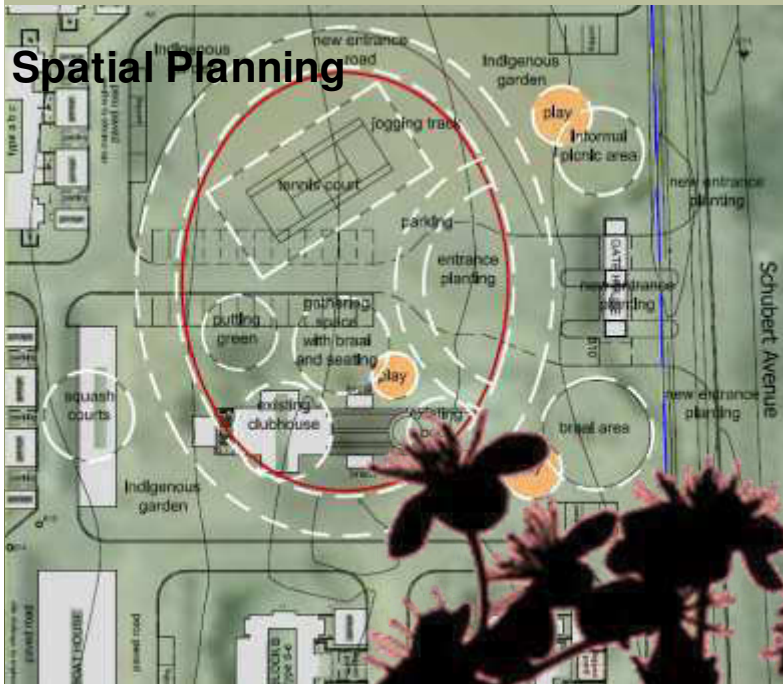
01 Valpre Bottling Plant, Heidelberg



05 Landscape Projects– Current

051 Commercial

02 Melodie Waters, Hartebeespoortdam



Streetscape

Indigenous Planting



05 Landscape Projects – Current

052 Commercial/Recreational



02 Melodie waters, Hartebeestpoortdam



Rehabilitation



Area Layout



05 Landscape Projects– Current

052 Commercial/Recreational

03 Grain Building, Pretoria



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05 Landscape Projects– Completed

053 Offices

04 Ismail Dawson offices, Pretoria



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05 Landscape Projects – Conceptual

