

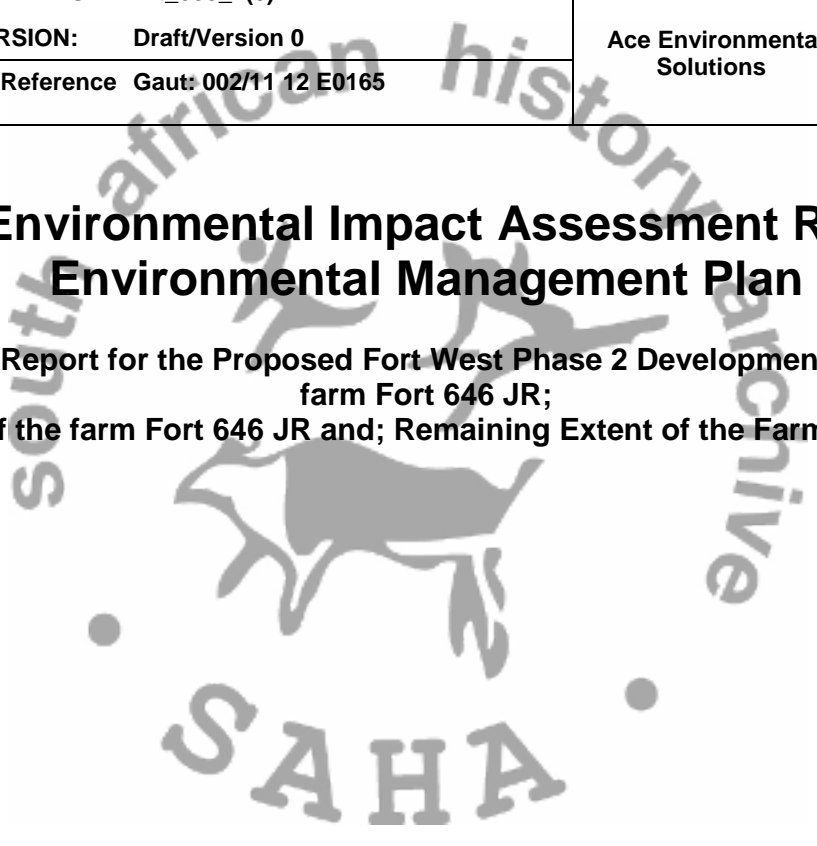


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PROJECT:	Draft EIA Proposed Fort West Phase 2 Development	
CONSULTANT:	Ace Environmental Solutions	
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Draft Environmental Impact Assessment Report & Environmental Management Plan

Draft EIA & EMP Report for the Proposed Fort West Phase 2 Development on Portion 2 of the farm Fort 646 JR;
Portion 3 of the farm Fort 646 JR and; Remaining Extent of the Farm Fort 646 JR





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Acronyms

- AADWF** Annual Average Demand Waste Flow
- AADD** Annual Average Daily Demand
- BNG** Breaking New Ground policy
- CBD** Convention on Biological Diversity
- DWA** Department of Water Affairs
- EAP** Environmental Assessment Practitioner
- EIA** Environmental Impact Assessment
- EMP** Environmental Management Plan
- WMP** Waste Management Plan
- GDARD** Gauteng Department of Agricultural and Rural Development
- GDoLG&H** Gauteng Department of Local Government and Housing
- CoT** City of Tshwane
- GDP** Gross Development Product
- ha** Hectares
- IDP** Integrated Development Plan
- I&AP** Interested and Affected Parties
- MIG** Municipal Infrastructure Grant
- NEMA** National Environmental Management Act (Act 107 of 1998)
- PPE** Personal Protection Equipment
- PPP** Public Participation Process
- RDL** Red Data Listed
- SAHRA** South African Heritage Resources Agency
- WWTW** Wastewater Treatment Works



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i Exclusive Summary

The Department of Housing's "Breaking New Ground" (BNG) policy, implemented in 2004 aimed to radically change the *status quo* of housing provision in South Africa. Social Housing needs in South Africa is to be met by Low Cost Housing Developments, such as the proposed mixed use development at Fort West. The government's objectives of providing housing for all are an ongoing commitment and development requirement for the poor to middle income families. Low income housing developments must be formulated holistically, by providing sufficient social amenities such as schools, crèche's, community clinics, proper water & sanitary requirements, etc. The proposed Fort West development will be a self sustainable government housing "Urban Village"

The Department of Local Government and Housing propose to continue with Phase 2 of the current Fort West Mixed use Development. The proposed site for the Fort West Housing Development is located next to vacant land adjacent to residential development and is a continuation of Phase 1 Fort West Development.

