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Environmental Management Programme Report (EMPr): proposed Lotus Gardens Retail Development on Portion 539 of the Farm Pretoria Town and Townlands 351 JR, Gauteng



Technical Report: **EMP-2016-11-22**

Prepared for: **Espero Properties (Pty) Ltd**

Prepared by: **Exigo Sustainability (Pty) Ltd**

EOH

Environmental Management Programme Report (EMPr): proposed Lotus Gardens Retail Development on Portion 539 of the Farm Pretoria Town and Townlands 351 JR, Gauteng

22 November 2016

Conducted on behalf of:

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DOCUMENT HISTORY

Report no	Date	Version	Status
ER-2016-11-22	22 November 2016	1.0	Draft for I&AP review

LIST OF ABBREVIATIONS

Abbreviation	Description
ADD	Average Daily Demand
ADF	Average Daily Flow
BA	Basic Assessment
BAR	Basic Assessment Report
GDARD	Gauteng Department of Agriculture and Rural Development
CTMM	City of Tshwane Metropolitan Municipality
CV	Curriculum Vitae
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EM	Environmental Manager
EMPr	Environmental Management Programme Report
IEM	Integrated Environmental Management
I&AP's	Interested and Affected Parties
IDP	Integrated Development Programme
NEMA	National Environmental Management Act
NWA	National Water Act
Pm	Project Manager
RIDP	Regional Integrated Development Programme
SABS	South African Bureau of Standards
SANS	South African National Standards
WM	With Mitigation
WOM	Without Mitigation

TABLE OF CONTENTS

1. INTRODUCTION	6
1.1. PURPOSE	6
1.2. OBJECTIVES	6
1.3. SCOPE	7
2. PROJECT BACKGROUND	7
3. DETAILS OF THE APPLICANT	10
4. DETAILS OF THE EAP	10
5. PROJECT DESCRIPTION	11
5.1. PROJECT OVERVIEW	11
5.1.1. CIVIL SERVICES.....	11
5.1.2. WATER	11
5.1.3. SEWAGE	11
5.1.4. STORMWATER.....	12
5.1.1. FLOODLINES	12
5.1.2. ROAD INFRASTRUCTURE	12
5.1.3. ELECTRICITY	15
6. ENVIRONMENTAL MANAGEMENT PROGRAMME.....	18
6.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)	18
6.1.1. ROLES AND RESPONSIBILITIES.....	18
6.1.1.1. ENVIRONMENTAL CONTROL OFFICER (ECO).....	18
6.1.1.2. ADJUDICATING AUTHORITY'S INSPECTORATE	18
6.1.1.3. PROJECT/ENVIRONMENTAL MANAGER (PM/EM)	18
6.1.1.4. THE DEVELOPER/ PROJECT PROPONENT	18
6.1.1.5. THE CONTRACTOR OR SUB-CONTRACTORS	18
6.1.2. ENVIRONMENTAL MANAGEMENT ACTIVITIES CHECKLIST	19
6.1.3. ENVIRONMENTAL INCIDENTS	36
6.1.4. ENVIRONMENTAL AWARENESS TRAINING	36
6.2. AUDIT PROTOCOL.....	37
6.2.1. CONSTRUCTION PHASE.....	38
6.2.2. OPERATIONAL PHASE	38
7. OVERALL CONCLUSIONS AND RECOMMENDATIONS	39
8. APPENDIX 1: COMPANY PROFILE AND PROJECT TEAM CV'S	40

LIST OF FIGURES

Figure 1	Project Locality map.....	8
Figure 2	Aerial Map	9
Figure 3	CTMM Stormwater Network.....	13
Figure 4	Development layout plan	14
Figure 5	Layout of proposal (preferred alternative).....	16
Figure 6	Sensitivity Map of the proposed development site	17

LIST OF TABLES

Table 2	Environmental management programme	20
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LOTUS GARDENS RETAIL CENTRE EMPr

1. INTRODUCTION

This Environmental Management Programme Report (EMPr) contains guidelines, operating procedures and rehabilitation/pollution control requirements which will ensure that the impacts of the development are minimised and the positive benefits enhanced.

1.1. PURPOSE

This EMPr is to act as a flexible, standalone document and it is recommended that it must be employed during all phases of the development. This document requires that responsibility, accountability and commitment be promoted at all times by the developer/owner, the main contractor and subcontractors.

Any non-compliance with the conditions set out in this EMPr will be regarded as an offence and will consequently be dealt with in terms of the relevant Sections in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). Environmental incidences and the handling thereof, should be recorded by filling out the incidence logs, this responsibility should be taken up by the Environmental Control Officer (ECO) or Environmental Liaison Officer (ELO).

The process which was followed in compiling the EMPr is in compliance with the NEMA, and applies the principles of Integrated Environmental Management (IEM).

1.2. OBJECTIVES

The main objective of Environmental Protection during construction and operation are:

- To ensure that the proposed operations do not impact on water quality or quantity available from local sources.
- To prevent where possible, or otherwise minimise soil, air, noise, surface- and groundwater pollution to acceptable levels.
- To minimise disturbance to and destruction of habitat of flora and faunal species.
- To minimise disturbances and destruction of heritage, archaeological and paleontological sites (if present).
- To minimise and control the production of waste and the effects of waste on the environment; and to minimise the risk of accidental waste release and make provisions for emergency situations.
- To ensure compliance with relevant environmental legislation.
- To ensure effective environmental management is implemented at the proposed operations throughout the project lifespan.

LOTUS GARDENS RETAIL CENTRE EMPr

1.3. SCOPE

In order to achieve the above objectives, the scope of the EMPr should include the following:

- Definition of the environmental management objectives to be realized during the life of a project (i.e. construction and operational phases) in order to enhance benefits and minimise adverse environmental impacts.
- Description of the detailed actions needed to achieve these objectives, including how they will be achieved, by whom, with what monitoring/verification, and to what target or performance level. Mechanisms must also be provided to address changes in the project implementation, emergencies or unexpected events, and the associated approval processes.
- Clarification of institutional structures, roles, communication and reporting processes required as part of the implementation of the EMPr.
- Description of the link between the EMPr and associated legislated requirements.
- Description of requirements for record keeping, reporting, review, auditing and updating of the EMPr.

2. PROJECT BACKGROUND

Exigo Sustainability (Pty) Ltd (Exigo) was appointed by Espero Properties (Pty) Ltd to facilitate the Environmental Authorization process for the proposed shopping centre development on Portion 539 of the Farm Pretoria Town and Townlands 351 JR, Gauteng. Exigo is an independent company, the Company Profile and CVs of the project team is detailed in APPENDIX 1: COMPANY PROFILE AND PROJECT TEAM CV'S.