053 Offices

05 Celtic Manor, Pretoria

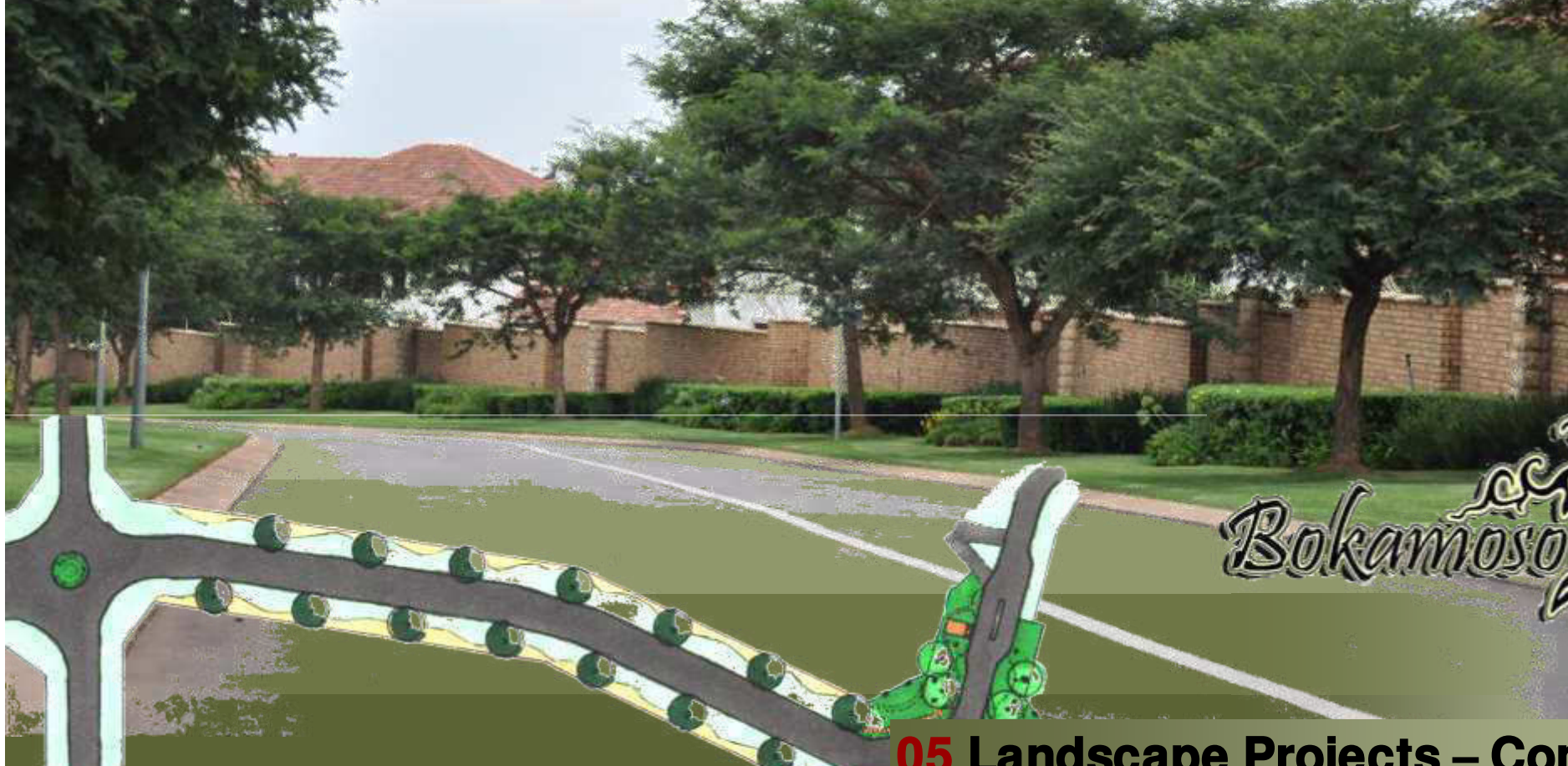


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05 Landscape Projects - Completed