The development proposed is aimed to address the need for formal housing within the municipal area. In order to provide housing closer to areas of job opportunities, this development is off an essential need to address the demanding problem of informal housing.

The current site is unoccupied and standing vacant, however there is a small settlement, the Davidsonville Settlement, situated on the ridge. This site has been subject to various anthropogenic influences due to the surrounding land use and there is currently an existing medium cost residential development to the South of this site and therefore the planned Phase 2 of Fort West Development will be in line with the surrounding land use.

The purpose of this Draft EIAR is to provide the Gauteng Department of Agriculture and Rural Development (**GDARD**) with a view to explain the relevance of the environmental factors identified and likely environmental impacts, together with additional specialist studies proposed or implemented, and finally mitigation measures proposed for the sustainable development of the Fort West Phase 2 Development.

A draft Environmental Management Plan (EMP) is also presented. The aim of the EMP is to provide the client with a site specific and practical document that should be implemented from "cradle to grave" of the proposed development to ensure active environmental management.

Table A1 presents a matrix of potential pollutants arising from construction related activities.

TABLE A1: Pollution Matrix – Construction Activities

ACTIVITY	POLLUTANT			
	Air	Water	Soil	Noise
Hydraulic Ground Breaking	√			√
Loading and unloading of construction materials	√			√
Cement / Concrete Mixing	√	√	√	√
Stockpiling of excavated Materials	√			√
Transport of construction material	√			√
Site Office and Storage Yard	√	√	√	√

There is a large body of knowledge and experience available in housing construction and management in all environments. The potential housing developments in Fort West will be approximately 2500 households with supporting services such as community centres and businesses ext. Work opportunities will be directly created related to the development, with a proportion of these positions being able to be taken up by suitably qualified and experienced previously disadvantaged South African nationals.

A feature survey of the proposed development site and desk-top study of critical environmental aspects has been undertaken in this report.

Environmental impacts considered in this report and predicted impacts consistent with NEMA and World Bank protocols, are summarised in **Table A2**.

**TABLE A2
ENVIRONMENTAL IMPACTS CONSIDERED AND PRELIMINARY CONCLUSIONS ON
SIGNIFICANCE DETERMINED FOR THE PROPOSED FORT WEST PHASE 2 DEVELOPMENT**

ENVIRONMENTAL FACTOR	Predicted Impact	Confidence In Prediction
Biophysical		
Ground and Surface Water Quality	Moderate	High
Flora and Fauna	Moderate	High
Soil Loss and Erosion	Low	High
Wetland	Low	High
Pollution Management		
Air Quality	Low	High
Soil Contamination	Low	High
Hazardous and Non-hazardous Solid Waste	Low	High
Liquid Wastes	Low	High
Noise and Vibration	Moderate	High
Social Surroundings		
Municipal Capacity	Moderate	High
Road Transport	Moderate	High
Storm Water.	Moderate	High
Employment	Low (+)	High
Land Use	Low	High
Health and Safety	Low	High
Heritage	High	Moderate/High

Notes:

Impact:

- Low Denotes incidental changes to atmospheric or environmental quality or abundance / biomass of biota in the affected area. Impacts will be local and or in the short-term.
- Moderate Denotes impact will cause a detectable effect in local ecosystem factors, atmospheric or environmental quality. Impacts may be regional with recovery measured in months to years.
- High Denotes large scale detrimental effects likely to cause highly significant effects on local ecosystem factors, atmospheric or environmental quality with long-term recovery measured in years or decades.



