

**FINAL ENVIRONMENTAL MANAGEMENT PLAN
FOR THE PROPOSED UPGRADE OF STRATEGIC
ROAD LINKAGES AND THE CONSTRUCTION OF A
PEDESTRIAN WALKWAY AND CYCLE PATH
NETWORK OLIEVENHOUTBOS,
CITY OF TSHWANE METROPOLITAN MUNICIPALITY
GAUTENG PROVINCE**

JUNE 2014

FOR:

**THE CITY OF TSHWANE
METROPOLITAN MUNICIPALITY**

BY:



spoor
environmental services

t: +27 (0)12 480 0612 | f: +27 (0)86 763 5635 | w: www.spoorenservices.co.za
a: Postnet Suite 111, Private Bag 1137, Lynnwood Ridge, 0040, Pretoria, South Africa

REPORT TITLE : Final Environmental Management Plan for the Upgrade of Strategic Road Linkages and the Construction of a Proposed Pedestrian Walkway and Cycle Path Network, Olievenhoutbos, City of Tshwane Metropolitan Municipality, Gauteng Province

CLIENT : City of Tshwane Metropolitan Municipality; Integrated Project Delivery Unit Infrastructure and Programme Management

REPORT STATUS : Final

SPOOR PROJECT REFERENCE : 02/22_Olievenhoutbos

PLACE AND DATE : Pretoria, June 2014

PROPONENT

Proponent:	City of Tshwane Metropolitan Municipality
Contact Person:	Mr I Adegelu
Physical address:	7th Floor, Bothongo Plaza East Building 285 Francis Baard Street , Pretoria, 0001
Postal address:	PO Box 1454, Pretoria, 0001
Telephone:	072 785 0885
Fax:	086 629 8739
Email:	idowua@tshwane.gov.za

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Consultant:	SPOOR Environmental Services (PTY) Ltd.
Contact Person:	JC van Rooyen
Physical address:	13 Augrabies St. Mooikloof Ridge, Pretoria
Postal address:	Postnet Suite 111, Private Bag X37, Lynnwood Ridge 0040
Telephone:	012 480 0612
Fax:	086 763 5635
Email:	jcyr@spoorenservices.co.za

DECLARATION OF INDEPENDENCE

I, JC van Rooyen as authorised representative of SPOOR Environmental Services hereby confirm my independence as an Environmental Assessment Practitioner and declare that neither I nor SPOOR Environmental Services (PTY) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which SPOOR Environmental Services (PTY) Ltd. was appointed as Environmental Assessment Practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Proposed Upgrade of the Strategic Road Linkages and the Construction of a Pedestrian Walkway and Cycle Path Network in the Olievenhoutbos Area of the City of Tshwane Metropolitan Municipality.

Signed.....

Date.....

REPORT DISTRIBUTION LIST

Name	Institution
I Adegelu	City of Tshwane Metropolitan Municipality

DOCUMENT HISTORY

Report	Date	Version	Status
OLIEVENHOUTBOS_EMP_01	March 2014	1.0	Draft
OLIEVENHOUTBOS_EMP_02	June 2014	2.0	Final

EXECUTIVE SUMMARY

SPOOR Environmental Services (PTY) Ltd. was appointed by the City of Tshwane Metropolitan Municipality's Integrated Project Delivery Unit: Infrastructure and Programme Management as the Environmental Assessment Practitioner to manage the relevant environmental management processes related to the proposed development.

The proposed project includes the upgrade of strategic road linkages and the simultaneous construction of a pedestrian walkway and cycle path network in certain specific road reserves alongside specific roads in the Olievenhoutbos area. Upgrading of the strategic link roads will consist of the formalization of existing dirt roads to proper surfaced roads which will include the usual residential street infrastructure. Construction of the associated walkways and cycle paths will consist of 1,5m – 2m wide tracks that will increase to 3m where the pedestrian walkways and cycle paths will run alongside each other.

Pedestrian walkways and cycle pathways will be constructed along both sides of the roads for the all of the routes indicated. Furthermore the proposed infrastructure will also be supplied with street furniture such as park benches and rubbish bins and with the required traffic safety features in high activity nodes such as pedestrian road crossings. In terms of this aspect there was a specific comment from the City of Tshwane's Metropolitan Emergency Services Section that frequent accidents occur between pedestrian and cyclists. Specific action would therefore be required in terms of ensuring the safety of pedestrians and cyclist on these walkways and cycle paths in order for this new infrastructure to benefit the local communities maximally. In addition, the Station Commander of the Olievenhoutbos SAPS has also sensitised the EAP towards the importance of suitable access in and around all construction areas for the SAPS to be able to police the area effectively. The relevant mitigation measure recommended in terms of the communication required between the construction management team and the Olievenhoutbos Police must therefore be implemented.

In terms of ecological sensitivity the Specialist found that the majority of the project footprint does not pose the risk of noteworthy environmental degradation purely as a result of the situation that the roads and pathways will be developed within the exiting road reserves of the Olievenhoutbos business and residential area. The only sections of the development footprint that was found to be sensitive was that included in the riverine area of the three watercourses (upper tributaries of the Rietspruit) included in the project area. Of these only one remained "natural" and two are concrete lined channels. Specific impact mitigation measures were suggested for the management of the construction process in this area. Social impacts could be caused as a result of health and safety issues during the construction phase of the project but could be managed effectively through appropriate mitigation measures.

The aim of this Environmental Management Plan is to ensure that the planning, assessment, construction and operational phases of the development comply with the relevant environmental legislation, regulations and guidelines. The Environmental Management Plan furthermore aims to organize and coordinate the proposed environmental management and mitigation measures and to describe these measures in order to prevent, reduce or otherwise manage the potential negative social and environmental impacts associated with the proposed development and to add to the favourable impacts of the project.

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	iv
TABLE OF CONTENTS	v
LIST OF FIGURES.....	vi
APPENDIXES	vi
LIST OF ABBREVIATIONS	vii
1. INTRODUCTION.....	1
2. AIM OF THE EMP	1
3. EMP CONTEXT	1
4. PROJECT DESCRIPTION	2
4.1 Locality.....	2
4.2 Proposed Site Activities and Facilities	3
5. RECEIVING ENVIRONMENT	5
6. MANAGEMENT STRUCTURE.....	8
6.1 Applicant / Implementing Agent.....	8
6.2 Environmental Assessment Practitioner (EAP).....	8
6.3 Resident Engineer (RE) or Project Manager (PM).....	9
6.4 Principal Construction Contractor or Principal Contractor (PC).....	9
6.5 Environmental Control Officer (ECO)	9
6.6 Health and Safety Officer	10
6.7 The Community Liaison Officer (CLO).....	10
6.8 The Local Community	10
6.9 In General	10
7. BIO PHYSICAL, SOCIO ECONOMIC AND CULTURAL IMPACTS AND THE ASSOCIATED MITIGATION AND REHABILITATION MEASURES	11
8. CONCLUSION	39
9. REFERENCES.....	40
9.1 Published Sources	40
9.2 Unpublished Sources	40

LIST OF FIGURES

Figure 1: Locality

Figure 2: Site Sensitivity

APPENDIXES

Appendix 1: Proposed Penalties and Fines Associated with Various Acts of Non-compliance and Miss-conduct.

Appendix 2: Typical Composition of a Construction Camp

Appendix 3: Procon Environmental Technologies (PTY) Ltd.

LIST OF ABBREVIATIONS

BAR	Basic Assessment Report
COIDA	Compensation for Occupational Injuries and Diseases Act (No 130 of 1993)
CLO	Community Liaison Officer
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GDARD	Gauteng Department of Agriculture and Rural Development
IDP	Integrated Development Plan
ISDF	Integrated Spatial Development Framework
PC	Principal Contractor
PM	Project Manager
RE	Resident Engineer
SAHRA	South African Heritage Resources Agency
SHE	Safety, Health and Environment
H&S Rep	Health and Safety Representative
PPE	Personal Protective Equipment

1. INTRODUCTION

SPOOR Environmental Services (PTY) Ltd. was appointed by the City of Tshwane Metropolitan Municipality's Integrated Project Delivery Unit: Infrastructure and Programme Management as the Environmental Assessment Practitioner to manage the relevant environmental management processes related to the proposed development. This Environmental Management Plan (EMP) was developed in order to guide the relevant contractors and maintenance managers with regard to their responsibilities in terms of responsible environmental management during the construction phase of the proposed upgrades of certain strategic link roads and the construction of sections of Pedestrian Walkway and Cycle Path Networks. Finally, the EMP must assist the Applicant in the management of the anticipated impacts during the operational phase of the project.

2. AIM OF THE EMP

The aim of the EMP is to ensure that the planning, assessment, construction and operational phases of the development comply with the relevant environmental legislation, regulations and guidelines. The EMP furthermore aims to organize and coordinate the proposed environmental management and mitigation measures and to describe these measures in order to prevent, reduce or otherwise manage the potential negative social and environmental impacts associated with the proposed development and to add to the favourable impacts of the project. In brief the EMP therefore aims to ensure that;

- ❖ activities arising as a consequence of the design, construction and operational on the site of the development are managed in a way that reduces or avoids negative social and environmental impacts and to enhance its positive effects,
- ❖ impacted environments are restored according to the recommendations of the EMP,
- ❖ efficient information sharing is maintained and a clear understanding exists of all the responsibilities of all the relevant stakeholders,
- ❖ the necessary precautions are taken against damages and claims that occur as a result of the implementation of the development in a timeous fashion,
- ❖ accurate records are kept of the progress of the development during its various stages as well as of the ongoing monitoring of all its associated social and environmental impacts
- ❖ timeous completion occurs of all the implementation activities on account of generally sound management.