054 Complex Development

06 The Wilds, Pretoria



Bokamoso

05 Landscape Projects – Completed

054 Complex Development

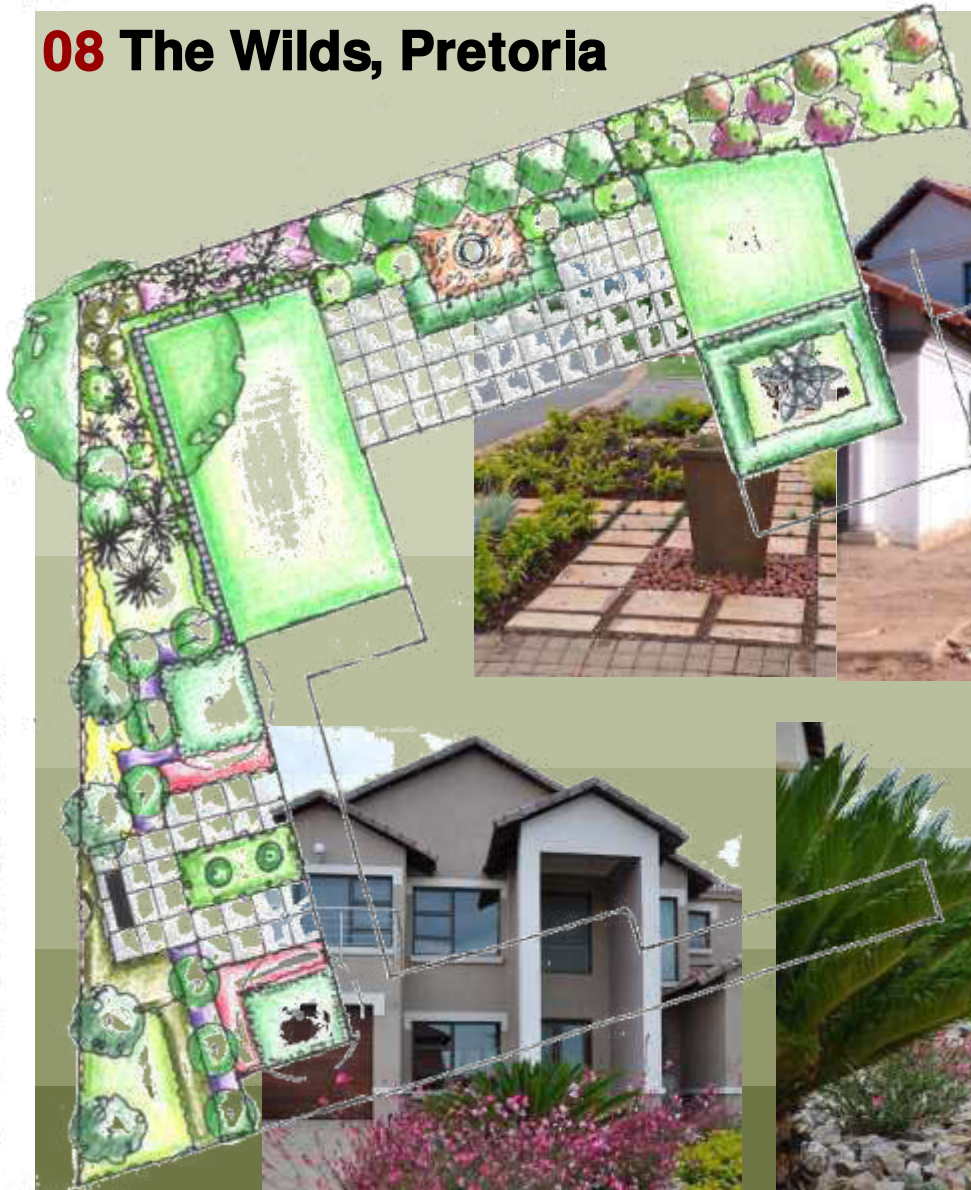
07 The Wilds, Pretoria



05 Landscape Projects – Completed

055 Residential

08 The Wilds, Pretoria



Bokamoso

05 Landscape Projects – Completed

055 Residential

09 The Wilds, Pretoria

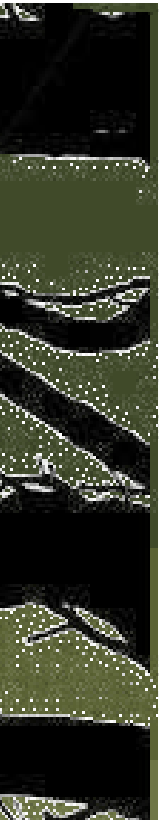


Bokamoso

05 Landscape Projects – Completed

055 Residential

010 The Wilds, Pretoria



Bokamoso 

05 Landscape Projects – Completed

055 Residential



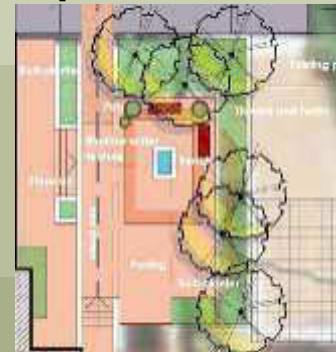
011 Governor of Reserve Bank's Residence, Pretoria