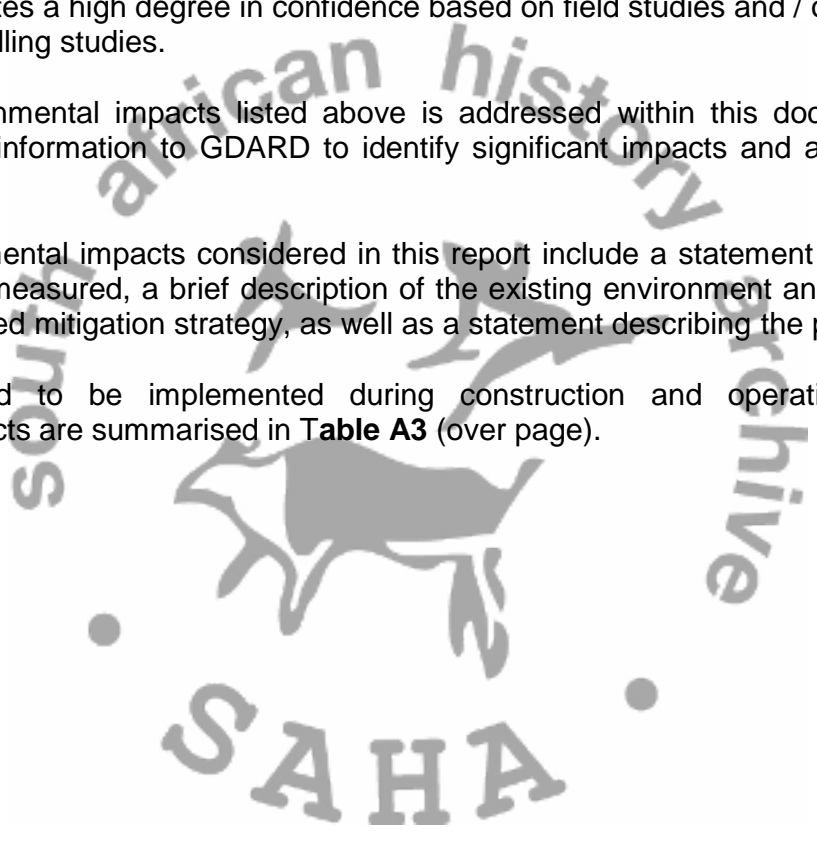
Confidence in Prediction:

- Low Denotes very limited confidence in prediction to a lack of field, modelling or predictive data. Predictions are based on experience or general industry data.
- Moderate Denotes limited field data or modelling available. Together with experience or general industry data, moderate confidence is held in the prediction.
- High Denotes a high degree in confidence based on field studies and / or modelling studies.

Each of the environmental impacts listed above is addressed within this document with a view to providing sufficient information to GDARD to identify significant impacts and accordingly appropriate mitigation.

Significant environmental impacts considered in this report include a statement of objective(s) against which they can be measured, a brief description of the existing environment and constraints, potential impacts and proposed mitigation strategy, as well as a statement describing the predicted impact.

Measures proposed to be implemented during construction and operations to manage the environmental impacts are summarised in **Table A3** (over page).





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TABLE A3

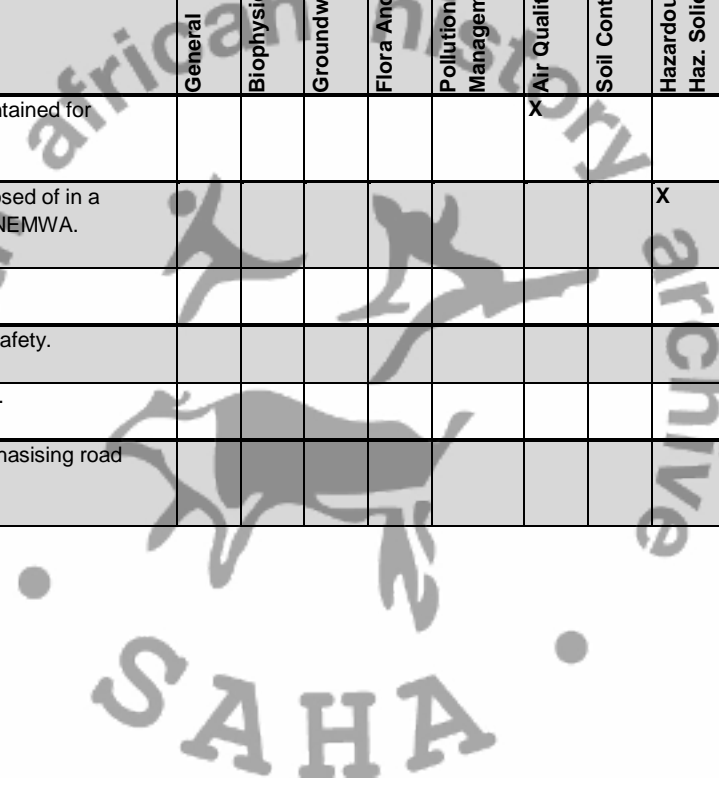
MANAGEMENT MEASURES PROPOSED TO BE IMPLEMENTED DURING CONSTRUCTION AND OPERATION