3. EMP CONTEXT

This EMP fits into the overall planning, implementation and operation of the walkway and cycle path development and should be implemented by the Applicant. A copy of the EMP should always be available on site. All contractors and sub-contractors must be well-informed of the EMP and its contents.

4. PROJECT DESCRIPTION

4.1 Locality

Existing roads to be upgraded as well as the proposed pedestrian walkway and cycle path network will be constructed within the existing road reserves of some of the main distributor and other lower class roads within the central Olievenhoutbos range. The proposed new infrastructure will consist of the following aspects;

- ❖ **Oak Street from Legong/Cycad Crescent Street up to Bohlale Street -**
780m upgrade of informal gravel road to new surfaced road along the existing stormwater channel;
- ❖ **Ikati Street up to Indulamithi Street –**
690m upgrading of gravel road to surfaced road;
- ❖ **Imbongolo Street from Ikati Street up to Imbovane Street –**
750m upgrading of gravel road to surfaced road;
- ❖ **1st Street –**
Construction of walkway and cycle path, 2200m in length and with the width varying between 1.5m to 3.0m wide;
- ❖ **Motola/Waterberg Street –**
Construction of walkway and cycle path, 2200m in length and the width varies from 1.5m wide to 3.0m wide;
- ❖ **Bohlale Street –**
Cycle Path about 650m in length and 2.0m wide;
- ❖ **Cycad/Naledi Street -**
Cycle Path about 800m in length and 2.0m wide;
- ❖ **Imbongolo Street –**
Cycle Path about 850m in length and 2.0m wide.

PLEASE NOTE: The Olievenhoutbos street names are in the process of being renamed, however the proposed upgrades will be implemented as per the locality plan. See Figure 1.

In addition, the ecological Specialist identified the following areas being influenced by the proposed new infrastructure.

Riparian Crossing	Locality	Description
Perennial feature	25°53'48.33"S 28° 5'35.91"E	A perennial system that has seen some transformation such as erosion, bank incisement and alien encroachment of riparian vegetation. The non-

Riparian Crossing	Locality	Description
		perennial system transverse 1 st Street through a culvert system.
Non-perennial feature 1	From 25°54'42.51"S 28° 5'27.73"E until 25°54'53.03"S 28° 5'47.19"E	An artificial concrete canal that has been created within an open space area. This concrete canal stops close to Imbongolo Avenue, where it releases into another unknown non-perennial system.
Non-perennial feature 2	From 25°55'5.72"S 28° 5'26.10"E To 25°55'5.57"S 28° 5'40.01"E	A tributary of the non-perennial feature located within the bottom portion of the route traversing in the centre of this portion. Due to the surrounding residential development, this feature has been canalised and transformed by a concrete canal.

4.2 Proposed Site Activities and Facilities

Key components of the proposed project include the following basic activities and facilities;

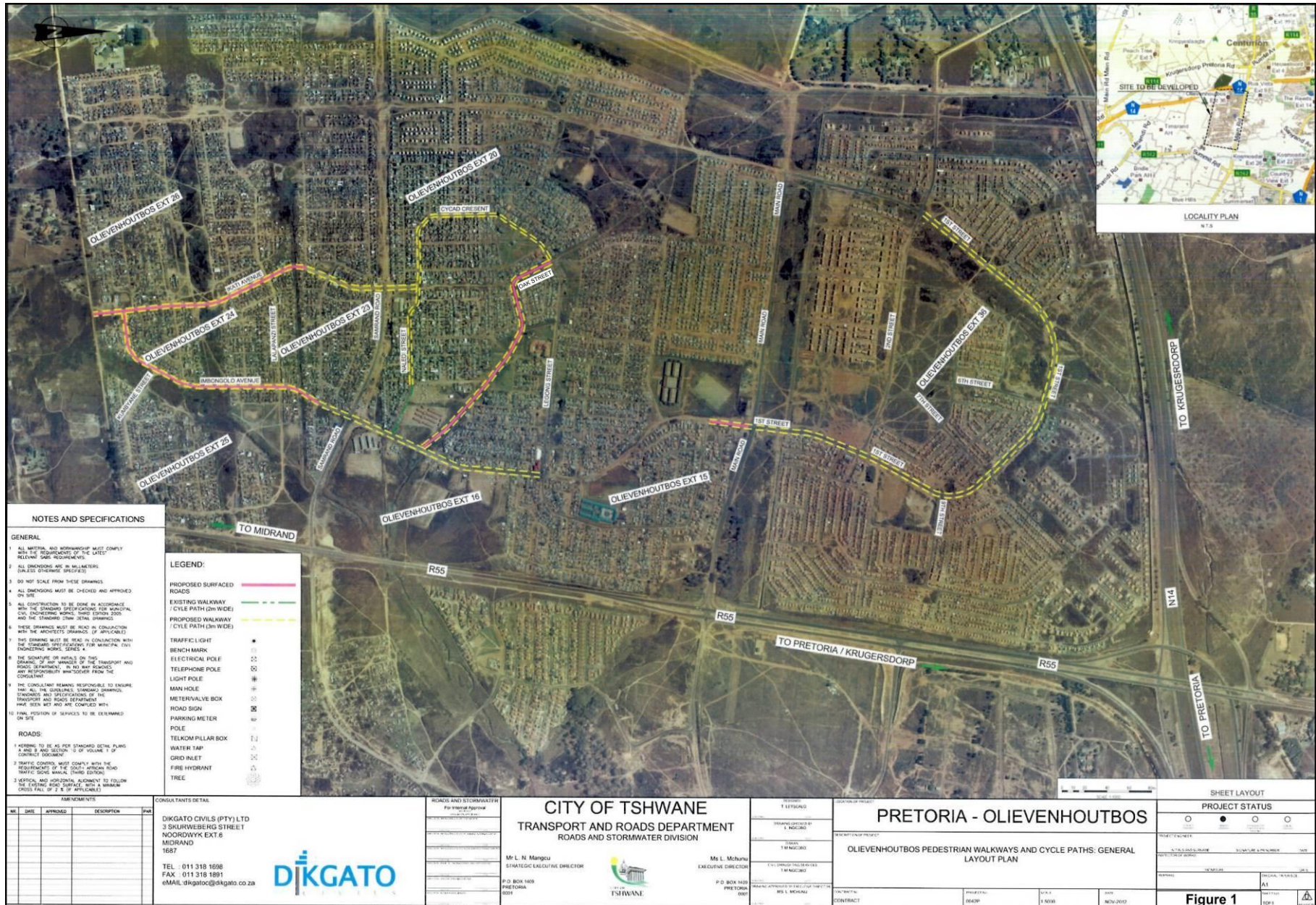
Construction Phase:

- ❖ Security fence with security checkpoint around the construction camp,
- ❖ Site offices,
- ❖ Chemical Toilets,
- ❖ Construction materials store rooms and laydown areas,
- ❖ Waste collection area,
- ❖ Temporary construction vehicle parking area.

Operational Phase:

- ❖ A ±2200m section of informal gravel road surfacing,
- ❖ ±4400m section of pedestrian walkways and cycle paths, 1.5m - 3m wide and surfaced with 60mm Concrete Interlocking Blocks,
- ❖ ±2300m section of cycle paths, 2m wide and surfaced with 60mm Concrete Interlocking Blocks,
- ❖ Street furniture consisting of traffic safety signage, benches, bus stop shelters, dustbins, concrete bollards and street lighting.

FINAL ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED UPGRADE OF STRATEGIC ROAD LINKAGES AND THE CONSTRUCTION OF A PEDESTRIAN WALKWAY AND CYCLE PATH NETWORK, OLIEVENHOUTBOS, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG



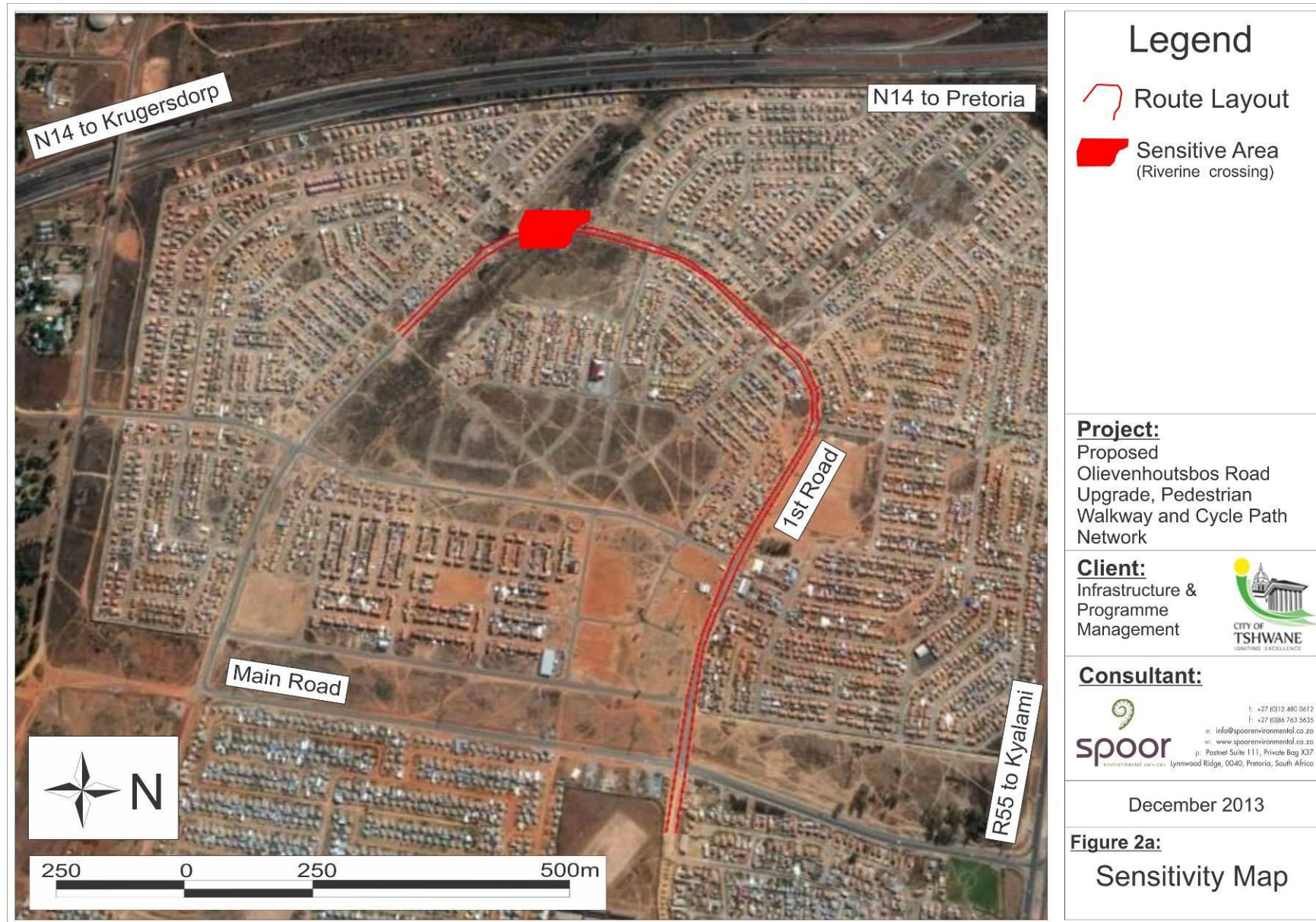
5. RECEIVING ENVIRONMENT

The proposed walkways and cycle paths development site is situated at an average altitude of 1510m above mean sea level. The area receives between 620 and 800mm of rain per annum. Floristically the development site is situated within the Egoli Granite Grassland veldtype that is located in the larger Grassland Biome (Mucina & Rutherford, 2006). Although this veld type is described as endangered in terms of its general conservation status, the proposed road upgrades and pedestrian walkway and cycle path development makes exclusive use of the existing road reserve footprint areas and will not develop over any sensitive or virgin areas with the exception of the riverine areas associated with the upper tributaries of the Rietspruit system. Although these watercourse systems were found to be in a state described as “Largly Modified by the Specialist, all riverine areas are to be treated as sensitive and must be treated in the manner described by the Specialist. See Figure 2.

In terms of the groundcover of the development site, the site is wholly situated within the road reserves of the roads as described above. The section at Oak Street from Legong/Cycad Crescent Street up to Bohlale Street is also totally modified although not situated in a road reserve. This section contains informal dirt walkways along the concrete storm water channel. It is therefore a totally ecologically disturbed area covered with a mix of exotic and pioneer stage indigenous vegetation (mainly *Eucalyptus spp.*, *Melia spp.*, *Acacia sieberiana* & *karoo* and *Pennissetum spp.*, *Cynodon spp.*, *Ricinus spp.*, *Amaranthus spp.*) with scattered exotic weeds in between.

Visual inspections of the Olievenhoutbos area revealed severe pollution of all the riverine systems apart from the start of several erosion gullies at the discharge ends of some of the storm water culverts. Although it can be seen that efforts has been made to enhance the character of the area with landscape park areas and with the addition of the proposed surfaced roads and pedestrian walkway and cycle paths, it is quite evident that serious service delivery difficulties exists in the area and this is causing severe environmental impacts especially in the riverine areas. These impacts far exceed the possible impacts related to the addition of the new infrastructure and the Tshwane Municipality will need to look into this in terms of the impact it has on the quality of the environment here.

Existing activities and facilities alongside the implicated roads consist of traffic infrastructure, overhead lighting and signage as well as sections of existing pedestrian pathways. Adjacent land uses consist predominantly of residential areas with intermitted informal trading areas and recreation areas. The proposed pedestrian walkways and cycle paths will be situated between a number of important access road in Olievenhoutbos and will contribute positively to the road safety for the local community members that need to travel between these areas on a daily basis. It is furthermore believed that the street furniture associated with the proposed walkways will also contribute to the quality of the urban environment in this area and to the quality of life for the local community.





6. MANAGEMENT STRUCTURE

In order to ensure that the prescribed mitigation, rehabilitation and monitoring measures are effectively and efficiently implemented in all the relevant stages of the development, it is important to assign certain responsibilities to the specific managers thereof. The success of the implementation of the aims of this EMP will not only depend on whether appropriate mitigation and rehabilitation measures have been correctly identified, but also on the level of commitment of all the responsible individuals to implement the recommendations which are proposed in this document.

6.1 Applicant / Implementing Agent

The party or agent who is or represents the developer and who will be implementing the development as the contractual overseer is the developer or implementing agent. In this case the developer of the property will be:

City of Tshwane Metropolitan Municipality
Mr I Adegelo
7th Floor, Bothongo Plaza East Building
285 Francis Baard Street
Pretoria
0001

Tel: 072 785 0885
Fax: 086 629 8739
E Mail: idowua@tshwane.gov.za

The Applicant is responsible for:

- ❖ the implementation of the EMP (from the initiation of the project to the completion of construction) and all the prescribed rehabilitation,
- ❖ appointing a project manager (PM) that will represent the developer/implementing agent and who will liaise competently with all the Services, contractors, the local community and the other entities involved.

6.2 Environmental Assessment Practitioner (EAP)

The appointed Environmental Assessment Practitioner (EAP) is responsible for:

- ❖ ensuring that the EMP for the proposed road upgrade and Pedestrian Walkway & Cycle path Network complies with all the relevant environmental legislation and all the conditions of the GDARD,
- ❖ liaising with the developer/implementing agent at the onset of the construction phase and for ensuring that he/she is aware of the identified responsibilities and of the environmental issues of the development,
- ❖ informing the developer/implementing agent of the need of appointing an environmental control officer (ECO) (See 6.5) and providing advice on the actual appointment.

6.3 Resident Engineer (RE) or Project Manager (PM)

The Resident Engineer (RE) also known as the Project Manager (PM) of the principal construction contractor (see 6.4) usually fulfils the role of the overall project management of the development project on behalf of the developer/implementing agent. The PM can also be appointed directly by the developer/implementing agent and stand independent of the principal construction contractor, in which case the principal construction contractor will appoint his/her own PM. It is therefore the responsibility of the developer/implementing agent to define the specifics of the appointment of the PM/RE. The RE/PM in conjunction with the Environmental Control Officer (ECO) (See 6.5) will be responsible for the implementation of the EMP.

6.4 Principal Construction Contractor or Principal Contractor (PC)

In the event that the principal construction contractor and the PM are represented by the same entity, the PM will be responsible for the appointment of sub-contractors and the implementation of this document. The PC and his/her PM are responsible for:

- ❖ responding timeously to any complaints and commands issued by the environmental control officer,
- ❖ recording any paper trails from the developer/implementing agent, ECO and the PM,
- ❖ appointing a construction foreman to act as representative for all the employees,
- ❖ rehabilitating the site to conditions acceptable to the directives of the EMP and the reasonable approval of the ECO,
- ❖ compliance to any applicable laws and acts specifically those relevant to the project
- ❖ conducting site inspections along with the ECO, (See 6.5)

6.5 Environmental Control Officer (ECO)

The developer/implementing agent is responsible for employing an environmental control officer (environmental advisor) or ECO at the start of the construction phase.

The ECO, on behalf of the implementing agent will be responsible for:

- ❖ compiling a monitoring and auditing plan to ensure that the environmental management procedures of the EMP are implemented and are effective,
- ❖ ensuring that the Contractors/Sub-contractors and Employees are aware of their environmental impact. (This can be achieved through an environmental awareness-training program conducted at the onset of the construction phase),
- ❖ conducting and monitoring site activities, and ensuring that they have the minimal environmental impact,
- ❖ recording and issuing spot-fines for any non-compliance with the requirements of the EMP,
- ❖ producing a photographic record of the site before, during and after construction,
- ❖ liaising between the developer/implementing agent and the PC (and the relevant appointed sub-contractors) and the local community (via the community liaison officer – see 6.7) with regard to all environmental concerns,
- ❖ the ECO in association with the relevant parties will also be responsible for assisting in the resolution of conflicts arising due to the development.

6.6 Health and Safety Officer

According to the Occupational Health and Safety Act in terms of the Construction Regulations 85 of 1993 (OHS act), which came into effect on 18 July 2003, a Health and Safety Representative (SHE Rep) must be employed under the Compensation for Occupational Injuries and Diseases Act. (COIDA) (Act No 130 of 1993). The SHE Rep will be responsible for the following:

- ❖ Investigate potential hazards and dangerous occurrences and examine the causes of accidents.
- ❖ Conduct toolbox talks on a weekly basis to sensitise workers of potential hazards on the construction site.
- ❖ Attend monthly Health and Safety (H&S) meeting with management.
- ❖ Make sure that the workers adhere to the Health and Safety standards regarding Personal Protective Equipment (PPE) and weather related work conditions.
- ❖ Have a Safety file on site with the relevant certificates, minutes of H&S meetings and documentation regarding the toolbox talks according to the COIDA act.

6.7 The Community Liaison Officer (CLO)

The CLO must preferably consist of an individual representative of the neighbouring Communities and/or other interest groups. The CLO is appointed by representatives of the local groups and is responsible for the communication between the neighbours and all the other representatives of the management structure for the total duration of the construction phase of the development. The CLO can also function as the community representative during the Operational phase of the development. He/she will therefore be responsible for liaising between the development management, the surrounding landowners and other affected parties within the community as soon as details become available on how the project will affect them and how it might affect them in the foreseeable future.