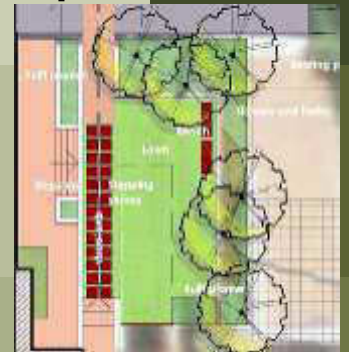
Plant Palette



Option 1



Option 2



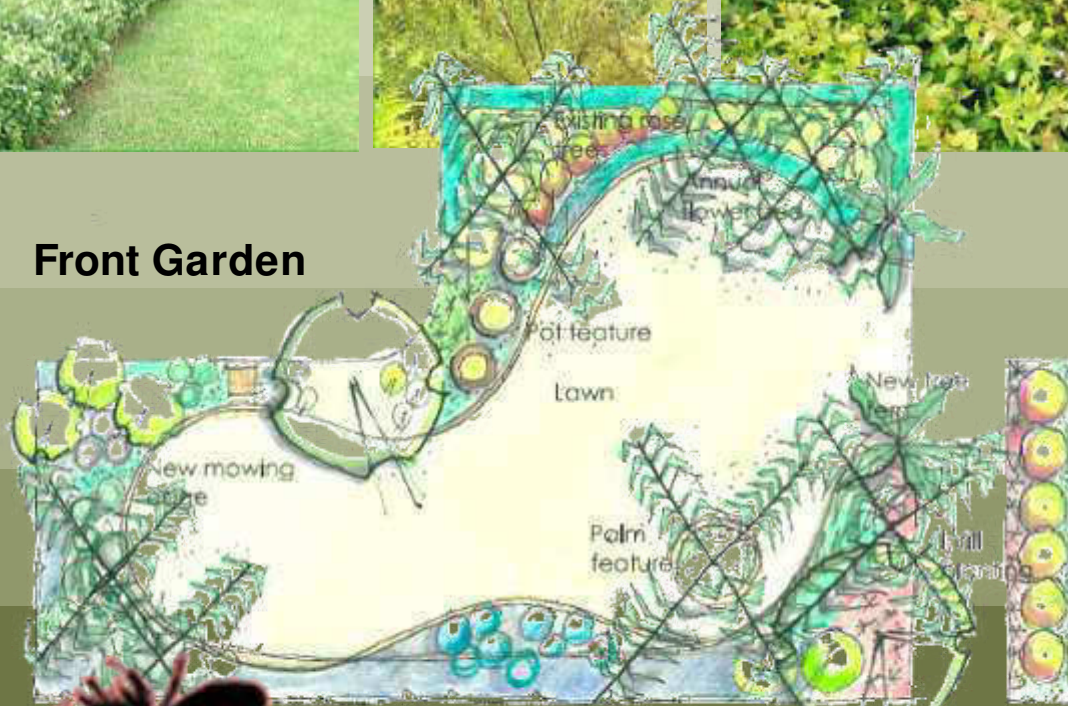
05 Landscape Projects – Conceptual

055 Residential

012 House Ismail, Pretoria



Front Garden



Back Garden



05 Landscape Projects - Conceptual

055 Residential



013 Forest Garden, Pretoria



05 Landscape Projects – Completed

055 Residential

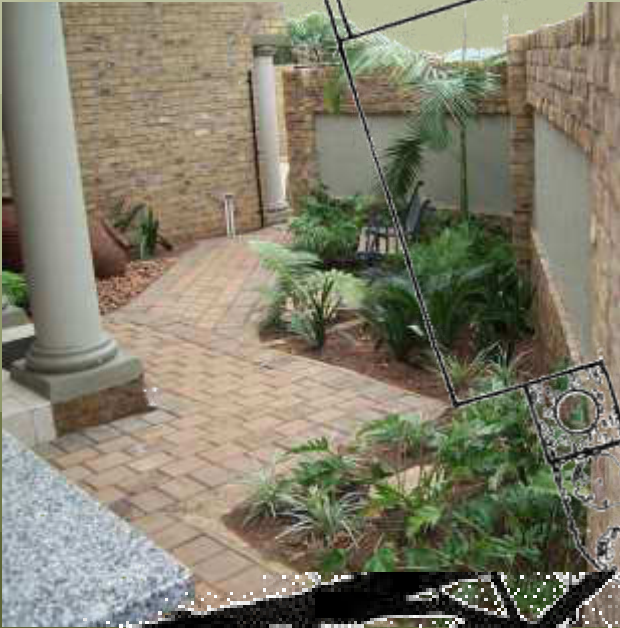
015 Forest Garden, Pretoria



Bokamoso

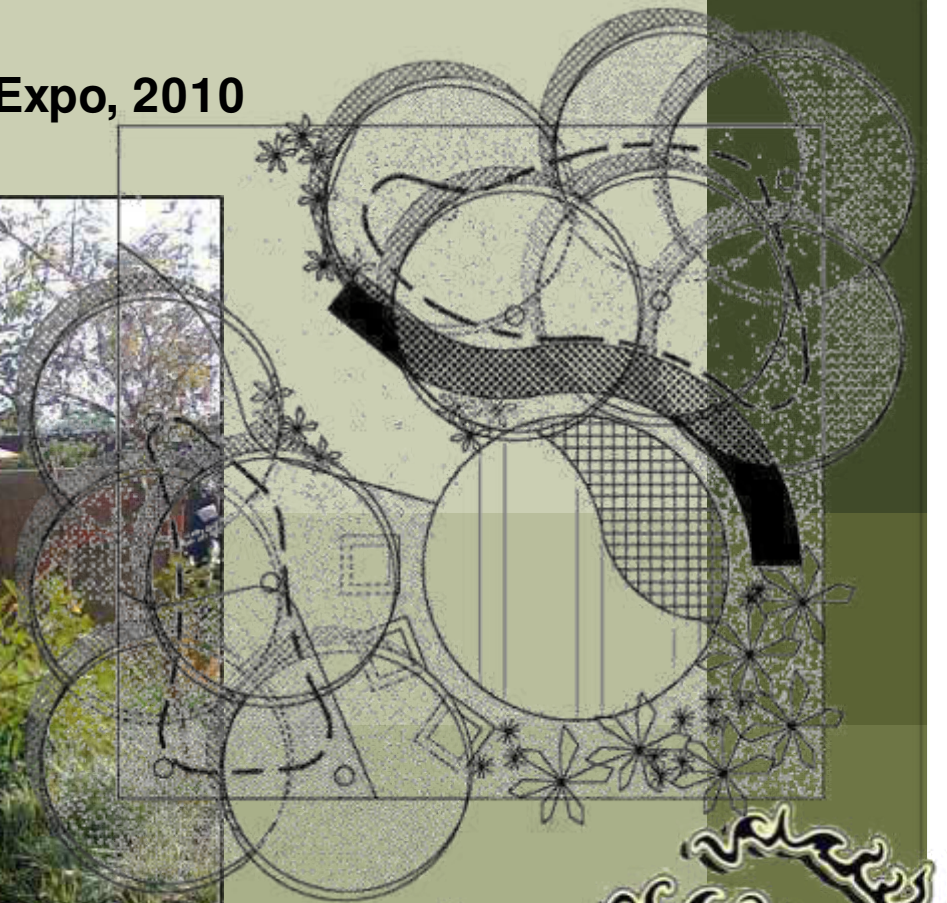
05 Landscape Projects - Completed

055 Residential



01 Safari Garden Expo

Received a Silver Certificate at the Safari Garden Expo, 2010



Bokamoso 

06 Corporate Highlights

061 Awards

02 UNISA Sunnyside Campus, Pretoria

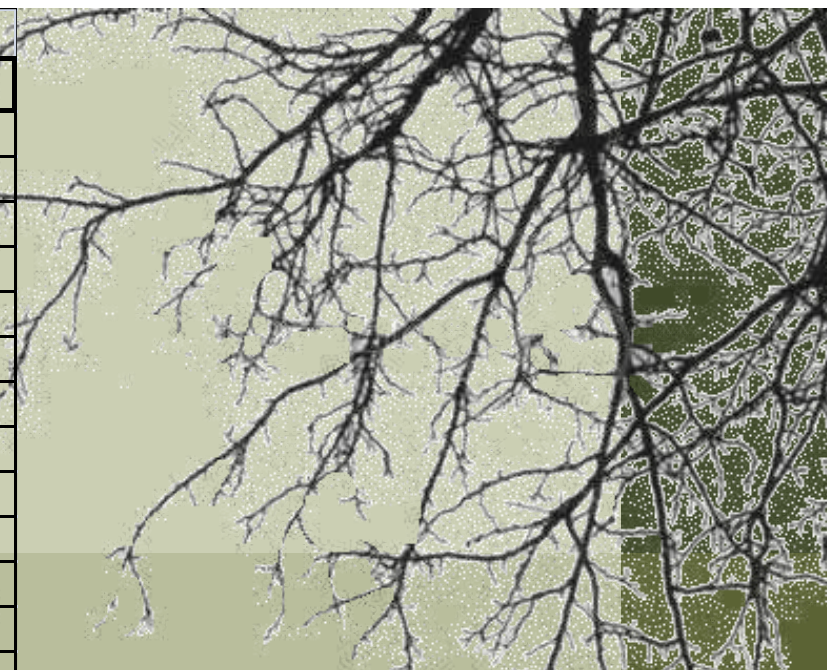
Best Commercial Paving Plan in Gauteng, 1997