	General	Biophysical	Groundwater Quality	Flora And Fauna	Pollution Management	Air Quality	Soil Contamination	Hazardous And Non Haz. Solid Waste	Liquid Waste	Hazardous Materials	Noise And Vibration	Site Decommissioning	Socioeconomic Environment	Risk & Hazard & Road Transport
Prepare and implement a site-specific EMP.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Store bulk hydrocarbons in appropriate bunded tanks.			X							X				
Manage domestic waste so not to encourage rodents.	X												X	
Where possible, retain any remaining overstorey vegetation.				X										
Plant trees, shrubs and grasses within the development to support environment.				X										
Where possible, construction materials to be stored within purpose-built bunded and covered stockpile areas.						X				X				
Identify measures for improving operation and management.						X								
During windy conditions, consider the use of water sprays or crusting agents, or reduce vehicle speeds.						X								



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	General	Biophysical	Groundwater Quality	Flora And Fauna	Pollution Management	Air Quality	Soil Contamination	Hazardous And Non Haz. Solid Waste	Liquid Waste	Hazardous Materials	Noise And Vibration	Site Decommissioning	Socioeconomic Environment	Risk & Hazard & Road Transport
Ensuring transport and all mobile plant is properly maintained for optimum performance.						X								
Hazardous wastes shall be stored, managed and disposed of in a manner approved by GDARD and in accordance with NEMWA.								X		X				
Connect to existing services infrastructure.									X					
Erect sufficient warning signs, barriers and fences for safety.														X
Prepare and implement a Transport Management Plan.														X
Conduct inductions and regular tool-box sessions emphasising road safety.														X





ii Project Background

Ace Environmental Solutions was appointed as an Independent Environmental Assessment Practitioner (EAP) by Scip Engineering Group (Pty) Ltd. (Scip) to facilitate Environmental Impact Assessment (EIA) process for the proposed Phase 2 Fort West Development, on the Farm Fort 646 JR consists of four (4) farm portions which are registered in the name of the Republic of South Africa. The four (4) farm portions are as follows:

- Remaining Extent of the Farm Broek Scheur 318 JR
- Portion 16 of the Farm Pretoria Town and Townlands 351 JR
- Portion 31 of the Farm Pretoria Town and Townlands 351 JR
- Portion 226 of the Farm Pretoria Town and Townlands 351 JR

Scip appointed ACE as an EAP to facilitate the EIA process for Fort West Phase 2 Development in line with Listing Number 2 - NEMA Act, 1998 (Act No. 107 of 1998) - GNR 545 .

The process was registered for an EIA with the Gauteng Department of Agriculture and Rural Development (GDARD) under preceding Regulation 386 and 387 of the National Environmental Management Act (Act No. 107 of 1998) and was assigned the reference number GAUT **002/11 12 E0165**. The final Scoping Report was accepted by GDARD Please see **Appendix A**

The size of the Farm Fort 646 JR is approximately 389, 4278 (three hundred eighty nine comma four two seven eight) hectares in extent. The above farm was later subdivided again and Phase 2 of the proposed Fort West development will consists of the following Potions:

Potion 2 of the farm Fort 646 JR
Potion 3 of the farm Fort 646 JR
Remaining Extent of the Farm Fort 646JR

The Department of Housings “Breaking New Ground” (BNG) policy, implemented in 2004 aimed to radically change the *status quo* of housing provision in South Africa. Social Housing needs in South Africa is to be met by Housing Developments, such as the proposed development at Fort West. The government’s objectives of providing housing for all are an ongoing commitment and development requirement for the poor to middle income families. New developments must be formulated holistically, by providing sufficient social amenities such as schools, crèche’s, community clinics, proper water & sanitary requirements, etc. The proposed Fort West Phase 2 development will be comprised of residential units as well as all the supportive land uses for a complete integrated development.