6.8 The Local Community

It is important to involve the local communities where this is relevant in terms of impacts that the development may have on their activities or facilities. If possible a local community member or group should be identified to which pertinent information can be communicated. These parties will also have an open channel through the ECO to communicate any issues to the applicant.

6.9 In General

All of the abovementioned parties (6.1 – 6.8) are responsible for appointing representatives that are suitably qualified to perform the necessary tasks appointed to them. These representatives must also be able to interact within a professional team in order to facilitate all the relevant activities needed for the successful implementation of the EMP and the completion of the proposed Road Upgrade and Pedestrian Walkway & Cycle Path Network development.

7. BIOPHYSICAL, SOCIO ECONOMIC AND CULTURAL IMPACTS AND THE ASSOCIATED MITIGATION AND REHABILITATION MEASURES

BIOPHYSICAL ENVIRONMENT

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
<p>Composition of Labour Force</p> <ul style="list-style-type: none"> ➤ Employment of members of the Local Community. 	<p>PC, Site Managers And CLO</p>	<p>Pre-construction; Construction and Operational</p>	<ul style="list-style-type: none"> ➤ Members of the local communities closest to the proposed walkways and cycle path developments (Olievenhoutbos) must be employed during the construction and operational phases as far as possible, and the contingent of the local community employed must preferably be equally represented by male and female workers. ➤ The Relevant skills development workshops should be conducted at all the applicable levels of the local communities and for every possible activity wherever the construction phase of the development can allow for this. 		
<p>Environmental Awareness</p> <ul style="list-style-type: none"> ➤ Fires ➤ Proper personal conduct 	<p>PC, Site Managers & ECO</p>	<p>Pre-construction; Construction and Operational</p>	<ul style="list-style-type: none"> ➤ Cooking in the construction camps must be performed by electrical or gas stoves in well ventilated areas which are declared safe for this 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
<ul style="list-style-type: none"> ➤ Pollution ➤ EMP 			<p>purpose. Designated fire places must be provided for, in the construction camps in safe areas away from flammable materials. No fires may be built outside these areas.</p> <ul style="list-style-type: none"> ➤ Sufficient temporary ablution facilities (1 for every 15 people) in the form of chemical toilets must be provided for all workers during the pre-construction, construction and rehabilitation phases of the development. These ablution facilities must be serviced on a regular basis as per the contractor's schedule that provides them. ➤ Conduct Environmental Awareness Workshop(s) to sensitize any and all visitors and workers on the site to the relevant site specific sensitivities (significant habitats, such as the Unnamed Water Course) and on how these areas must be handled. ➤ This EMP must be made available to all employees, construction workers, visitors and maintenance personnel on the site to ensure that they are informed of the appropriate environmentally responsible conduct. A copy must therefore be held at the site offices at all times. ➤ This EMP is drafted in such a manner that this section can be reproduced (photo copied) and handed out to all of the managers and contractors who must use it as a monitoring tool whereby check-ups (weekly or monthly whatever is applicable) can be performed and be added to a 		

FINAL ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED UPGRADE OF STRATEGIC ROAD LINKAGES AND THE CONSTRUCTION OF A PEDESTRIAN WALKWAY AND CYCLE PATH NETWORK, OLIEVENHOUTBOS, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>final monthly report or project completion report to track the monitoring of the project effectively over the lifetime of the construction phase and the Operational phase of the development.</p> <ul style="list-style-type: none"> ➤ All employees, construction workers, maintenance personnel and site managers must furthermore be made aware of the location of the EMP document (at the site office) and of their responsibility to adhere to the content thereof. This action can be performed at an Environmental Awareness Workshop at the first appropriate time when the bulk of the contractors and sub-contractors have been appointed. ➤ Activities such as littering, informal settlement, loud music and other ill-mannered behaviour will be regarded as unacceptable and it will be the responsibility of the various contractors and other employers to ensure that workers under their supervision conduct themselves appropriately. These actions must be reported to the ECO who will see to the issuing of the relevant fines. See Appendix 1. ➤ No damage and/or removal of indigenous plant or animal material for cooking or other purposes will be allowed. See Appendix 1. 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
<p>Building of a construction camp & related activities</p> <p><i>See Appendix 2_Typical Composition of Construction Camp</i></p> <ul style="list-style-type: none"> ➤ Site clearance for administration structures. ➤ Compaction of resident soils by construction vehicles. ➤ Possible contamination by fuels and other construction materials. ➤ Security ➤ Access 	<p>PC, Site Managers & ECO</p>	<p>Pre-construction; Construction</p>	<ul style="list-style-type: none"> ➤ Local authorities (e.g. the City of Tshwane Metropolitan Municipality (CoT), SA Police (Olievenhoutbos Station) CoT EMS, and Traffic department) as well as the surrounding land owners must be notified of the commencement of the construction activities at least 6 weeks before the actual start of the activities. The contractors must, at the relevant community liaison meeting communicate the dangers of the construction site and stress that the site is specifically out of bounds for small children. ➤ The whole of a construction site should preferably be fenced off during construction. The principal contractor must in addition provide suitably visible signage (visible for both motorists and pedestrians) along all of the major circulation routes and entrances around the site informing people that the site is under construction and private property and that no access is allowed for any unauthorised persons. No casual access may be allowed here. ➤ Full documentation (ID, contact details and of next of kin) of all personnel must be kept on file at the site office and no unauthorized persons may be allowed on site. ➤ The construction phase must be managed by strict 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>management guidelines (EMP as well as the internal guidelines of the individual contractors) and it will be the responsibility of the relevant contractors to ensure that they themselves and their workers conduct themselves according to the management guidelines laid down.</p> <ul style="list-style-type: none"> ➤ The chosen site for construction camps must not be located closer than 100m horizontally from any drainage courses. ➤ Vegetation clearance for the erection of construction camps must be kept to an absolute minimum and must adhere to the footprint no larger than the camps themselves. (refer to Appendix 1) ➤ The main site office must be situated within one of these camps (PC or Civils) as well as storage areas for construction vehicles and other construction related equipment. Temporary water and fuel tanks must also be contained in the camp as well as a workshop area. ➤ Adequate water, sanitation and solid waste disposal services must be provided or arranged for prior to human habitation on the site. Solid waste should be sorted into categories and those not suited to be dumped in an appropriate waste skip at the temporary facility (E.g. cement and chemicals) must be dumped at a recognized waste disposal facility designed for this purpose. A suitable site must be selected for the waste skip site and this site should only contain materials that 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>do not pose any risk in terms of surface or sub surface environmental contamination (e.g. building rubble). This site must also be suitably rehabilitated after completion of the construction activities.</p> <ul style="list-style-type: none"> ➤ An earth berm or drainage ditch (450mmx450mm) must be constructed around construction camps to prevent runoff from these camps. ➤ Special attention must be given to any temporary fuel tank and its surrounding area. This area should be appropriately designed, in a watertight bunker which is able to hold 110% of the volume of the tank itself. The area should be monitored on a weekly basis to ensure that no fuel is leaking into the soils. ➤ The drainage valve of the bunded area may not be allowed to drain into the surrounding soils but must be piped into containers to be removed by an Oil recycling company. ➤ Should an accidental puncture of a fuel tank occur and the bunded area be breached, an appropriate specialist (Procon Environmental Technologies (PTY) Ltd. (013) 679 4617/34) should be contacted immediately for clean-up operations. The top soils and sub soils of the site of the spillage must be completely removed and be disposed of at a fittingly licensed facility by the specialist. The excavation must be filled up to the top with healthy soils. This must be performed directly after a spillage and not only at the final rehabilitation of 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>the construction camp to ensure no leaching of oils and fuels into the sub soils.</p> <ul style="list-style-type: none"> ➤ Containment bunkers must be kept empty at all times to be prepared for any emergency spills. ➤ All construction materials must be stored in designated areas that are suitable for the containment of that specific material. (Cement, paints, acidic cleaning agents and bitumen, must be stored in water tight containers within the construction camp). In the event of a spillage the appropriate environmental specialist (e.g. Procon Environmental Technologies (PTY) Ltd (013) 679 4617/34) must be contacted. The contaminated soil must be removed to a depth at which no sign of the contaminant is visible and replaced with healthy soils. ➤ Construction vehicles and equipment must be checked and maintained on a regular basis (weekly) to ensure that no environmental contamination is brought about by oil, fuel or hydraulic fluid leakages. ➤ All fuel and lubricant oriented areas (for storage and waste) at the service site (e.g. diesel tanks, workshop shed, and compressor shed) must be constructed with impervious concrete floors and oil and fuel resistant walls, with watertight sumps at the end of the catchment drains of these areas. Sumps must be pumped into suitable containers and removed by an appropriate specialist, to a suitably licensed waste disposal facility. 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<ul style="list-style-type: none"> ➤ After construction is complete the construction camp must be dismantled and full rehabilitation of the site be done. ➤ Compacted soils must be loosened to a depth of 300mm and reseeded with seed of locally occurring indigenous ground covering species. This must occur in all the areas not to be taken up by building structures. All soils in areas contaminated with cement dust, small oil and fuel leakages and other contaminants must be removed to an appropriate depth as per the specific contaminant as prescribed by the ECO. These soils must be replaced with suitably healthy soils (able of harbouring plant and animal life) and be stabilized by contouring the soils according to the local site contours, reseeded or re planted with soil stabilising ground covering species indigenous to the local area. ➤ Where possible, access roads must be restricted to already degraded areas or make use of existing roads and paths. ➤ The orientation of these access roads (new roads) must be parallel to the contours to eliminate erosion as far as possible. ➤ Drivers of construction vehicles must be informed to make use of accepted access roads only and not enter into any sensitive areas. ➤ Site roads must also be reshaped according to the prevailing contours, scarified, fertilized and re-seeded and re-vegetated with indigenous grasses 		