The proposed site is located on the north-eastern corner of the N4 and Acridian Street interchange in Lotus Gardens within the City of Tshwane Metropolitan Municipality. **Error! Reference source not found.** and **Error! Reference source not found.** indicates the location of the project site. The following coordinates serve as the centre point of the site:

Latitude: 25°45'3.31"S; Longitude: 28° 5'40.42"E

The 21 digit code for the site: TOJR00000000035100539

The proposed mixed-use development will comprise of:

- Construction of a 11 000 m2 retail centre
- Construction of a 500 m2 fast food outlet
- Upgrade of existing access roads and construction of internal roads and parking area

LOTUS GARDENS RETAIL CENTRE EMPt

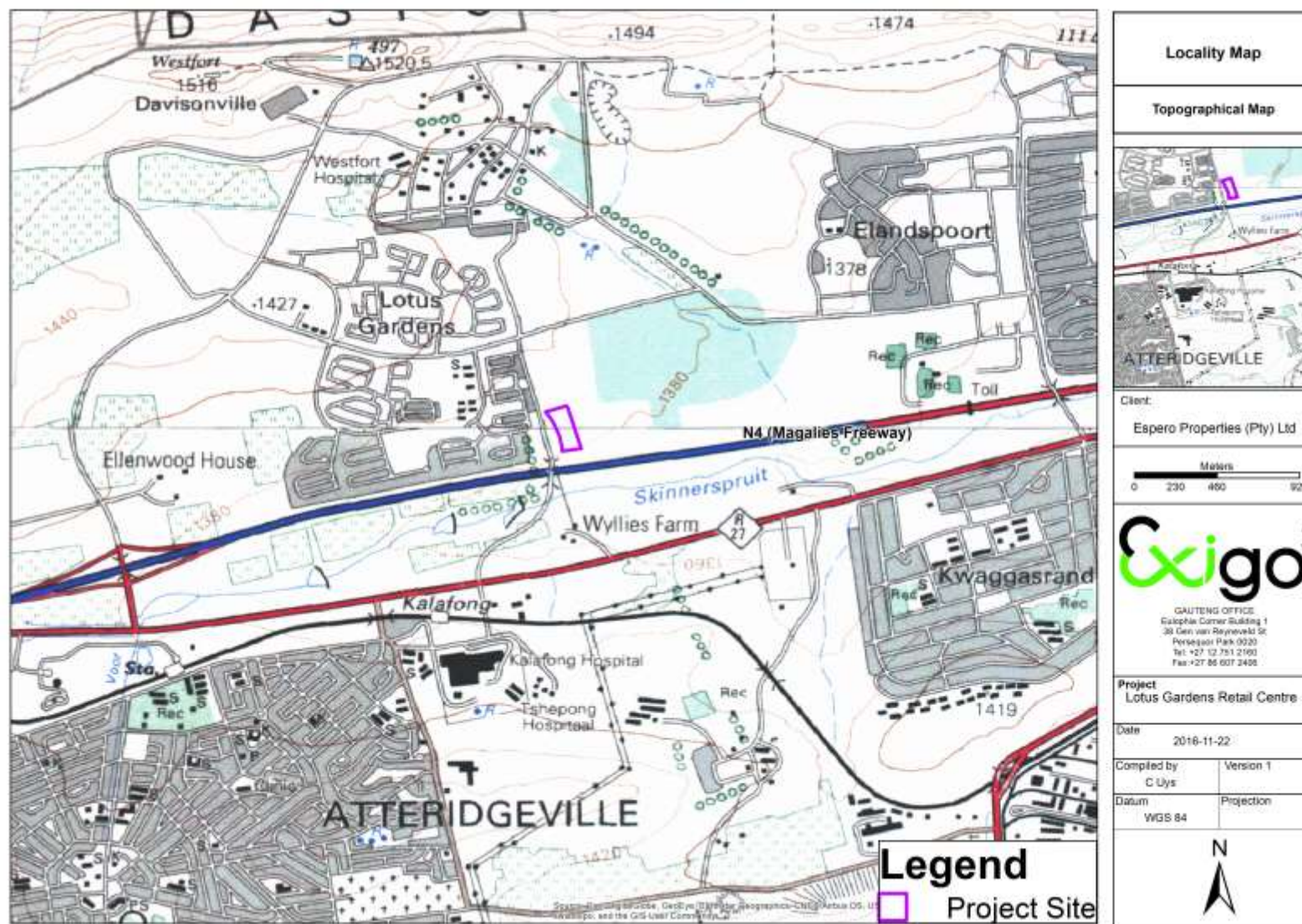


Figure 1 Project Locality map

LOTUS GARDENS RETAIL CENTRE EMPr

3. DETAILS OF THE APPLICANT

The details of the applicant are indicated below:

Details of the Applicant	
Full names of the applicants:	Espero Properties (Pty) Ltd
Contact person:	Monique Pieterse
Physical Address	Unit 8, 1 st Floor, Block B, 34 Impala Road, Chiselhurst, Sandton
Postal Address	PO Box 4442, Randburg, 2125

4. DETAILS OF THE EAP

As per the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998), (NEMA) as amended and the Environmental Impact Assessment Regulations of 2014, the following information is pertinent with regards to the Environmental Assessment Practitioners (EAPs) that has conducted the Basic Assessment Report for the proposed development.

EAP	Qualifications	Years' experience
Mr. Michael Grobler	(BSc. Hons. Conservation Ecology, Masters in Organizational Leadership, Pr.Sci.Nat.)	11 years
Mrs Chantal Uys	BHCS Hons Archaeology	8 years

Contact Details of Principal Environmental Assessment Practitioner:

Details of the EAP	
Full name of the principal EAP:	Exigo Sustainability (Pty) Ltd
Contact person: Address	Michael Grobler Postnet 74, P/Bag X07, Arcadia, 0007 Pretoria
Telephone number:	012 751 2160
Fax number:	086 607 2406
Email address	michael@exigo3.com

LOTUS GARDENS RETAIL CENTRE EMPr

5. PROJECT DESCRIPTION

5.1. PROJECT OVERVIEW

The proposed Lotus Gardens Retail Centre development on Portion 539 of the farm Pretoria Town and Townlands 351 JR consist of the following proposed mixed-use development:

- Construction of a 11 000 m² retail centre
- Construction of a 500 m² fast food outlet
- Upgrade of existing access roads and construction of internal roads and parking area

5.1.1.CIVIL SERVICES

The proposed development is situated within the jurisdiction of the City of Tshwane Metropolitan Municipality (CTMM). Therefore, the CTMM will be responsible for the provision of water, electricity, sewerage disposal, and refuse removal services, i.e. civil service provision. Service connection applications have been submitted to the CTMM. The services are discussed in more detail below and the services report is appended in Appendix F.6 of the BAR.