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iii The Proponent

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E-mail:			

iv The Applicant

Project applicant:	Scip Engineering Group (Pty) Ltd. (Scip) on behalf of Gauteng Department of Local Government Housing		
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v The Environmental Assessment Practitioner

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1 Project Overview

The **Gauteng Department of Local Government and Housing (GDoLG&H)** appointed Scip Engineering Group Pty Ltd (Scip) as the project managers for the proposed Fort West Phase 2 Development.

The project manager, Scip has commissioned an independent Environmental Assessment Practitioner (EAP) ACE Environmental Solutions (“ACE”) to undertake an Environmental Impact Assessment (EIA) process for the proposed Fort West Phase 2 Development. Fort West Phase 2 Development falls within the City of Tshwane (CoT) District Municipality, Tshwane, Gauteng Province. In local context, the proposed areas of development are situated north of the Lotus Gardens and north of the old N4 Highway. It is situated west of Pretoria CBD and Danville lies to the east. The area forms part of the City of Tshwane Spatial Development Framework and is located in region 3 of City of Tshwane. The Spatial Development Framework (SDF) earmarked this area as residential development zone with supporting services.

This application will be made in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act 107 of 1998 (as amended) ('GN R543”)

Environmental studies are required to address the potential impacts associated with the proposed project, and to provide an assessment of the project in terms of the biophysical, social and economic environments. It is this assessment, which aids both the environmental authorities GDARD and the applicant in making decisions regarding the future of the project.

An important phase of an EIA is *Scoping*. This is the phase during which issues and concerns were identified in order to focus the specialist studies and provided a framework within which this EIA assessment was undertaken. In keeping with environmental legislation, it is the responsibility of the EAP to ensure that the public is provided the opportunity to participate meaningfully in the environmental investigation process. This includes identification of issues and review of reports.

Accordingly, interested and affected parties (I&APs) were invited to review the Draft Scoping Report to verify that their contributions are captured and correctly understood. Issues raised by I&APs have been used, together with issues identified by the professional team, to define the terms of reference for the Specialist Studies to be undertaken in this detailed Impact Assessment Phase.



The public will also have the opportunity to review this Draft Environmental Impact Assessment Report and any Specialist Studies Reports. The comments received during the Draft Scoping review period has been incorporated into the Final Scoping Report, and submitted to the GDARD who accepted the report Ref: Final Scoping Report, GDARD Ref: Gaut: **002/11 12 E0165. (Appendix A)** These studies now proceed as part of the detailed Impact Assessment Phase and feed into the Environmental Management Plan (EMP).

1.1 Purpose of this Draft Environmental Impact Assessment Report

The Environmental Impact Assessment Report forms part of a series of reports and information sources that are being provided during the EIA process for the proposed Fort West Phase 2 Development. In accordance with the EIA Regulations, the purpose of this Draft Environmental Impact Assessment Report is to:

- Provide a description of the proposed project as well as the affected environment at a sufficient level of detail to facilitate informed decision making;
- Describe the local planning context and environment within which the project is proposed;
- Provide an overview of the process being followed in the EIA and the public participation process (PPP),
- Describe and assess the predicted impacts of the project on the environment;
- Provide recommendations to avoid or mitigate negative impacts; and to enhance the benefits of the project.

This report has been prepared after public and authority consultation during the Scoping Phase of the EIA process and after various specialist studies have been completed. A Scoping Report was prepared and submitted to the Gauteng Department of Agriculture and Rural Development (GDARD) for review on 24 January 2012.

Permission was obtained to continue with the EIA on the 9th of March 2012, Reference No. Gaut: **002/11 12 E0165**.

This Draft EIAR & EMP is available for public and authority review for a period of 40 days (31 August 2010 to 30th September 2010). The final EIAR will be updated with comments received during the review period and submitted to all I&AP's for a further 21 day commenting period before submitted to the GDARD for review and the subsequent issuance of an Environmental Authorization

This (EIAR) expands on the key issues identified during the Scoping Phase and incorporates comments received from the GDARD and registered I&AP's on the Final Scoping Report. The impact assessment addresses activity-specific impacts, cumulative impacts, assesses alternatives and provides recommendations and conclusions.