06 Corporate Highlights

061 Awards

Project Name	Status	Project
Environmental Impact Assessment(EIA) and Scoping Report		
Junction 21	ROD	EIA
5 O'clock site access	In Progress	EIA
Bokamoso X 1	In Progress	Scoping & EIA
Doornvallei Phase 6 & 7	In Progress	EIA
Engen Interchange	In Progress	Scoping & EIA
Erasmia X15	In Progress	EIA
Franschkloof	In Progress	EIA
K113	Amendment of ROD	EIA
K220 East	ROD	EIA
K220 West	ROD	EIA
K54 ROD conditions	In Progress	EIA
Knopjeslaagte 95/Peachtree	ROD	EIA
Knopjeslaagte portion 20 & 21	ROD	EIA
Lillieslief/Nooitgedacht	In Progress	EIA
Mooiplaats 70 (Sutherland)	In Progress	EIA
Naauwpoort 1 - 12/Valley View	In Progress	EIA
PeachTree X5	In Progress	EIA
Strydfontein 60	In Progress	EIA
Thabe Motswere	In Progress	Scoping & EIA
Vlakplaats	In Progress	EIA
Waterval Valley	In Progress	EIA
Environmental Opinion		
Doornkloof 68 (Ross)	In Progress	Opinion
Monavoni X 53	In Progress	BA & Opinion
Mooikloof (USN)	In Progress	Opinion
Norwood Mall/Sandspruit	In Progress	Opinion
Riversong X 9	In Progress	Opinion
Sud Chemie	In Progress	Opinion
USN Benjoh Fishing Resort	In Progress	Opinion



The adjacent list host the status of our current projects. Only a selected amount of projects are displayed.



07 Current Environmental Projects

071 EIA, Scoping & Opinion

Project Name	Status	Project
Basic Assessment(BA)		
Annlin X 138	In Progress	BA
Clubview X 29	ROD	BA
Darrenwood Dam	In Progress	BA
Durley Holding 90 & 91	In Progress	BA
Elim	In Progress	BA
Fochville X 3	In Progress	BA
Hartebeeshoek 251	In Progress	BA
Klerksdorp (Matlosana Mall)	In Progress	BA
Monavoni External Services	ROD	BA
Monavoni X 45	Amendment of ROD	BA
Montana X 146	In Progress	BA
Rooihuiskraal X29	In Progress	BA
Thorntree Mall	In Progress	BA

Environmental control officer (ECO)		
Grace Point Church	In Progress	ECO
R 81	In Progress	ECO
Highveld X 61	In Progress	ECO
Mall of the North	In Progress	ECO
Olievenhoutbosch Road	In Progress	ECO
Orchards 39	In Progress	ECO
Pierre van Ryneveld Reservoir	In Progress	ECO
Project Shelter	In Progress	ECO