5.1.2.WATER

The City of Tshwane Metropolitan Municipality (CTMM) is the relevant Water Supply Authority and will be responsible for supply of water to the development. The calculated Average Daily Demand (ADD) for the proposed office and retail space is 58.056 kl, while that of the open parking area inclusive of landscaping is 4.806 kl. Therefore the total water demand for the development is 62.862 kl (0.728 l/s) per day.

Provision for the water mains for the proposed retail development will be from either of the existing water mains situated in the following roads:

- Parallel with Dijon Road
- Parallel with Coriander Street

The City of Tshwane Metropolitan will advise as to the best connection point.

5.1.3.SEWAGE

All linked sewers connecting to the bulk main will be constructed within the road reserves. Any linked pipe connecting to the CTMM's sewer outfall will be routed in accordance with the CTMM's requirements. An Average Daily Flow (ADF) for sewage is as follows:

- Proposed office and retail space: 58.056 kl

Thus resulting in a total ADF of 58.056 kl (0.672 l/s) per day. An existing 150 mm diameter sewerage pipe is situated on the eastern side of Dijon Street and is flowing in a southerly direction towards the N14. The proposed connection position will be at the lowest southern point of the site. The proposed

LOTUS GARDENS RETAIL CENTRE EMPr

connection position will have to be approved by the CTMM.

5.1.4. STORMWATER

The internal stormwater will be collected by a conventional catch pits and pipe system and discharged via the municipal stormwater system. The development's stormwater system will connect to the municipal stormwater system at points AK3/3a and AK3/4a as per the SWMP Report. Please refer to the Stormwater Management Plan in Appendix F.5 of the Basic Assessment Report (BAR). The design criteria, materials and methods of construction will be based on the Drainage Manual by The South African National Road Agency and standards as issued by the CTMM.

5.1.1.FLOODLINES

The town planners for the project, Plankonsult, have certified that no floodlines for floodwater with an expected frequency of 1:50 and 1:100 years as required in terms of Section 144 of the National Water Act (Act 36 of 1998) appears within the proposed township boundaries. Refer to the development plan Figure 4.

5.1.2.ROAD INFRASTRUCTURE

A traffic study was compiled to specifically deal with the overall traffic impact as a result of the proposed development. The study proposed the following upgrades to the road networks surrounding the site:

- Acridian Street/Coriander Street
 - It is proposed that a queue length survey be conducted after the opening of the centre. Traffic signals to be installed subject to any of the three queue lengths warrants of the SARTSM being met.
 - A right-turn lane with 45m storage capacity at the southern approach.
 - A right-turn lane with 45m storage capacity at the eastern approach.
 - Road markings to be provided accordingly.
- Dijon Street/Tamarind Street/Proposed access to retail centre
 - Existing priority controlled T-intersection to be converted into a four-legged priority controlled intersection to provide access to the retail centre.
- Dijon Street/Proposed Service Access
 - Dijon Street to be extended southwards and a priority controlled service access to the retail centre should be constructed.