The following specialist investigations were conducted and incorporated in the EIAR during this EIA Phase see Appendices B to J:

- Environmental Management Plan – Appendix B
- Waste Management Plan – Appendix C
- Ecological Assessment – Appendix D
- Roads and Stormwater Preliminary Engineering Design Report – Appendix E
- Water and Sanitation Master Plan – Appendix F
- Water and Sanitation Preliminary Engineering Design Report – Appendix G
- Flood Line Report – Appendix H
- Heritage Impact Assessment – Appendix I
- Traffic Impact Assessment – Appendix J
- Geotechnical Investigation – Appendix K

1.2 Details of the Environmental Assessment Practitioner

Ace Environmental Solutions is a consulting company providing specialist environmental consulting services to public and private sector clients. ACE provides a comprehensive range of multidisciplinary consultancy services and tailors individual support packages for project planning, design, management, integration and supervision, including environmental assessment and management.

Collectively the Consultant can demonstrate relevant local as well as international experience, including operational experience in the Gulf,

Key attributes of the Consultant include relevant environmental management EIA and audit expertise and in the key areas of land management.

ACE has the capacity to plan and implement the full range of environmental studies. This includes: environmental impact assessments for mining, oil and gas, industrial, marine, and urban development projects; environmental management and monitoring programs; sewage and wastewater treatment; environmental audits; packaging, transport and disposal of intractable and hazardous wastes; assessments and remediation of contaminated sites and land use capability assessments. In addition, the company has extensive experience with the development of public policy, legislation and in managing community relations surrounding environmental issues.

ACE as the nominated environmental consultant firm, will assume direct responsibility for the satisfactory delivery of the environmental outcomes of the project. All elements of the implementation will be undertaken by Ace Environmental Solutions staff experience, building on the consultant's sensitivity to the issues underlying cultural and social needs in the project area, together with the ability to design and closely manage an output based project will minimise the risks associated with this project.



Gerhardus Uys will perform the function of Principle Consultant and the Project Manager. Gerhardus Uys holds a Science degree in Environmental Management with 10 years comprehensive experience in Environmental Management both in South Africa and Middle East. Experience included, EIA compilation, implementation of standards like ISO 14001 to help organizations minimize how their operations negatively affect the environment (cause adverse changes to air, water, or land), to ensure compliance with applicable laws, regulations, and other environmentally oriented requirements, to continually improve on the above. Project fields include various Industrial projects, Oil and Gas industries, Opencast Diamond Mining, Sensitive Coastal Areas, Land Rehabilitation, and Tourism Development projects.

Monique Uys will perform the function of assistant project Manager and Environmental consultant. Monique holds a BA Degree with specialisation in Environmental Management. Monique has 10 years Business Management with 4 years Environmental Management Experience included, in helping organizations minimize how their operations negatively affect the environment, to ensure compliance with applicable laws, regulations, and other environmentally oriented requirements, to continually improve on the above. Monique is responsible for Projects Coordinator and Business Development, continuous monthly environmental monitoring and report writing. As well as client's liaison regarding all aspects of environmental management plans and ISO 14001 implementation.



2 Description of the Proposed Activity

The land uses envisaged for the proposed Fort West Phase 2 Development Area will include, inter alia:

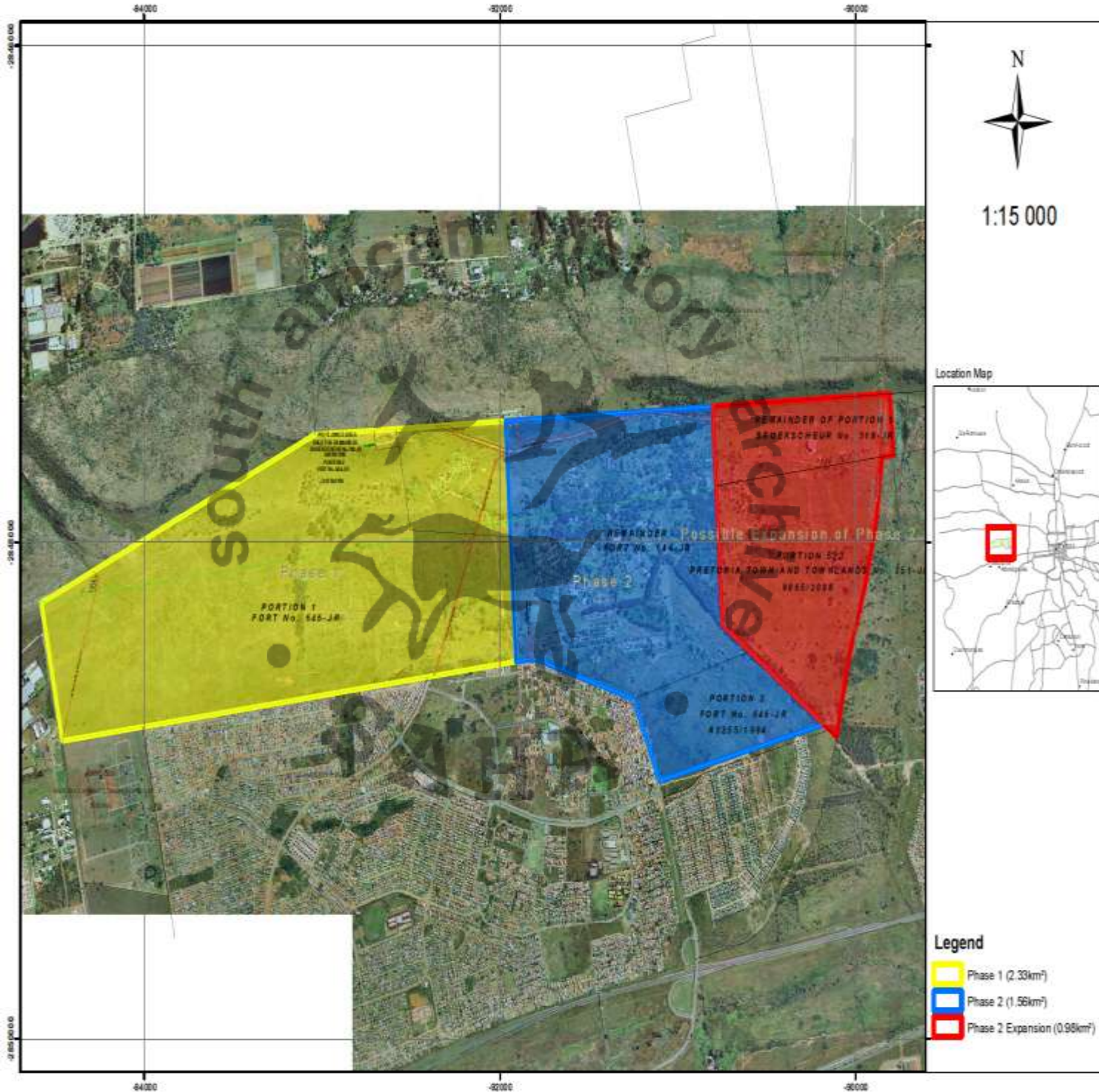
- Single Residential uses with an erf size of approximately 350m².
- High Density Residential Uses with a density of between 80 and 120 units per hectare.
- Community Facilities that will include a police station, post office, sport stadium and clinic.
- Offices that will also include medical suites, estate agents and a veterinary.
- Public Open Space. This will include the open space provided next to the ridge, the stream, the sport stadium and then provision will also be made for community parks.
- Institutional. One primary school and secondary school will be provided. Provision will also be made for at least 4 crèches and 4 Places of Public Worship.
- Retail facilities which will accommodate public transport.

2.1 Location

Fort West Phase 2 Development falls within the City of Tshwane (CoT) District Municipality, Tshwane, Gauteng Province. In local context, the proposed areas of development are situated north of the Lotus Gardens and north of the old N4 Highway. It is situated west of Pretoria CBD and Danville lies to the east. The area forms part of the City of Tshwane Spatial Development Framework and is located in region 3 of City of Tshwane.

The subject properties are located within the western sector of the Tshwane Metropolitan Municipality. See **Figure 1 Locality Map**

Figure 1 Locality Map



2.2 Property Description

The Farm Fort 646 JR is surrounded by medium cost, formalised residential areas of Elandsfontein, Lotus Gardens, Elandspoor, Danville and Davisonville. The old Fort West Leprosy Hospital is located to the east of the site. The Witwatersberg Ridge system defines the northern boundary of the site. The development area is situated 13km west of the Pretoria Inner City.

The site is currently vacant. Owing to current surrounding land uses, the site has been subjected to various anthropogenic influences over an extended period of time. The Fort West development will be in line with, and complimentary to, surrounding land uses.