S24 G		
Wonderboom	In Progress	S24 G
Mogwasi Guest houses	Completed	S24 G



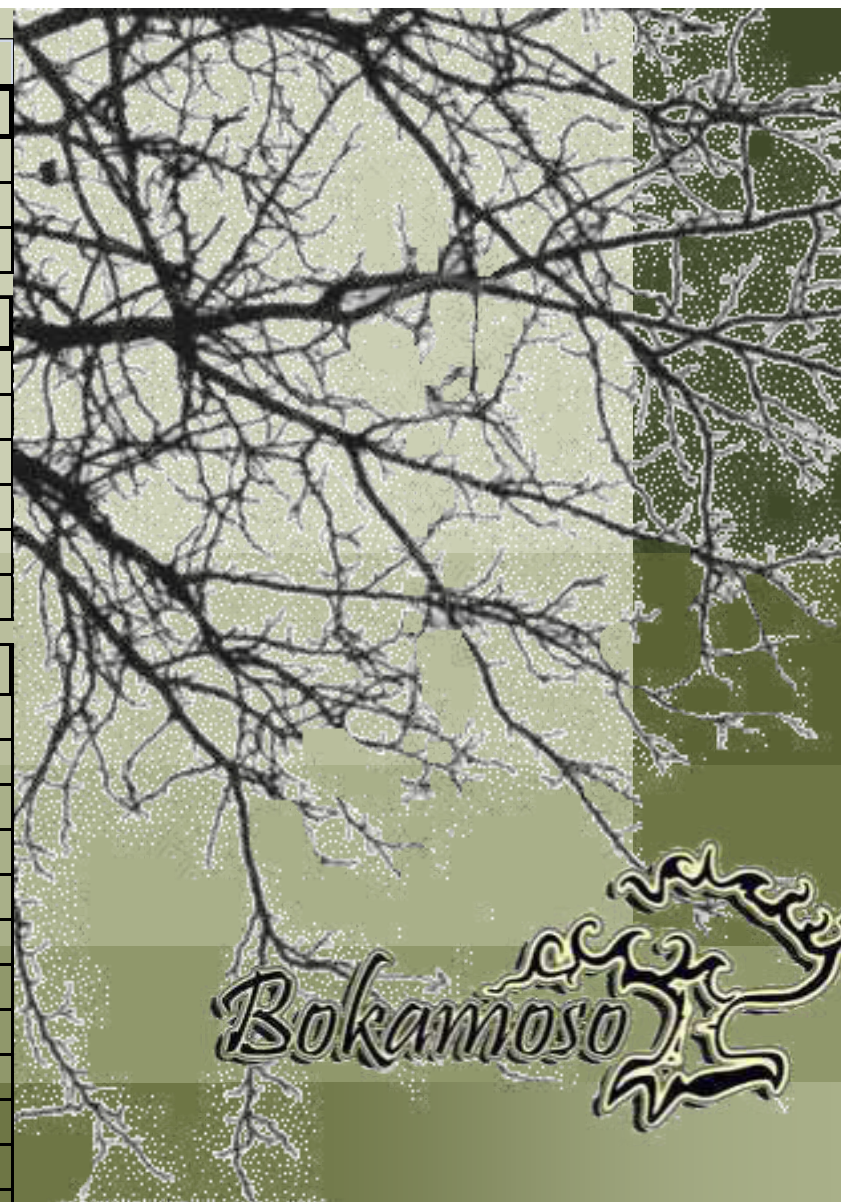
07 Current Environmental Projects

072 BA, ECO & S24 G

Project Name	Status	Project
Objection		
Colesberg WWTW	In Progress	Objection
Nigel Steelmill	Completed	Objection
Chantilly Waters	Completed	Objection

Development facilitation Act- Input (DFA)		
Burgersfort	In Progress	DFA & BA
Doornpoort Filling Station	In Progress	DFA & EIA & Scoping
Eastwood Junction	In Progress	DFA
Ingersol Road (Erf 78, 81 - 83)	In Progress	DFA
Roos Senekal	In Progress	DFA & EIA & Scoping
Thaba Meetse 1	In Progress	DFA & EIA & Scoping

Water Use License Act (WULA)		
Britstown Bulk Water Supply	In Progress	WULA
Celery Road / Green Channel	In Progress	WULA
Clayville X 46	In Progress	WULA
Dindingwe Lodge	In Progress	WULA
Doornpoort Filling Station	In Progress	WULA+DFA+EIA+SC
Eco Park Dam	In Progress	WULA
Groote Drift Potch	In Progress	WULA
Jozini Shopping Centre	In Progress	WULA+BA
K60	Completed	WULA
Maloto Roads	In Progress	WULA
Kwazele Sewage Works	In Progress	WULA
Monavoni External Services	In Progress	WULA+BA
Nyathi Eco Estate	In Progress	WULA
Prairie Giants X 3	In Progress	WULA
Waveside Water Bottling Plant	Completed	WULA



07 Current Environmental Projects

073 Objection, DFA & WULA

Project Name	Status	Project
Environmental Management Plan(EMP)		
Heidelberg X 12	ROD	EMP
Monavoni Shopping Centre	Completed	EMP
Forest Hill Development	Completed	EMP
Weltevreden Farm 105KQ	Completed	EMP+EIA
Raslouw Holding 93	Completed	EMP+BA
Durley Development	Completed	EMP+BA
Rooihuiskraal North X 28	Completed	EMP

Rehabilitation Plan		
Norwood Mall/Sandspruit	In Progress	Rehabilitation
Project Shelter Heidelberg	In Progress	Rehabilitation
Sagewood Attenuation Pond	ROD	Rehabilitation
Velmore Hotel	Completed	Rehabilitation
Grace Point Church	Completed	Rehabilitation
Mmamelodi Pipeline	Completed	Rehabilitation

Visual Impact Assessment		
Swatzkop Industrial Developme	Completed	Assessment +DFA
Erasmia	Completed	Assessment

Signage Application		
Menlyn Advertising	Completed	Signage
The Villa Mall	Completed	Signage+EMP+BA