LOTUS GARDENS RETAIL CENTRE EMPr

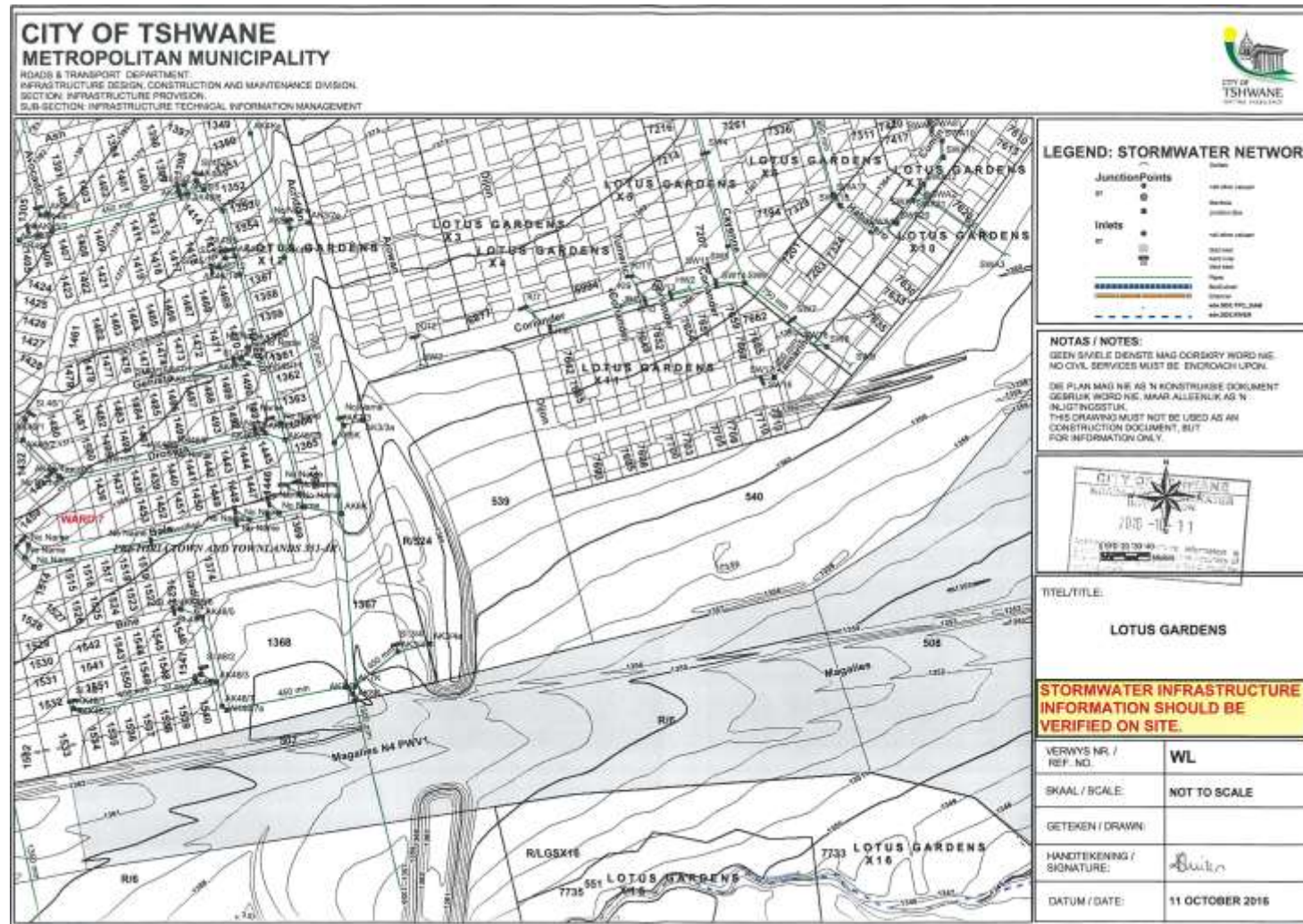


Figure 3 CTMM Stormwater Network

LOTUS GARDENS RETAIL CENTRE EMPr

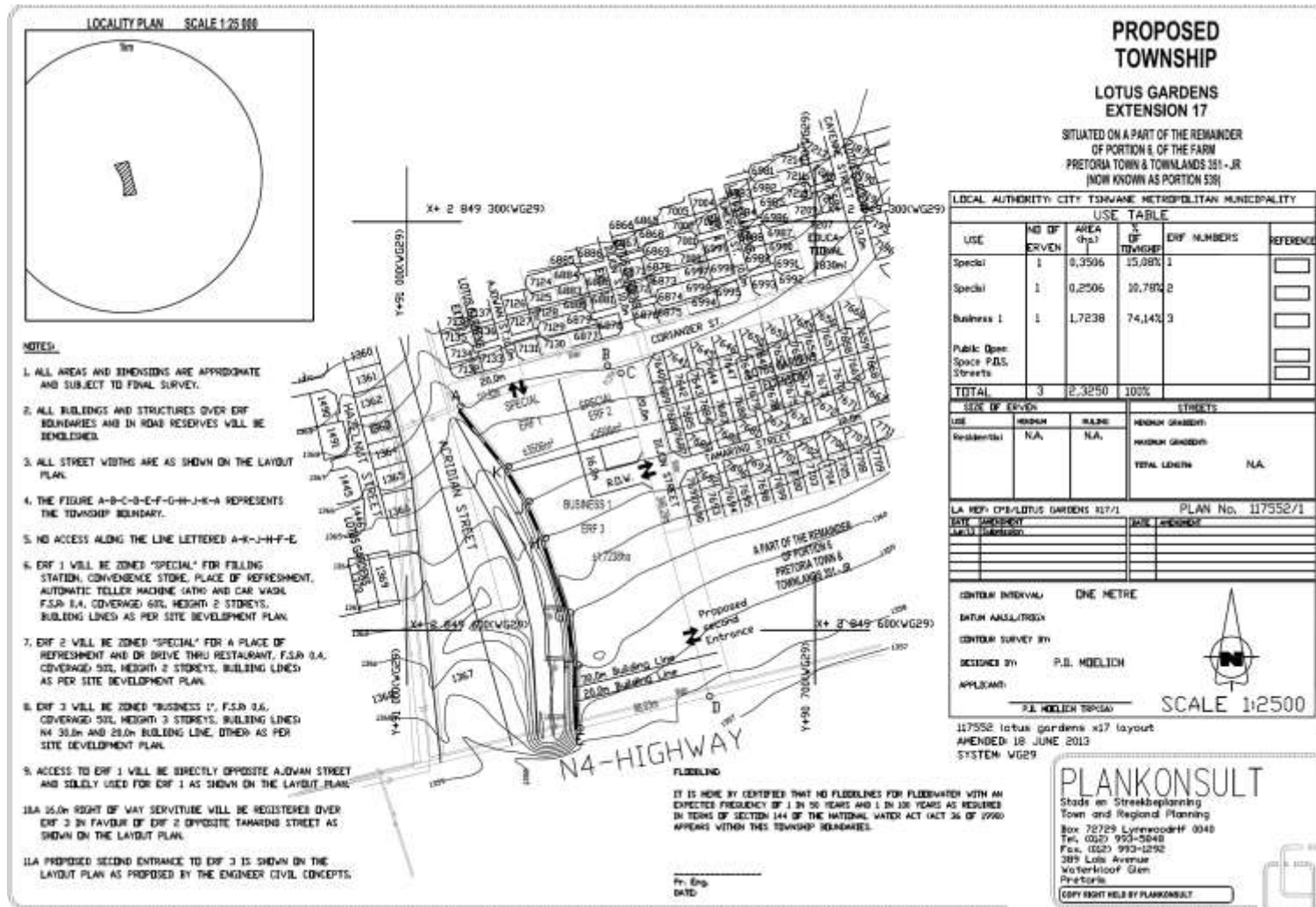


Figure 4 Development layout plan

LOTUS GARDENS RETAIL CENTRE EMPr

5.1.3.ELECTRICITY

The CTMM should confirm capacity at their substation to supply the proposed development with electricity in writing, once the township has been proclaimed. The development will connect to the substation on the right of Acridian Street between Coriander Street and the N4. Energy efficiency is being evaluated by way of energy efficient lighting, gas for cooking and use of solar energy. Appropriate structural designs, energy effective building construction and orientation, are not currently being considered: The following is recommended:

- Local building material instead of imported building material should be used as much as possible (this will reduce transportation impacts and enhance local employment creation).
- Building material that can be recycled / reused should be used as far as possible.
- Use should be made of highly durable building material for parts of the building that is unlikely to be changed during the life of the building (unlikely to change due to e.g. renovation, fashion, changes in facility life cycle, etc.) is recommended.
- Building material should be legally obtained by the supplier, e.g. wood must have been legally harvested, and sand should be obtained only from legal borrow pits and from commercial sources.
- Use of building material that requires excessive amounts of energy to manufacture should be minimised.
- Use of building material originating from sensitive or scarce environmental resources should be minimised. E.g. no tropical hardwood should be used.

The development will be constructed in line with the National Building Regulations (SANS 10400-NBR (SA) and the SANS 204 Energy Efficiency in Buildings' standard (SABS 2009) with regards to energy efficient building practices and materials.

LOTUS GARDENS RETAIL CENTRE EMPt



Figure 6 Sensitivity Map of the proposed development site

LOTUS GARDENS RETAIL CENTRE EMPr**6. ENVIRONMENTAL MANAGEMENT PROGRAMME****6.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)****6.1.1. ROLES AND RESPONSIBILITIES**

A number of role-players will be responsible to ensure responsible environmental practices as described in this report are implemented on the proposed development site throughout each of the project cycles and throughout the project lifespan.

Key individuals are briefly discussed in this section, and are identified in the table below where specific responsibility is assigned to each.

6.1.1.1. ENVIRONMENTAL CONTROL OFFICER (ECO)

The ECO is appointed by the developer and is responsible for undertaking regular monitoring of site activities.

6.1.1.2. ADJUDICATING AUTHORITY'S INSPECTORATE

The Inspectorate of the adjudicating authority may carry out 'spot checks' on the site.