FINAL ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED UPGRADE OF STRATEGIC ROAD LINKAGES AND THE CONSTRUCTION OF A PEDESTRIAN WALKWAY AND CYCLE PATH NETWORK, OLIEVENHOUTBOS, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>and vegetation characteristic of the local ecological veld types (where no future construction will occur).</p> <ul style="list-style-type: none"> ➤ Also see Recommendations under Geology and Soils. 		
<p>Bulldozing and Cutting</p> <ul style="list-style-type: none"> ➤ Stability of specific cut and fill sites. ➤ Rubble removal ➤ Waste Soils 	PC, Site Managers & ECO	Pre-construction and Construction	<ul style="list-style-type: none"> ➤ Specific sites where cut and fill activities is needed must be inspected by qualified engineers and signed off as stable and safe before construction activities can commence here. ➤ Topsoil (top 300mm layer minimum) must be removed, prior to any earthmoving activities and stockpiled separately from subsoil material. ➤ Where these procedures are used during the construction process, rubble associated with the cut operations (natural and not building rubble) must be used in the fill areas where no structural stability is needed. E.g. in front of the structures. Rubble may not be left anywhere on the construction site or be pushed down valleys or drainage ways. Materials and rubble left over must otherwise be reshaped and re-vegetated to resemble the surrounding landscape. ➤ Material (only natural) from cutting should be used for the shaping of earth berms or for landscaping. 		
Climate					