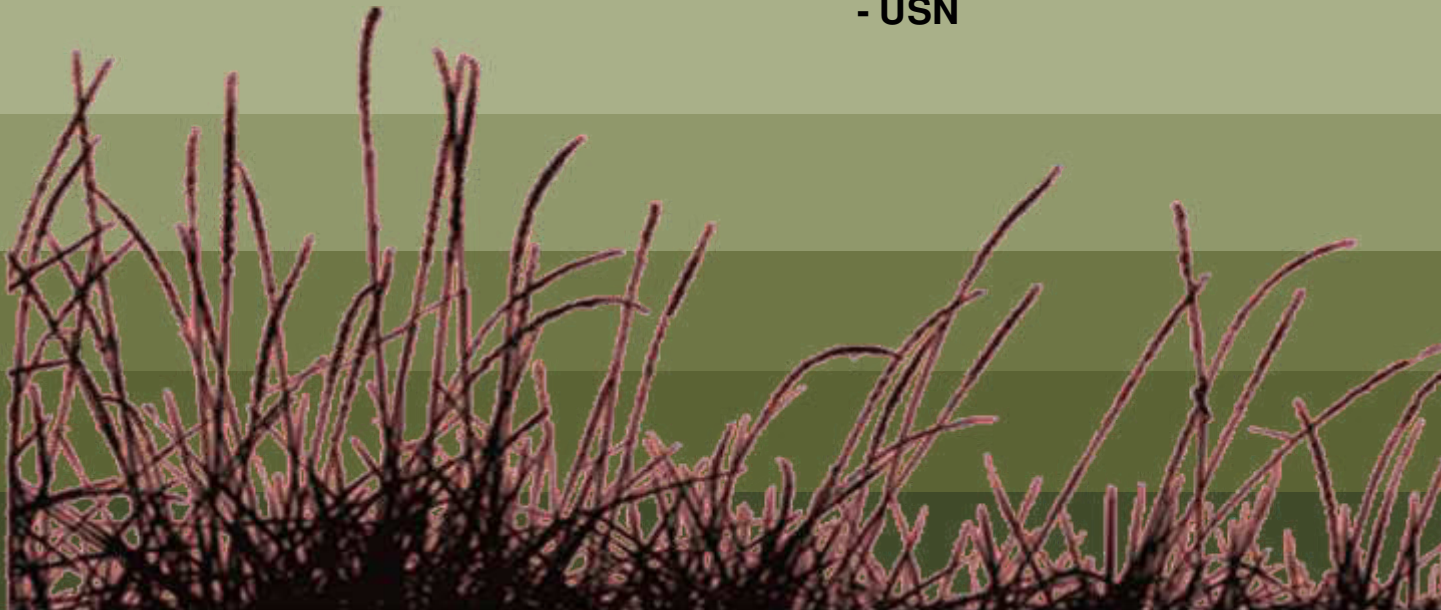
07 Current Environmental Projects

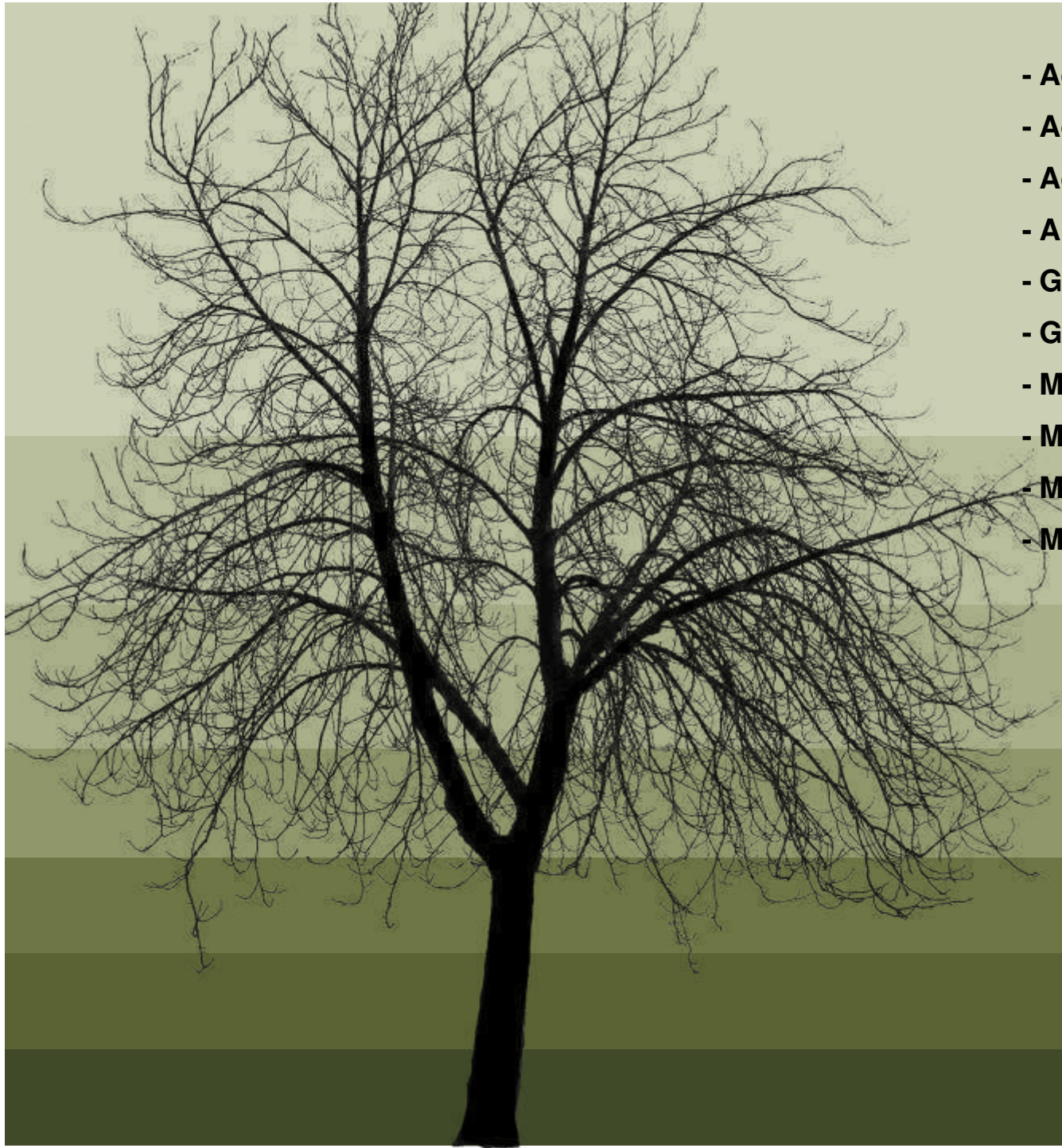
074 EMP, Rehabilitation , Waste Management & Signage Application