6.1.1.3. PROJECT/ENVIRONMENTAL MANAGER (PM/EM)

The Project/Environmental Manager (a contractor/developer employee) is responsible for the overseeing of the environmental management of all aspects of the construction and operational phase of the development. The PM/EM will receive feedback from the ECO, and will approve any changes to the EMPr; changes to the design etc. The PM/EM will be responsible for overseeing any environmental incidents and the proper mitigation thereof.

6.1.1.4. THE DEVELOPER/ PROJECT PROPONENT

The developer assumes overall responsibility for the development and its repercussions on the environment. Duty of care in respect of environmental management as, inter alia, explained in the National Environmental Management Act, Section 28 and other relevant provisions as contained in this plus other applicable laws.

6.1.1.5. THE CONTRACTOR OR SUB-CONTRACTORS

All contractors have the responsibility to implement and adhere to the EMPr and ensure that the factors which may compromise the achievements of the objectives of sustainable development and environmentally responsible operations are brought to the attention of the project proponent. The contractor must comply with all orders pertaining to environmental management issues (whether verbal or written) given by the ECO or directly by the project proponent. Contractors also have the responsibility to ensure that their employees are fully cognizant of,

LOTUS GARDENS RETAIL CENTRE EMPr

and abide by the EMPr. It is the service provider's responsibility to ensure that the works will comply with the specifications as set out in the management plan. Operators should be properly trained and informed of operational and maintenance responsibilities and environmental liabilities.

6.1.2.ENVIRONMENTAL MANAGEMENT ACTIVITIES CHECKLIST

The following table forms the core of this EMPr for the construction and operational phases of this project. This table ought to be used as a checklist on site. During the construction phase, compliance with this EMPr must be audited monthly.

LOTUS GARDENS RETAIL CENTRE EMPr

Table 1 Environmental management programme

N o	Activity	Impact	Without or With Mitigation	Signifi- can- ce	Mitigation Measures	Compli- ance (Yes/No)
				Magnitude		
ECOLOGICAL/BIODIVERSITY IMPACTS						
Construction Phase						
1	Clearing of vegetation for construction infrastructure, access roads etc.	Habitat destruction	WOM	Moderate	<ul style="list-style-type: none"> The removal of plant species should only occur on the project site of the development and not extend across the site boundaries; Conduct flora species search and rescue efforts (small succulents such as Aloe davyana) before ground clearing begins in order to reduce negative impacts on species of concern; Remove and relocate any plants of botanical or ecological significance as indicated by the ecologist or Environmental Control Officer (ECO); Vegetation to be removed as it becomes necessary; Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from leaving the demarcated area; Monitoring should be implemented during the construction phase of the development to ensure that minimal impact is caused to the flora of the area; The ECO should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation; 	
			WM	Low		

LOTUS GARDENS RETAIL CENTRE EMPt

					<ul style="list-style-type: none"> Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications; Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during pipeline construction; Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the raptors (refer to Appendix C) occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist or ECO; 	
2	Clearing of vegetation for construction infrastructure, access roads etc.	Habitat fragmentation	WOM	Moderate	<ul style="list-style-type: none"> All possible efforts must be made to ensure as little disturbance as possible to the sensitive habitats such as rocky footslopes during construction; Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place; Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. 	
			WM	Low		
3	Exposure of soils to rainfall and wind during construction	Soil erosion	WOM	High	<ul style="list-style-type: none"> The following mitigation measures should be implemented to prevent erosion along sensitive soils, wetlands and drainage channels during the construction phase of the development: Cover disturbed soils as completely as possible, using vegetation or other materials; Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. Sediment trapping, erosion and stormwater control 	
			WM	Low		

LOTUS GARDENS RETAIL CENTRE EMPt

					<p>should be addressed by a hydrological engineer in a detailed stormwater management plan;</p> <ul style="list-style-type: none"> Protect sloping areas that are susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas; Repair all erosion damage as soon as possible to allow for sufficient rehabilitation growth; Gravel roads must be well drained in order to limit soil erosion; Minimize clearance of vegetation. Retain natural trees, shrubbery and grass species wherever possible; 	
4	Movement of vehicles on site during construction, storage of waste material and chemicals (if relevant)	Spillages of harmful substances	WOM	Moderate	<ul style="list-style-type: none"> Appropriate sanitary facilities must be provided during construction and all waste removed to an appropriate waste facility. Any excess or waste material or chemicals should be removed from the site and discarded in an environmental friendly way. The ECO should enforce this rule rigorously; Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off; Spill kits should be on-hand to deal with spills immediately; All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays that will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier. 	
			WM	Low		
5	Exposure of soils to rainfall and wind during construction	Dust contamination (air pollution)	WOM	Moderate	<ul style="list-style-type: none"> A speed limit should be enforced on dirt roads (preferably 30km/h) during construction. Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) of construction areas and access roads, and ensure that 	
			WM	Low		

LOTUS GARDENS RETAIL CENTRE EMPt

					these are continuously monitored to ensure effective implementation.	
			WOM	Moderate	<ul style="list-style-type: none"> Control involves killing the alien invasive species detected, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA or in terms of Working for Water guidelines. The control of these species should even begin prior to the construction phase considering that small populations of these species was observed during the field surveys; Institute strict control over materials brought onto site, which should be inspected for seeds of noxious plants and steps taken to eradicate these before transport to the site. Routinely fumigate or spray all materials with appropriate low-residual herbicides prior to transport to or in a quarantine area on site. The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. Alien invasive tree species listed by the CARA regulations should be eradicated; Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish; Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. 	
6	Continued movement of personnel and vehicles on and off the site during the construction phase, as well as occasional delivery of materials required for maintenance	Spread of alien invasive species	WM	Negligible		
7	Construction of infrastructure, access roads etc.	Negative effect of human activities on flora	WOM	Moderate	<ul style="list-style-type: none"> Staff should not be accommodated on site. No temporary accommodation must be erected on the site. Adequate rubbish bins and sanitation facilities should be provided to construction workers; 	
			WM	Negligible		

LOTUS GARDENS RETAIL CENTRE EMPt

					<ul style="list-style-type: none"> The ECO should regularly inspect the site, including storage facilities and compounds. A monitoring programme should also be implemented around these areas to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds; Maintain proper firebreaks around entire development footprint. Educate construction workers regarding fire risks and the occurrence of important resources in the area and the importance of protection; Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas. Construction activities must be restricted to working hours Monday to Saturday, unless otherwise approved by the appropriate competent person in consultation with the affected residents. Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g. courtship, nesting) seasons. In addition, control pets to avoid harassment and disturbance of wildlife. Camp fires at construction sites must be strictly controlled to ensure that no veld fires are caused. 	
8	Continued movement of vehicles on and off the site during the construction phase, as well as occasional delivery of materials required for maintenance	Fauna mortality on roads	WOM	Moderate	<ul style="list-style-type: none"> More fauna are normally killed the faster vehicles travel. A speed limit should be enforced (speed on site max 40 km/hour; Outside of the site 60 km/h. It can be considered to install speed bumps in sections where the speed limit tends to be disobeyed. (Speed limits will also lessen the probability of road accidents and their negative consequences). Travelling at night should be avoided or limited as much as possible. No travelling at night should be allowed without approval by site manager; 	
			WM	Low		