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
<ul style="list-style-type: none"> ➤ High rainfall in 24 hours could cause potential storm water related impacts e.g. scouring and erosion. ➤ Potential water saturated soil conditions. ➤ The incidence of frost brought about by the proximity to a river system. ➤ Electrical storms. ➤ Veld fires. ➤ Precautionary measures. 	PC, Site Managers & ECO	Pre-construction; Construction and Operational	<ul style="list-style-type: none"> ➤ Implement a construction/management plan to specify the most appropriate time (preferably May – early September) for any construction activities to commence and to phase the construction phase so as to clear only those areas influenced by the next phase of construction. ➤ Special attention must be given to the overall storm water design so as to increase the volume of site-specific storm water absorption thereby decreasing the volumes and velocities of storm water at the far end of the storm water system. ➤ Areas where site specific storm water drainage measures (e.g. gravel pit drains) are to be constructed, must be specified by the engineering geologist to determine the suitability of the site for this purpose and thereby not decreasing the stability of the sub structure of the soil as a result of saturated soil water conditions. ➤ Special attention must also be given to the design of the storm water structures at the discharge ends of the storm water system so as not to cause erosion damage. ➤ Ensure that the founding structures of all the structures are constructed during a time of stable sub soil conditions and as per engineer’s detail. ➤ Strict safety management rules must accompany the manifest of the walkway and cycle path development in terms of fire safety. No fires may be allowed outside of designated fireplaces and 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			braai areas. All activities and facilities which has fire related activities must be provided with the appropriate fire distinguishing equipment which must be monitored and serviced by a qualified service operator on a regular basis, according to NHBRC specification.		
<p>Geology and Soils</p> <ul style="list-style-type: none"> ➤ Loss of topsoil - (essential vegetative substrate); ➤ Scouring and erosion; ➤ Compressibility and collapse potential of transported and residual soils between founding depth and bedrock; ➤ Site drainage – to reduce risk of subsurface material saturation and consequent differential 	PC, Site Managers & ECO	Pre-construction; Construction and Operational	<ul style="list-style-type: none"> ➤ Topsoil (top 300mm layer minimum) must be removed prior to any earthmoving activities and stockpiled separately from subsoil material and only at the sites of the construction camps and the footprints of the specific structures to be built. The stockpiled topsoil mounds should not exceed 1,5m in height. ➤ Topsoil stripping should occur in a phased manner and only where construction will follow rapidly to avoid long periods of exposure and only during periods of low precipitation to avoid erosion and subsequent siltation of nearby water bodies. ➤ Areas where construction has to take place must be clearly demarcated to ensure that only these areas are stripped. ➤ Stockpiled topsoil must not be compacted by any vehicle and should be protected against erosion. (E.g. construct a bunded area of sand around the topsoil stockpiles to ensure the containment of the topsoil). ➤ Stockpiled topsoil must not be contaminated with 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
movement; ➤ Perched water conditions on shallow soils. ➤ Contaminations			oil, diesel, petrol, construction material or rubble or any other foreign matter, which may inhibit its potential to harbour faunal and floral communities after rehabilitation. ➤ Stockpiled topsoil must not be used as fill material and should be replaced wherever rehabilitation is needed, after construction. ➤ Compressibility and collapse potential of the soils and subsurface material of areas where the walkway and pathway infrastructure are to be constructed should be investigated by a qualified engineer and construction should then commence according to the specialist's prescriptions. ➤ Special attention should be given to site drainage details. Qualified engineers should inspect paving sections and adequate drainage structures should be designed and constructed to avoid subsurface water saturation and possible structural failure. ➤ Erosion control measures should be implemented to prevent siltation and loss of existing and remaining topsoil on site. ➤ In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product, such as <i>Petro-Clean™</i> . The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility. No Hydrocarbons may escape into the environment. A spill recovery kit must be on site, along with trained		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			personnel.		
<p>Hydrology</p> <ul style="list-style-type: none"> ➤ Unstable soil conditions as a result of water saturation. ➤ Site drainage ➤ Scouring and erosion ➤ Siltation of downstream water bodies ➤ Possible groundwater pollution. ➤ Ponding 	PC, Site Managers & ECO	Pre construction, Construction and Operational	<ul style="list-style-type: none"> ➤ Implement a construction/management plan to specify the most appropriate time (preferably May – early September) for construction activities to commence and to phase the construction phase so as to clear only those areas influenced by the next phase of construction and to curb major erosion and loss off topsoil as a result of storm water runoff. ➤ Flood line determination should be performed for the site along the unnamed water course. This can form part of the Storm Water Management Plan. ➤ Special attention should be given to site drainage details. Qualified engineers should inspect the paving alignments and adequate drainage structures should be designed and constructed to avoid subsurface water saturation and possible structural failure of structures erected here. ➤ When excavations for f are being done, potential collapsible soil must be pointed out by the engineering and the necessary precautions taken. ➤ Storm water drainage structures must be designed by qualified engineers and in a way that disposes of the site storm water in a safe matter, which is not harmful to the surrounding environment in any way. 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<ul style="list-style-type: none"> ➤ Sufficient numbers of temporary chemical toilets (1 per 15 people) must be installed by the PC for the time of the construction activity and before the permanent sewer system is installed and in an approved working order. ➤ Storm water runoff must be channelled from open areas with retention structures (Gabion and Reno Mattresses) to any outlets if applicable. This must be done without compromising the conditions of the sub soil stability. Storm water outlets discharging storm water into the surrounding areas must contain energy dissipating structures that will curb erosion at this outlet into the river effectively. ➤ Straw bales should be placed and adequately secured on all downhill locations where erosion may occur to prevent washouts and to retain siltation and topsoil from the site. A supply of straw bales must be kept on site for this purpose. ➤ Where ponding occurs these areas must be pumped out or drained to ensure that no ponding occurs that may cause dangerous Operational health and safety conditions especially to the local community's children. These conditions must also be communicated to the community via the CLO and it must be stressed that children especially must stay away from the construction site. 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
<p>Vegetation and Animal Life</p> <ul style="list-style-type: none"> ➤ Removal of vegetation and animal habitat as a result of construction activity. ➤ Red Data listed species ➤ Unnamed Water Course ➤ Site specific management plans. ➤ Layout ➤ Removal of Alien invasive plant species. 	<p>PC, Site Managers & ECO</p>	<p>Pre-construction, construction and Operational</p>	<ul style="list-style-type: none"> ➤ All of the significant indigenous trees and other indigenous vegetation which fall within the areas to be developed if any must be retained or transplanted under the supervision of a specialist. Special attention must be given to ensure that the vegetation in these areas are not disturbed for any purposes i.e. firewood. ➤ Any significant indigenous plant specimens (e.g. trees of 1,5m with a trunk thicker than 150mm and vegetation clusters) that will come into harm's way must be transplanted, (if feasible and to a similar suitable natural area of the site or in a temporary nursery (this can happen at a safe site near the construction camp) and be replanted in the natural areas of the site or be used in the rehabilitation or landscaping of the site during the post construction period. ➤ <i>Hypoxis hemerocallidea</i> has been identified by the GDARD to occur in the wider area but was not found in the site area. Should it however be identified to occur under the road upgrades or walkway/cycle path footprint during the construction process, a rescue and relocation plan must be prepared by a suitable specialist for the relocation of the species. ➤ Only indigenous vegetation must be planted during the operational phase to increase the 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>biodiversity of the site and effort should be given to retain the natural character of the site as far as possible.</p> <ul style="list-style-type: none"> ➤ Any small game or other bird, reptile or amphibian specie that becomes trapped in the trenches or in any construction or operational related activity may not be harmed and must be placed in a suitable container. The relevant GDARD or closest SPCA must then be contacted to come and remove the animal. This Conservation Department or SPCA will then bear the responsibility to relocate the specie to a suitable habitat. ➤ Proliferation of alien and invasive species is expected within disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the proposed Olievenhoutbos route. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled. ➤ Removal of the alien and weed species encountered on the property must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational and rehabilitation/ maintenance 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>phases.</p> <ul style="list-style-type: none"> ➤ Species specific and area specific eradication recommendations: <ul style="list-style-type: none"> • Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used. • Footprint areas should be kept as small as possible when removing alien plant species. ➤ No vehicles should be allowed to drive through designated sensitive areas during the eradication of alien and weed species. 		
<p>Sensitive Sites</p> <ul style="list-style-type: none"> ➤ The Upper Rietspruit Tributaries ➤ Sensitive species 	PC, Site Manager & ECO	Pre-construction, Construction and Operational	<ul style="list-style-type: none"> ➤ Sensitive areas as indicated in the sensitivity map (Figure 2) must be set out on a plan which must be permanently displayed at the site offices of the operational phase site manager and the construction contractor's offices. ➤ A reasonable buffer should be created around this area and must be fenced off to ensure no access into these areas during construction and operations. These areas are to be regularly checked by the ECO. ➤ In the event that any sensitive or red data species be encountered on site (see above section), the ECO must be contacted (during the construction phase) and relevant the GDARD official or closest 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>SPCA must be notified. The ECO or GDARD or SPCA must then be contacted to remove and relocate the specie found. The specie must be relocated by the specialist to a nearby Nature Reserve and to where suitable habitat for the specie exists. The relevant fines must be incurred when these areas or mitigation measures are breached. See Appendix 1.</p> <ul style="list-style-type: none"> ➤ No trapping or other method of catching of any animal or bird species may be performed by any party on the construction or operations site or by any person during the operational phase of the development. If these species become trapped in the foundation trenches or other construction or operational related circumstance, it must be reported to the ECO or Operational Phase Site Manager who must in turn report it to the GDARD or closest SPCA. ➤ No dumping of any form is permitted in the drainage area or its surrounds, any non-compliance must be reported immediately. It is the responsibility of the relevant contractor or site manager to inform and supervise their employees. ➤ No damage and/ or removal/trapping/snaring of indigenous plant or animal material for cooking and other purposes will be allowed. (See Appendix 1) ➤ A property alien eradication and rehabilitation plan must be drafted with the aid of a specialist. 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<ul style="list-style-type: none"> ➤ Any storm water outlets discharging storm water into the drainage ways must contain energy dissipating structures that will curb erosion at this outlet effectively. ➤ The storm water outlet should be constructed according to an approved design for grass species can re-vegetate the proposed gabion blocks speedily. 		
<p>Waste Management</p> <ul style="list-style-type: none"> ➤ Waste Management Plan ➤ Storage ➤ Cleaning ➤ Disposal ➤ Waste Removal ➤ Record Keeping 	PC, Site Managers & ECO	Construction, and Operational	<ul style="list-style-type: none"> ➤ Prepare a Waste Management Plan for the construction site and offices during the construction phase and ensure the provision of dustbins at regular distances (as per CoT specification) along the routes during the operational phase of the walkways/cycle paths. ➤ All roads should be cleared of any construction waste and should be swept clean with a broom, as to avoid the waste from entering the storm water systems. ➤ All solid waste must be removed and transported to a recognized waste disposal site on a weekly basis. ➤ On completion of works, the contractor shall clear away and remove from the site all construction paint, surplus material, foundations, plumbing and other fixtures of every kind. Areas thus cleared shall be graded and scarified to restore the ground as near as possible to its original profile. 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<ul style="list-style-type: none"> ➤ Keep records of waste reuse, recycling and disposal for future reference. Provide information to ECO. 		
Fuel Management <ul style="list-style-type: none"> ➤ Storage ➤ Re-Fuelling ➤ Drip trays and Spill Kits ➤ Notification ➤ Rehabilitation 	PC, Site Managers & ECO	Construction, and Operational	<ul style="list-style-type: none"> ➤ Re-fuelling must take place in the designated area with sufficient surface sealing such as a concrete liner to prevent spillage and soil contamination. See Appendix 1. ➤ Drip trays (min 10cm deep) must be placed under all vehicles awaiting maintenance, suspected of having a mechanical problem that can lead to a significant leakage, that is decommissioned and awaiting removal or that will remain in the parking area for more than one week. ➤ The drip tray must be able to contain 110% of the total amount/ volume of oil in the vehicle. ➤ Spill kits must be available in all vehicles that transport hydrocarbons for dispensing to other vehicles on the site. The dispensing devices (pump heads) must be compatible with the vehicles to which they are dispensing. In addition the dispensing devices must be fitted with the necessary valves/ apparatus that will ensure that the nozzles do not drip fuel after pumping has stopped. ➤ The whole of the site where vehicles are operated must undergo routine weekly inspections for any spillages, and these areas must be rehabilitated 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>accordingly.</p> <ul style="list-style-type: none"> ➤ Applicable provincial and local government departments, local municipalities and adjacent landowners must be notified within 24 hours of a spillage or leak. ➤ In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product, such as <i>Petro-Clean™</i>. The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility. No Hydrocarbons may escape into the environment. A spill recovery kit must be on site, along with trained personnel. 		
<p>Vehicle Maintenance</p> <ul style="list-style-type: none"> ➤ Design ➤ Maintenance area ➤ Equipment ➤ Machinery 	<p>PC, Site Managers & ECO</p>	<p>Construction, and Operational</p>	<ul style="list-style-type: none"> ➤ Vehicle maintenance may only be performed if in a sealed off area with an oil impenetrable floor. In the case that the Principle Contractor cannot supply such a facility on site, all vehicles and machinery must be serviced and maintained off site. Vehicle maintenance yards and secured storage areas will be established as far as is practicable, outside any 1:100 year flood lines and buffer areas as determined by the storm water management plan. The maintenance yard should be indicated on the layout plan of the site. ➤ The maintenance of vehicles and equipment used 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>for any purpose during any phase must take place only in the maintenance yard.</p> <ul style="list-style-type: none"> ➤ Any breakdown other than that in the maintenance area of the site requires the presence of a spill treatment team and equipment. This team must prevent and mitigate any spills that occur in this situation. ➤ Equipment used in the construction and operational phases must be adequately maintained in order not to spill oil, diesel, fuel, or hydraulic fluid during operations. ➤ Machinery or equipment used on the site must not constitute a pollution hazard in respect of the above substances. The main contractor, site manager or ECO shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable. 		
<p>General Rehabilitation Measures</p> <ul style="list-style-type: none"> ➤ Relevant phases of the activity ➤ Contamination ➤ Rehabilitation measures 	PC, Site Managers & ECO	Construction, and Operational	<ul style="list-style-type: none"> ➤ Rehabilitation should be implemented immediately after construction activities and should aim to prevent erosion and aid the return of natural, endemic and indigenous vegetation cover. ➤ After any construction activities are complete, the services camp must be taken down and full 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>rehabilitation of the temporary construction site be done. Compacted soils must be loosened to a depth of 300mm re-compacted lightly (via turf roller) and reseeded with seed of locally occurring indigenous ground covering species.</p> <ul style="list-style-type: none"> ➤ All soils contaminated with cement dust, small oil and fuel leakages and other contaminants must be removed to an appropriate depth as per the specific contaminant and as prescribed by the ECO. These soils must be replaced with healthy soils (able of harbouring plant and animal life) and be stabilized by contouring the soils according to the local site landform. ➤ Site roads used during construction must also be reshaped according to the prevailing landform, scarified, fertilized and re-seeded and re-vegetated with indigenous grasses and vegetation characteristic of the local ecological veld types. ➤ After construction, the PC/PM/operational phase Site Manager must ensure that the site is clean and void of any soils, construction rubble or any other construction related materials. ➤ All barren sections of the finished construction area around the development must be wetted and stabilized to form a good medium for planting. These areas must then be reseeded with indigenous species resembling the existing specie mix. The area must be reseeded at a rate of 5kg/ha with a seed mix appropriate for the local 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>area.</p> <ul style="list-style-type: none"> ➤ The whole of the construction area must be cleared of any loose laying mounds of soil or other construction materials and litter. The ECO and the PC/PM must organize a final site inspection to see if this measure is in place before the site is signed off as finished. ➤ Cognisance must be taken of all of the mitigation and rehabilitation measures in the site specific EMP and must be read in conjunction with this rehabilitation plan. 		
SOCIO-ECONOMIC ENVIRONMENT					
<p>Visual Environment</p> <ul style="list-style-type: none"> ➤ Construction related activities. ➤ Final visual outlook of the development. 	PC, Site Managers & ECO	Pre-construction, construction and Operational	<ul style="list-style-type: none"> ➤ Negative impacts related to the construction phase of the development will only last for the duration of the construction phase of the development and will thus not be permanent. The PC and subcontractors must see to the overall tidiness of the construction area and that construction vehicles, materials and personnel stay within the construction camps after hours, over weekends and on public holidays. For the relevant proposed fines see Appendix 1. ➤ Indigenous vegetation must be used to screen negative visual aspects of structures. Screening 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>must however not be obtrusive to the natural character of the site.</p> <ul style="list-style-type: none"> ➤ Screening vegetation and landscaping must be planted to ensure that it is applied in a way that compliments the vegetation of the region. 		
<p>Noise:</p> <ul style="list-style-type: none"> ➤ Possible noise pollution occurring as a result of construction activities. ➤ Use of explosives ➤ Occupational Health and Safety 	PC, Site Managers & ECO	Pre-construction; Construction and Operational	<ul style="list-style-type: none"> ➤ The surrounding land owners and all of the registered I&AP's must be notified of the commencement of construction activities well in advance of the actual start of the activities (At least 6 weeks). ➤ Structures containing activities that may contribute to undesirable noise levels in the area must be placed and orientated to face away from areas sensitive to noise pollution as far as possible. ➤ Noisy activities related to the construction phase of the development (e.g. vehicles, compressors, workers) must be kept to the necessary minimum. Construction activities must also be restricted to between 08:00 in the mornings and 05:00 in the evening and not on any weekend or public holidays. This must be monitored by the ECO and fines must be levied for non-compliance. (See Appendix 1). ➤ All employees, construction workers and maintenance personnel must be instructed to be sensitive towards the surrounding land owners. This action can be performed via an 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			<p>Environmental Awareness Workshop at the first appropriate time when the bulk of the contractors and sub-contractors have been appointed. (See Appendix 1)</p> <ul style="list-style-type: none"> ➤ Activities such as loud music and other ill-mannered behaviour must not be allowed. This behaviour will be regarded as unacceptable and it will be the responsibility of the various contractors and other employers to ensure that workers under their supervision conduct themselves appropriately. These actions must be reported to the ECO who will see to the issuing of the relevant fines. (See Appendix 1). Further it is the responsibility of the Body Corporate to implement and inform residents of the noise policy guidelines for the development. ➤ Construction vehicles and equipment must be regularly serviced to avoid the noise that these machines may make if in disrepair. ➤ Construction workers and staff must be supplied with sufficient protective clothing and other gear (e.g. ear plugs) and must furthermore be trained how to use this gear properly by the Occupational Health and Safety Officer. ➤ The contractor shall give the Engineer 24 hours' notice before any blasting operation is carried out. ➤ The applicant via the contractor must inform surrounding landowners, the local community and any other registered I&AP at least 24 hours prior to blasting operations in order for them to make 		