- Billion Property Group
- Cavaleros Developments
- Centro Developers
- Chaimberlains
- Chieftain
- Century Property Group
- Coca Cola
- Elmado Property Development
- Flanagan & Gerard
- Gautrans
- Hartland Property Group
- Moolman Group
- MTN
- M&T Development
- Old Mutual
- Property Investment Company
- Petroland Developments
- RSD Construction
- SAND
- Stephan Parsons
- Twin City Developments
- Urban Construction
- USN



08 Indicative Clients





- Adobe Illustrator CS3
- Adobe Photoshop CS3
- Adobe InDesign CS3
- AutoCAD
- Google SketchUP
- GIS
- Microsoft Office Word
- Microsoft Office Excel
- Microsoft Office Publisher
- Microsoft Office Power Point

Bokamoso 

Qualifications And Experience In The Field Of Environmental Planning And Management (Lizelle Gregory (Member Bokamoso)):

Qualifications:

- Qualified as **Landscape Architect** at UP 1991;
- Qualified as **Professional Landscape Architect in 1997**;
- A Registered Member at The **South African Council for the Landscape Architect Profession (SACLAP)** with Practise Number: **PrLArch97078**;
- A Registered Member at the **International Association for Impact Assessment Practitioners (IAIA)**;
- Qualified as an **Environmental Auditor in July 2008** and also became a Member of the International Environmental Management Association (IEMAS) in 2008.

Working Experience:

- Worked part time at Eco-Consult – 1988-1990;
- Worked part time at **Plan Associates as Landscape Architect in training** – 1990-1991;
- Worked as Landscape Architect at **Environmental Design Partnership (EDP)** from 1992 - 1994
- Practised under **Lizelle Gregory Landscape Architects** from 1994 until 1999;
- Lectured** at Part-Time at **UP** (1999) – Landscape Architecture and **TUT** (1998- 1999)- Environmental Planning and Plant Material Studies;
- Worked as **part time Landscape Architect and Environmental Consultant at Plan Associates** and **managed their environmental division for more than 10 years** – 1993 – 2008 (assisted the **PWV Consortium** with various road planning matters which amongst others included environmental Scans, EIA's, Scoping reports etc.)
- Renamed business as **Bokamoso in 2000** and is the only member of Bokamoso Landscape Architects and Environmental Consultants CC;
- More than 20 years experience in the compilation of Environmental Reports**, which amongst others included the compilation of various **DFA Regulation 31 Scoping Reports**, EIA's for EIA applications in terms of the applicable environmental legislation, Environmental Management Plans, Inputs for Spatial Development Frameworks, DP's, EMF's etc. Also included EIA Application on and adjacent to mining land and slimes dams (i.e. Brahm Fisherville, Doornkop)

Qualifications And Experience In The Field Of Landscape Architecture (Lizelle Gregory (Member Bokamoso)):

Landscape Architecture:

-Compiled landscape and rehabilitation plans for more than 22 years.

The most significant landscaping projects are as follows:

-Designed the Gardens of the Witbank Technicon (a branch of TUT). Also supervised the implementation of the campus gardens (2004);

-Lizelle Gregory was the Landscape Architect responsible for the paving and landscape design at the UNISA Sunnyside Campus and received a Corobrick Golden Award for the paving design at the campus (1998-2004);

-Bokamoso assisted with the design and implementation of a park for the City of Johannesburg in Tembisa (2010);

-The design and implementation of the landscape gardens (indigenous garden) at the new Coca-Cola Valpre Plant (2012-2013);

-Responsible for the rehabilitation and landscaping of Juksei River area at the Norwood Shopping Mall (Johannesburg) (2012-2013);

-Designed and implemented a garden of more than 3,5ha in Randburg (Mc Arthurpark). Bokamoso also seeded the lawn for the project (more than 2,5 ha of lawn successfully seeded) (1999);

-Bokamoso designed and implemented more than 800 townhouse complex gardens and submitted more than 500 Landscape Development Plans to CTMM for approval (1995 – 2013);

-Assisted with Landscape Designs and the Masterplan at Eco-Park (M&T Developments) (2005-2011);

-Bokamoso designed and implemented an indigenous garden at an office park adjacent to the Bronberg. In this garden it was also necessary to establish a special garden for the Juliana Golden Mole. During a recent site visit it was established that the moles are thriving in this garden. Special sandy soils had to be imported and special indigenous plants had to be established in the natural section of the garden.

-Lizelle Gregory also owns her own landscape contracting business. **For the past 20 years she trained more than 40 PDI jobless people (sourced from a church in Mamelodi)** to become landscape contracting workers. All the workers are (on a continuous basis) placed out to work at nurseries and other associated industries;

-Over the past 20 years the Bokamoso team compiled more than 800 landscape development plans and also implemented most of the gardens. Bokamoso also designed and implemented the irrigation for the gardens (in cases where irrigation was required). Lizelle regarded it as important to also obtain practical experience in the field of landscape implementation.