LOTUS GARDENS RETAIL CENTRE EMPt

Operational Phase						
9	Exposure of soils to rainfall and wind during operations	Soil erosion	WOM	Moderate	<p>The following mitigation measures should be implemented to prevent erosion along sensitive soils, wetlands and drainage channels during the operational phase of the development:</p> <ul style="list-style-type: none">Cover disturbed soils as completely as possible, using vegetation or other materials;Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices.Sediment trapping, erosion and stormwater control should be addressed by a hydrological engineer in a detailed stormwater management plan;	
			WM	Negligible		
10	Movement of vehicles on site during operation, storage of waste material and chemicals (if relevant)	Spillages of harmful substances	WOM	Moderate	<ul style="list-style-type: none">All waste should be removed to an appropriate waste management facility;Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off;Spill kits should be on-hand to deal with spills immediately;	
			WM	Negligible		
11	Continued movement of personnel and vehicles on and off the site during the operational phase, as well as occasional delivery of materials required for maintenance	Spread of alien invasive species	WOM	Moderate	<ul style="list-style-type: none">Control of alien invasive species involves killing any alien invasives detected, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA or in terms of Working for Water guidelines.	
			WM	Negligible		
WETLAND IMPACTS						
Construction Phase						
12	The increased	Soil compaction	WOM	Low	The following mitigation measures should be implemented to	

LOTUS GARDENS RETAIL CENTRE EMPt

	exposed areas created, as well as the roads and additional surface areas created during construction	and erosion leading to sedimentation of wetland/water resources	WM	Negligible	<p>prevent erosion along slopes and drainage channels during construction:</p> <ul style="list-style-type: none"> Increased runoff due to removal of vegetation and increased soil compaction must be managed to ensure the prevention of siltation and the maximum stream bank stability. Storm water leaving the site downstream must be clean and of the same quality as in situ before it enters the construction site (upstream). Preconstruction measures must be in place to ensure sediments are trapped. The project should be divided into as many phases as possible, to ensure that the exposed areas prone to erosion are minimal at any specific time; Cover disturbed soils as completely as possible, using vegetation or other materials; Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. Sediment trapping, erosion and stormwater control should be addressed by a hydrological engineer in a detailed stormwater management plan; Protect sloping areas and drainage channel banks that are susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas; Repair all erosion damage as soon as possible to allow for sufficient rehabilitation growth; Gravel roads must be well drained in order to limit soil erosion; Control the flow of runoff to move the water safely off the site without destructive gully formation; Have both temporary (during construction) and permanent erosion control plans: <ul style="list-style-type: none"> Temporary control plans should include: 	
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LOTUS GARDENS RETAIL CENTRE EMPt

					<ul style="list-style-type: none"> Brush-packing of exposed areas to prevent overgrazing and subsequent erosion; Silt fencing; Temporary silt trap basins; Short term seeding or mulching of exposed soil areas (particularly on slopes); Limitations on access for heavy machinery and the storage of materials to avoid soil compaction; Permanent erosion control plans should focus on the establishment of stable native vegetation communities. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. 	
13	Large construction vehicles contributing substantially due to oil and fuel spillages; building waste, batching plants, sewage and domestic waste; stripping of topsoil	Water pollution from spillages and dust, etc.	WOM	Low	<ul style="list-style-type: none"> Any excess or waste material or chemicals should be removed from the site and discarded in an environmental friendly way. The ECO should enforce this rule rigorously; Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off; Spill kits should be on-hand to deal with spills immediately; All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays that will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier. 	
			WM	Negligible		
14	Continued movement of personnel and vehicles on and off	Spread of alien invasive species in wetland systems	WOM	Low	<ul style="list-style-type: none"> The use of indigenous plants must be encouraged in the rehabilitated areas, and stockpiles containing mostly exotic or weedy species should receive specialised handling and should be covered for extended periods to 	
			WM	Negligible		

LOTUS GARDENS RETAIL CENTRE EMPt

	the site during the construction phase, as well as occasional delivery of materials required for maintenance				<p>inhibit seedling germination of these species. Active management and eradication of exotic / alien plant species should also occur when seedlings are found.</p> <ul style="list-style-type: none"> • Institute strict control over materials brought onto site, which should be inspected for potential invasive invertebrate species and steps taken to eradicate these before transport to the site. Routinely fumigate or spray all materials with appropriate low-residual insecticides prior to transport to or in a quarantine area on site. The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. • Control involves killing of alien invasive species detected, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the Conservation of Agricultural Resources Act or in terms of Working for Water guidelines. • Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. • Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. • Institute an eradication/control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented. • A plan should be developed for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free 	
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LOTUS GARDENS RETAIL CENTRE EMPt

					mulching. Prohibit the use of fill materials from areas with known invasive vegetation problems. The spread of invasive plants should be avoided by keeping vehicles and equipment clean and reseeding disturbed areas with native plants..	
Operational Phase						
15	The increased hardened surfaces around infrastructure, as well as the roads and additional surface areas	Soil compaction and erosion leading to sedimentation of wetland/water resources	WOM	Moderate	<ul style="list-style-type: none"> Increased runoff due to removal of vegetation and increased soil compaction must be managed to ensure the prevention of siltation and the maximum stream bank stability. Sediment trapping, erosion and stormwater control should be addressed by a hydrological engineer in a detailed stormwater management plan; Control the flow of runoff to move the water safely off the site without destructive gully formation; Permanent erosion control plans should focus on the establishment of stable native vegetation communities. 	
			WM	Negligible		
16	Vehicles contributing due to oil and fuel spillages, dust	Water pollution from spillages and dust	WOM	Moderate	<ul style="list-style-type: none"> All waste material or chemicals should be removed from the site and discarded in an environmental friendly way; Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off; Spill kits should be on-hand to deal with spills immediately; 	
			WM	Negligible		
17	Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance	Spread of alien invasive species in wetland systems	WOM	Low	<ul style="list-style-type: none"> Control involves killing the alien invasive species detected, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the Conservation of Agricultural Resources Act or in terms of Working for Water guidelines. Institute an eradication/control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented. 	
			WM	Negligible		