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			the necessary arrangement.		
<p>Air Quality:</p> <ul style="list-style-type: none"> ➤ Increased dust pollution could occur during construction activities. ➤ Generation of dust on site dirt roads. ➤ Occupational Health and Safety 	PC, Site Managers & ECO	Pre-construction; Construction and Operational	<ul style="list-style-type: none"> ➤ Dust suppression must be performed according to the seasonal changes and according to the prevailing site-specific circumstances via a dust suppression truck on the site roads, other construction areas and the parking areas. ➤ Vegetation along roads and landscaping of the larger development environment will help improve air quality over the long term and must therefore be planted wherever disturbed as far as possible. ➤ Site roads and parking areas must furthermore be maintained to remain in a good condition (e.g. roads must be kept from widening so as to keep the exposed area (area influenced by winds) as small as possible. ➤ The onsite health and safety manager must ensure that workers are supplied with the correct safety wear and equipment (e.g. dust masks) and that they are informed as to their appropriate use. 		
<p>Archaeological Findings:</p> <ul style="list-style-type: none"> ➤ Possible archaeological findings. 	PC, Site Managers & ECO	Pre-construction; Construction and Operational	<ul style="list-style-type: none"> ➤ Employees, contractors and construction workers should be informed to report any unusual finds during the construction and Operational phases, to the ECO in order to implement the correct 		

FINAL ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED UPGRADE OF STRATEGIC ROAD LINKAGES AND THE CONSTRUCTION OF A PEDESTRIAN WALKWAY AND CYCLE PATH NETWORK, OLIEVENHOUTBOS, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG

IMPACT	RESPONSIBLE PARTY	PROJECT PHASE	MITIGATION AND REHABILITATION MEASURES	COMPLIANT	
				YES	NO
			procedures according to the South African Heritage Resources Act to conserve these finds appropriately. This issue must be brought forward during the environmental awareness workshops.		

8. CONCLUSION

Impacts caused as a result of the construction phase of the proposed Olievenhoutbos Pedestrian Roads Upgrade and Walkway & Cycle Path Network development is not deemed to be substantial at all. Construction activities will enter the sensitive riverine areas as indicated by the Specialist. This constitutes a small section of the overall development but care must be taken during the construction phase here. Construction related impacts can be significantly minimised provided that the mitigation and rehabilitation measures included in section 7 of this EMP are strictly adhered to. These impacts are described individually in Section 7 and corresponding recommendations are made concerning appropriate mitigatory measures.

Socio-economically the development would contribute towards its local socio-economic environment through the addition of the pathways and the associated street furniture. The EMS section of the City of Tshwane Metropolitan Municipality has sensitized the EAP in terms of accidents between pedestrian and cyclists and it will therefore be very important to add clearly understandable traffic safety controlling signage and other infrastructure to manage this risk and to allow the pathways to actually increase traffic safety from the pedestrian and cyclist point of view. The CoT EMS department should be contacted in this regard in order for them to provide guidance and assistance on how to increase the safety of pedestrians and cyclists on the proposed new pathways. In addition, the Station Commander of the Olievenhoutbos SAPS has also sensitised the EAP towards the importance of suitable access in and around all construction areas for the SAPS to be able to police the area effectively. The relevant mitigation measure recommended in terms of the communication required between the construction management team and the Olievenhoutbos Police must therefore be implemented.

Furthermore, the principle benefit would be to the local communities although the roads & pathways will also provide services and amenities to tourists visiting the area. Although not on a grand scale, the proposed development will also affect a range of new employment opportunities, which could provide noteworthy skills development opportunities in the short term, as well as sustained opportunities (maintenance) over the longer term.

9. REFERENCES

9.1 Published Sources

- ❖ Acocks, J. P. H., 1975. **Veld Types of South Africa**. Memoirs of the Botanical Survey of South Africa, No 40. Pretoria: Botanical Research Institute.
- ❖ Bezuidenhout, N., 2013. An Ecological Scan with Focus on Wetland Crossings as Part of the Environmental Assessment and Authorization for the Construction of Pedestrian Walkways and Cycle Tracks in Olievenhoutbos, Gauteng. Johannesburg: SAS.
- ❖ ENPAT, 1998. Van Riet, Claasen, van Rensburg, Du Plessis, Environmental Potential Atlas of South Africa.
- ❖ Kruger, A. C., 2002. Climate of South Africa: Surface Winds (WS43), Pretoria: South African Weather Service.
- ❖ Kruger, A. C., 2002. Climate of South Africa: Climate Regions (WS45), Pretoria: South African Weather Service
- ❖ Mucina, L. & Rutherford, M. C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. Pretoria: South African National Biodiversity Institute.
- ❖ Shultze, R. E., 1997. South African Atlas of AgroHydrology and Climatology, Pietermaritzburg: Department of Agricultural Engineering, University of Natal.

9.2 Unpublished Sources

- ❖ Bezuidenhout, N., Van Staden, S., 2013. An Ecological Scan with Focus on Wetland Crossings as Part of the Environmental Assessment and Authorization Process for the Upgrade of Strategic Link Roads and the Construction of Pedestrian Walkways and Cycle Tracks in Olievenhoutbos, Gauteng, Johannesburg: Scientific Aquatic Services (CC)
- ❖ Department of Environmental Affairs and Tourism, Weather Bureau, 1999, Climatological Information.
- ❖ Küsel, U.S., 2013. Cultural Heritage Resources Impact Assessment for the Construction of a Proposed Pedestrian Walkway and Cycle Path, Olievenhoutbos, Gauteng, Pretoria: African Heritage Consultants CC.

APPENDIX 1

Proposed Penalties and Fines Associated with Various Acts of Non-compliance and Miss-conduct.

PROPOSED PENALTIES AND FINES FOR NON-COMPLIANCE OR MISCONDUCT

This EMP forms part of the contract agreement between the Client and the Principal contractor and the Site Manager. As such, non-compliance with conditions of the EMP will amount to a breach of contract. Penalties will be issued directly to the PC/Site Manager by the ECO in the event of non-compliance to the EMP specifications. The issuing of a penalty will be preceded by a verbal warning by the ECO, as well as strict instruction in at least one monthly ECO report to rectify the situation. The ECO and PC/Site Manager will communicate with regards to realistic time-frames for possible rectification of the contravention, and possible consequences of continued non-compliance to the EMP.

Penalties incurred do not preclude prosecution under any other law. Cost of rehabilitation and/or repair of environmental resources that were harmed by the actions of the PC/Site Manager if such actions were in contravention of the specifications of the EMP will be borne by the PC/Site Manager himself. Penalties may be issued over and above such costs. The repair or rehabilitation of any environmental damage caused by non-compliance with the EMP cannot be claimed in the Contract Bill, nor can any extension of time be claimed for such works. Penalty amounts shall be deducted from Certificate payments made to the Contractor.

The following categories of non-compliance are an indication of the severity of the contravention, and the fine or penalty amounts listed in table 1 may be adjusted depending on the seriousness of the infringement.

Category One – Acts of non-compliance that are unsightly, a nuisance or disruptive to adjacent landowners, existing communities or persons passing through the area.

Category Two – Acts of non-compliance that cause minor environmental impact or localised disturbance.

Category Three – Acts of non-compliance that affect significant environmental impact extending beyond point source.

Category Four – Acts of non-compliance that result in major environmental impact affecting large areas, site character, protected species or conservation areas.

All of the contraventions mentioned in table 1 as well as any other contravention to the EMP specifications should be measured in terms of one of these 4 categories of non-compliance and penalties or fines should be adjusted accordingly.