LOTUS GARDENS RETAIL CENTRE EMP

HERITAGE IMPACTS						
Construction Phase						
	Digging foundations and trenches into sensitive deposits that are not visible at the surface	Damage/destruction of unknown sites of archaeological importance	WOM	Negligible	<ul style="list-style-type: none"> Site Monitoring: Regular examination of trenches and excavations. Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately A Palaeontological Impact Assessment should be considered where bedrock is to be impacted and, should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional paleontologist. It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. It should be stated that it is likely that further undetected archaeological remains might occur elsewhere in the Study Area along water sources and drainage lines, fountains and pans would often have attracted human activity in the past. Also, since Stone Age material seems to originate from below present soil surfaces in eroded areas, the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits. Burials and historically significant structures dating to the Colonial Period occur on farms in the area 	
			WM	Negligible		
18						

LOTUS GARDENS RETAIL CENTRE EMPt

					and these resources should be avoided during all phases of construction and development, including the operational phases of the development.	
AIR QUALITY IMPACTS						
Construction Phase						
19	Dust pollution and emissions from vegetation clearance, earthworks and increased traffic	Construction activities and vehicular movement on site	WOM	Moderate	<ul style="list-style-type: none"> Dust suppression of access roads, stockpiles and cleared areas must take place to minimize dust pollution. Hard surface the site roads at the earliest stage in the construction phase. Proper rehabilitation of disturbed areas is required in order to minimize bare patches 	
			WM	Low		
NOISE IMPACTS						
Construction Phase						
20	Noisy activities during construction (e.g. drilling, hammering, etc.)	Noise impact on surrounding landowners	WOM	Low	<ul style="list-style-type: none"> Construction activities to take place during daytime period only unless where necessary and agreed with the communities that may be impacted. Ensuring that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Acoustical mufflers (or silencers) should be considered on equipment exhausts. The developer should investigate the use of white-noise generators instead of tonal reverse alarms on heavy vehicles. 	
			WM	Negligible		
Operational Phase						
21	Noisy activities during operations	Noise impact on surrounding landowners	WOM	Negligible	<ul style="list-style-type: none"> Ensuring that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Acoustical mufflers (or silencers) should be considered on equipment exhausts. 	
			WM	Negligible		
VISUAL IMPACTS						
Construction Phase						
22	Construction of	Impact on	WOM	Moderate	<ul style="list-style-type: none"> The construction site, material stores, stockpiles and lay 	

LOTUS GARDENS RETAIL CENTRE EMPt

	infrastructure	landscape characteristics, key views and the visual quality of the area	WM	Negligible	<ul style="list-style-type: none">down area should be kept tidy.Measures to control wastes and litter should be included in the contract specification documents	
Operational Phase						
23	Additional lights at night	Additions to the cumulative negative effect on the visual quality of the landscape	WOM	Moderate	<ul style="list-style-type: none">Paint buildings & structures - environmental complementing colours (natural browns and dark greens of the surrounding landscape) Avoid pure lights & darks.To reduce glare external surfaces - structures surfaces to be articulated & textured.Planted Trees to emulate natural/cultural adjacent patterns.Paving materials with 'earthy' tones to complement the natural colours of the soils in the area.Parking areas to be laid out to retain clusters of vegetation to break monotony of paved surfaces.Light fixtures - precisely directed illumination - reduce light "spillage".High pole top security lighting avoided. If this cannot be avoided light fixtures should precisely direct illumination so as to avoid any light "spillage".Public movement areas (pathways and roads) - low level 'bollard' type lights - avoid post top lighting.	
			WM	Low		
TRAFFIC IMPACTS						
Construction Phase						
24	Construction vehicle movement on and off site	Additional pressure on road network	WOM	Moderate	<ul style="list-style-type: none">Provide advanced communication (i.e. signage, advertisements in local papers) about changes to local access, potential road hazards and expected traffic volumes during construction.Developer to construct three accesses to the site as follows:<ul style="list-style-type: none">Acridian Street/Coriander Street<ul style="list-style-type: none">It is proposed that a queue length survey	
			WM	Negligible		
25	Construction vehicle movement on and off site	Upgrade of existing roads surrounding retail centre	WOM	High		
			WM	High		

LOTUS GARDENS RETAIL CENTRE EMPr

					<p>be conducted after the opening of the centre.</p> <ul style="list-style-type: none"> ▪ Traffic signals to be installed subject to any of the three queue lengths warrants of the SARTSM being met. ▪ A right-turn lane with 45m storage capacity at the southern approach. ▪ A right-turn lane with 45m storage capacity at the eastern approach. ▪ Road marking to be provided accordingly. <ul style="list-style-type: none"> ○ Dijon Street/Tamarind Street/Proposed access to retail centre <ul style="list-style-type: none"> ▪ Existing priority controlled T-intersection to be converted into a four-legged priority controlled intersection to provide access to the retail centre ○ Dijon Street/Proposed Service Access ○ Dijon Street to be extended southwards and a priority controlled service access to the retail centre should be constructed 	
Operational Phase						
26	Operational traffic due to retail centre	Additional pressure on road network	WOM	Moderate	<ul style="list-style-type: none"> • Provide advanced communication (i.e. signage, advertisements in local papers) about changes to local access, potential road hazards and expected traffic volumes during construction. • Developer to construct three accesses to the site as follows: <ul style="list-style-type: none"> ○ Acridian Street/Coriander Street <ul style="list-style-type: none"> ▪ It is proposed that a queue length survey be conducted after the opening of the centre. ▪ Traffic signals to be installed subject to any of the three queue lengths warrants of the SARTSM being met. 	
			WM	Low		

LOTUS GARDENS RETAIL CENTRE EMPt

					<ul style="list-style-type: none">▪ A right-turn lane with 45m storage capacity at the southern approach.▪ A right-turn lane with 45m storage capacity at the eastern approach.▪ Road marking to be provided accordingly.○ Dijon Street/Tamarind Street/Proposed access to retail centre<ul style="list-style-type: none">▪ Existing priority controlled T-intersection to be converted into a four-legged priority controlled intersection to provide access to the retail centre○ Dijon Street/Proposed Service Access○ Dijon Street to be extended southwards and a priority controlled service access to the retail centre should be constructed	
WASTE MANAGEMENT IMPACTS						
Construction Phase						
27	Poor management and disposal of solid waste	Ineffective management of waste could result in surface, ground water and air contamination as well as ecological and health impacts.	WOM	Moderate	<ul style="list-style-type: none">• Implementation of an appropriate collection and disposal strategy to ensure regular removal of waste to a permitted waste disposal facility.• Ensuring that the design of the development includes adequate facilities for the temporary storage of waste, in terms of volume, location and enclosure;• The waste area should be concreted and bunded;• Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste;• Contaminated soil must be considered to be hazardous waste and disposed of accordingly.	
			WM	Negligible		
Operational Phase						
28	Poor management and disposal of solid waste	Ineffective management of waste could result in surface, ground	WOM	Low	<ul style="list-style-type: none">• Implementation of an appropriate collection and disposal strategy to ensure regular removal of waste to a permitted waste disposal facility.• Ensuring that the design of the development includes	
			WM	Negligible		