TABLE 1: List of Proposed Fines and Penalties as Applicable to Various Acts of Non-Compliance or Misconduct:

DESCRIPTION OF NON-COMPLIANCE TO EMP SPECIFICATION	SPOT FINES AND PENALTIES THAT COULD BE INCURRED
Any person, vehicle, plant or other activity related to the contractor's operations that spill over into a "no-go" or sensitive area	R 4 000
Any vehicle driving in excess of specified speed limits	R 1 000
Vehicles being driven, plant or construction materials being stored outside of demarcated areas within the construction site. Unauthorised persons on site.	R 2 000
Persistent, un-repaired oil/fuel leaks from machinery/vehicles. Spillages of oil/fuel at the re-fuelling site. Spillage of hazardous (e.g. Cement, Asphalt, Chemicals) materials on site. Burying of soils containing these spillages.	R 5 000
Litter on site or Dumping/ burying of rubble or waste outside designated location/s. Inadequate provision of waste disposal facilities on site	R 2 000
Illegal Fires on site	R 5 000
Eating / cooking food outside of designated areas. Inadequate site ablution facilities or failure to make use of the site ablution facilities.	R 1 000
Excessive noise and / or dust as a result of site activities	R 2 000
Contractor's operations causing a public nuisance as a result of contravention of EMP specifications.	R 2 000
Activities in contravention of EMP that cause water waste or pollution	R 5 000
Poaching/ setting of snares or traps.	R 5 000
Damage to cultural Sites	Up to R 100 000
Erosion as a result of non-compliance – penalty shall be equivalent to the cost of rehabilitation plus 20%	
Severe oil spills - penalty shall be equivalent to the cost of clean-up operations plus 20%	
Damage to indigenous vegetation or sensitive environments - penalty shall be equivalent to the cost of rehabilitation plus 20%	

DESCRIPTION OF NON-COMPLIANCE TO EMP SPECIFICATION		SPOT FINES AND PENALTIES THAT COULD BE INCURRED
Penalties for removing or damaging trees that are to be retained		
Girth of Trunk 1m above ground level	Replacement value per tree	
0 – 15 mm	R 100	
16 – 30 mm	R 200	
31 – 50 mm	R 500	
51 – 75 mm	R 1 000	
76 – 100 mm	R 2 500	
101 – 150 mm	R 5 000	
151 – 300 mm	R 10 000	
Larger than 300 mm	R 15 000 – R 100 000	

FOR ANY REPEAT OFFENDERS THE FINE WILL BE DOUBLED AND A THIRD OFFENCE COULD RESULT IN PERMANENT SUSPENSION.

The following acts and legislation, amongst others, apply and will be enforced and monitored by the ECO;

- ❖ Environmental Conservation Act, (Act 73 of 1989)
- ❖ National Environmental Management Act, (Act 107 of 1998)
- ❖ National Environmental Management: Biodiversity Act, (Act 10 of 2004)
- ❖ Water Act, 1998, (Act 36 of 1998)
- ❖ National Parks Act, (Act 57 of 1976)
- ❖ Lake Areas Development Act, (Act 139 of 1975)
- ❖ Mountain Catchment Areas Act, (Act 63 of 1970)
- ❖ Forest Act, (Act 122 of 1984)
- ❖ Conservation of Agricultural Resources Act, (Act 43 of 1983)
- ❖ All Provincial ordinances and regulations as applicable

APPENDIX 2

Typical Composition of a Construction Camp

FINAL ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED UPGRADE OF STRATEGIC ROAD LINKAGES AND THE CONSTRUCTION OF A PEDESTRIAN WALKWAY AND CYCLE PATH NETWORK, OLIEVENHOUTBOS, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG

Location of Site Camp

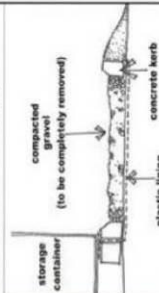
- Located practically and on already disturbed area.
- ECO should screen the site and approve.
- Camp minimum 100m horizontally from drainage courses.
- Camp must be rehabilitated after construction.
- Soils loosened, re-planted with appropriate vegetation.
- Remove contaminated soils. Contact specialist to replace with healthy soils and shape to resemble original landform.
- Final payments may be withheld until relevant mitigation and rehabilitation have been completed.
- Erosion may not occur in the construction camp.

The Main Site Office must contain:

- The EMP, notices that all parties are to adhere to it.
- A space to conduct environmental awareness workshops and relay pertinent information.
- Safety information and emergency response plan.
- Emergency Contact numbers
- Fire Extinguisher.
- Site must be Rehabilitated
- Use Existing structures on site, build a simple structure or the office can be housed in a rented shed or container.


Materials stored in designated areas:

- Design Storage containers to prevent spillages.
- If spillage occurs, contact specialist
- Remove contaminated soils, replace compacted soil (to be completely removed)

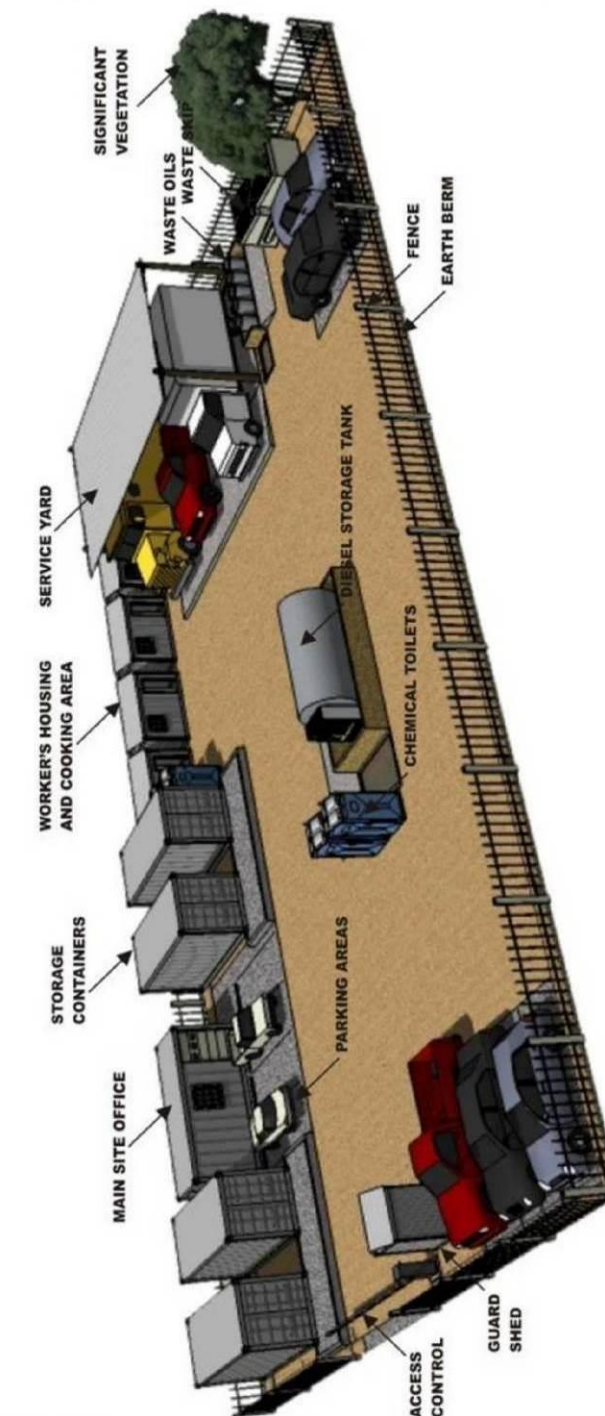


The camp must contain a service yard.

- Maintain vehicles and equipment regularly, to prevent spillages and to minimise noise levels. No oil, fuel hydraulic fluid etc may leak onto the soil. Service areas must have impervious concrete floors & oil and fuel resistant walls. Watertight sumps at the end of these catchment drains. Pump into containers: specialist to remove.
- Contractor to provide proof to the ECO.



sump
(to be emptied by specialist when required)



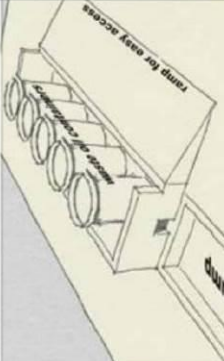
Workers will not disturb local community.

- Workers will not litter, play loud music or build shacks.
- On-site accommodation: be neat, clean and safe.
- Cooking only in designated cooking area(s). Only with Electrical or gas stoves. Area must be ventilated and safe for cooking in. No fires, especially in winter.
- Waste skip at appropriate place. Sort solid waste into categories and send Hazardous waste to registered facility.


Minimum Vegetation clearance - retain significant trees

- Footprint not be larger than the camps themselves.

An area must be prepared for the storage of waste oil, impervious concrete floors, oil and fuel resistant walls, drain towards sump, cleaned by specialist as required. Contractor must provide proof to the ECO. No used oil may be allowed to spill onto adjacent soils.




Parking areas: prevent spills or contain contaminants.



Temporary fuel tank and its surrounding area in a watertight bunker able to hold the volume of the tank.


- Monitor area weekly - no fuel onto surrounding soils
- If puncture occurs, contact ECO and specialist. Remove contaminated soils completely. Dump at licensed facility. Fill excavation to top with healthy soils.
- Always keep containment bunkers empty.

Procon Environmental Technologies tel: (013) 697 4617/34




Prevent runoff entering or leaving camp. (Earth berm, drainage ditch, or sandbags @ 500mm high

- 1 chemical toilet for every 15 people on the site
- Workers will use these toilets, not the site.
- Toilets will be clean and within walking distance from activities.



Preferably No new access roads.

- New roads must be parallel to the existing contours.
- Rehabilitate Roads after construction.



Fence off the construction camp and provide limited, appropriate access with signs; for Safety information and access control.

- Appoint a Security Guard to prevent damages to equipment and to keep unauthorized persons out.

ENVIRONMENTAL MANAGEMENT PLAN


PROPOSED CONFIGURATION OF A TYPICAL CONSTRUCTION SITE CAMP AS PER ENVIRONMENTAL MANAGEMENT PLANS

SPOOR

APPENDIX 3

Procon Environmental Technologies (PTY) Ltd.

Procon Environmental Technologies (Pty) Ltd



ultraspin

JACQUES STEYN
Environmental Engineer
BS&S(UP), SACTRP, MSc EESI
(STOCKHOLM)

P.O. Box 4243
Witbank 1035

Cell: 082 781 9870
Phone: +27(0)13 697 4617/34
Fax: +27 (0)13 697 4618
Email: jss@hyperlink.co.za
Home page: www.pro-enviro.co.za

Solving Environmental Challenges with World Class Technology

- **Ultraspin Hydrocyclones Oil-Water Separators**
- **Vehicle Wash Water Reclaim Systems**
- **Remediation - Water & Soil**
 - **Oil Spill Clean-up**
- **Environmental Degreasers & Cleaning Products**
- **MYCELX - Filtration**