LOTUS GARDENS RETAIL CENTRE EMPt

		water and air contamination as well as ecological and health impacts.			adequate facilities for the temporary storage of waste, in terms of volume, location and enclosure; <ul style="list-style-type: none">The waste area should be concreted and banded;Ensuring that waste handling, storage and collection is undertaken in accordance with the relevant health and municipal legislation, practices and procedures;Provision of adequate numbers of litter bins throughout the development;Promoting the recycling of waste, with specialist service providers appointed to remove the waste from site.	
SOCIO-ECONOMIC IMPACTS						
Construction Phase						
29	Creation of job opportunities	Economic upliftment in the area	WOM	Negligible	Use of local labour as far as possible.	
			WM	Moderate		
30	Construction workers on site	Increase in crime - safety risks to neighbours	WOM	Negligible	No mitigation measures recommended	
			WM	Negligible		
Operational Phase						
31	Creation of job opportunities	Economic upliftment in the area	WOM	Low	Use of local labour as far as possible.	
			WM	High		
32	Development of new retail centre	Impact on livelihood of surrounding retail centres	WOM	Negligible	No mitigation measures recommended	
			WM	Negligible		

6.1.3.ENVIRONMENTAL INCIDENTS

An environmental incident is defined as any unplanned event that results in actual or potential damage to the environment, whether of a serious or non-serious nature. An incident may involve non-conformance with any of the following:

- Legal requirements
- Requirements of the EMPr
- Any verbal or written order given by the ECO on site

In the event of any incident, the Environmental Incident Log, given in Appendix A should be completed. Corrective action to mitigate the impact (appropriate to the nature and scale of the incident) should be conducted immediately and affected parties notified.

In the case of serious incidents or emergencies, the incident report should be sent to the relevant authority as soon as possible after the incident has been recorded.

6.1.4.ENVIRONMENTAL AWARENESS TRAINING

Environmental awareness training is critical for two primary reasons:

- the workforce must understand how they can play a role in achieving the objectives specified in the EMPr, and
- the workforce must understand their obligations in terms of the implementation of the EMPr and adherence to environmental-legislative requirements.

This section of the report contains the environmental awareness plan which is aimed at ensuring that employees, contractors, subcontractors and other relevant parties are aware of and able to meet their environmental commitments. This plan is to be updated on a yearly basis during the construction and operational phases of the project in light of operational changes, learning experiences and identified training needs.

All full time staff and contractors are required to attend an induction session when they start, which session should include environmental aspects. Any contractor, who works on the site for a period of 24 hours or more, is also required to undergo induction training which should also be inclusive of environmental aspects.

It is therefore recommended that the Environmental Officer on site be involved in induction training (if this entity is separate from the SHE rep). The induction sessions may be modified / adapted based on the audience attending the specific session, but it should be ensured that all employees gain a suitable understanding of:

- Environmental requirements of the project, and how these will be implemented and

LOTUS GARDENS RETAIL CENTRE EMPr

monitored, including each employee's responsibilities with respect to environmental issues;

- Contents and commitments of the EMPr, including no-go areas, employee conduct, pollution prevention (prohibitions against littering, unauthorized fires, loud music, entry to adjacent properties, road conduct etc.);
- Environmentally sensitive areas on and around the project site, including why these are deemed important and how these are to be managed. Employees will also be made aware of protected species found on the site and how these are to be conserved, as well as alien invasive species potentially found on the site and how these should be managed; and
- Incident identification, remediation and reporting requirements: what constitutes an environmental incident (spillages, fire etc.) and how to react when such an incident occurs.

Environmental training will therefore not be restricted to induction training sessions, but will also be conducted on an on-going basis throughout the life of the project as and when required. Records are to be kept of the type of training given (matters discussed and by whom), date on which training was given and the attendees to each training session.

Management shall ensure that employees are adequately trained with regard to the implementation of the EMPr and environmental legal requirements and obligations. It is recommended that a training need analysis be conducted by a competent environmental training consultant to identify the appropriate environmental training programmes, and the appropriate target groups. Environmental training programmes shall be targeted at three distinct levels of employment i.e. the executive, middle management and labour. The training programmes shall contain the following information:

- The names, positions and responsibilities of the personnel to be trained
- The framework for appropriate training programmes
- The summarized content of each training course
- A schedule for the presentation of the training courses

6.2. AUDIT PROTOCOL

It is essential that during the construction and operational phase of the proposed development that monitoring and auditing of certain elements are carried out to ensure compliance with regulatory bodies. An Audit Protocol for both the construction phase and the actual operational phase will be required.

LOTUS GARDENS RETAIL CENTRE EMPr**6.2.1.CONSTRUCTION PHASE**

The following audits need to be completed:

1. EMPr compliance (on at least a monthly basis): to be checked by an Environmental Auditor.
2. Noise and / or Light Monitoring
 - A record of complaints must be kept on the premises which will record all noise and / or light complaints as well as the measures taken to address these complaints.
3. Occupational Health and Safety Act Compliance
 - A register must be compiled by the contractor that will indicate that the employees have been informed as to their rights under the Act; and
 - Accident records must be kept, as per the Act.

6.2.2.OPERATIONAL PHASE

The following audits must be compiled:

1. Waste Management
 - The developer/operator will engage into contract with a waste control company to remove waste from the site.
 - Waste separation to take place to ease the monitoring of the waste amounts.
 - Weekly monitoring of waste areas and waste management to be implemented.

LOTUS GARDENS RETAIL CENTRE EMPr

7. OVERALL CONCLUSIONS AND RECOMMENDATIONS

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through practical measures, the recommendations from the BAR have been included within this Environmental Management Plan (EMPr).

This EMPr will form part of the contract with the contractors appointed to construct and maintain the proposed retail centre and associated infrastructure. The EMPr should be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for key cycle phases (i.e. construction and operation) of the proposed project is considered to be fundamental in achieving the appropriate environmental management standards as detailed for this project.

It is also recommended that the process of communication and consultation with the community is maintained after the closure of the BA process, in particular, during the construction phase associated with the proposed project.

Therefore, based on the results of the BAR and this EMPr, Exigo recommends that this report is accepted for consideration by the competent authority.