The Farm Fort 646 JR consists of four (4) farm portions which are registered in the name of the Republic of South Africa. The four (4) farm portions are as follows:

- Remaining Extent of the Farm Broek Scheur 318 JR
- Portion 16 of the Farm Pretoria Town and Townlands 351 JR
- Portion 31 of the Farm Pretoria Town and Townlands 351 JR
- Portion 226 of the Farm Pretoria Town and Townlands 351 JR

The size of the Farm Fort 646 JR is approximately 389, 4278 (three hundred eighty nine comma four two seven eight) hectares in extent. The above farm was later subdivided again and Phase 2 of the proposed Fort West development will consists of the following Potions:

Potion 2 of the farm Fort 646 JR
Potion 3 of the farm Fort 646 JR
Remaining Extent of the Farm Fort 646JR

2.3 Built Environment

The whole area offers a mixture of residential properties ranging from ±R100 000 to R1 million. The scenic environment could sustain higher prices properties, but is not supported by the socio-economic profile of the current residents as well as the image of the area.

The immediate vicinity offers work opportunities to blue collar, industrial and manufacture workers. The growth in job opportunities will also have to be met by the supply of the correct housing facilities.

The area of proposed development covers a surface area of approximately 105 Ha and consists of single and double storey historical structures dating as far back as the early 1900's.



The site is characterised by formalised residential areas of Elandsfontein, Lotus Gardens, Elandspoot, Danville and Davisonville. The old Fort West Leprosy Hospital is located to east of the site. The Witwatersberg Ridge system defines the northern boundary of the site and the proposed development area is situated 13km west of Pretoria inner city.

2.3.1 Existing reservoirs

Based on the information supplied by GLS Consulting, the development areas fall across two reservoir zones namely Lotus Gardens and Pretoria West HL reservoir zones. Furthermore, within the Lotus Gardens reservoir zone, part of the development falls in the Lotus Gardens PRV sub zone as well.

The Lotus Gardens reservoir has a capacity of 9.5ML. The current zone AADD (Scenario 2 in WADISO) is 3 200 kℓ/d. The AADD of the proposed development that falls in the Lotus Gardens reservoir zone is approximately 1 600 kℓ/d which would take the total current zone AADD up to 4 800 kℓ/d. The reservoir capacity is adequate for a zone AADD of 4 800 kℓ/d per day. (However, Fort West Phase 1 is also in the planning stage. Fort West Phase 1 will definitely push the zone AADD too high for a 9.5KL reservoir and a second Lotus Garden reservoir will be required). *GLS Consulting Pty Ltd*

Refer to **Appendix F** for Detailed Water and Sewer Master Plans by GLs Consulting

The north western part of the proposed development will be serviced from the Lotus Gardens reservoir and the south eastern section will be serviced by the Pretoria West HL reservoir. The study done by GLS consulting shows that both reservoirs will be sufficient in supplying the development. See **Appendix G** For Preliminary Design on Water and Sanitation (*by Scip*) .

2.3.2 Existing pipelines

The Western part of the Lotus Gardens development is fed by two parallel pipelines that run from the Lotus Gardens Reservoir.

The Eastern part of the Lotus Gardens development is fed by a 350mm pipeline from the Pretoria West HL reservoir.

Refer to **Appendix G** for existing and proposed bulk water lines.

2.3.3 Existing Electricity Network

There is currently no spare capacity available for the entire area. The Meteor Substation upgrade, which is part of Eskom's second phase, will only be upgraded once the Sonlandpark Substation has been upgraded. Estimated completion date for the Sonlandpark upgrade is 2011/2012.



The Meteor upgrade will improve the power supply in the area and make additional capacity available for future housing developments. The new substation will provide for a demand of 9,8MVA (9,8Megawatts) and the total extent of the facility will cover less than 1 ha.

2.3.4 Existing Roads

The major road network surrounding the proposed Fort West phase 2 Development includes the N4 (Magalies Freeway). There is however no direct access to the development from the freeway. The N4 is situated 2.3km south of the development.

According to CoT's road Master plan, a Class 3 road with a 32m reserve is planned to connect Arcridian and Van Den Berg Street. This planned road will be an extension of Staats Artillery road.

Fort West will obtain access from Staats Artillery, van Den Berg and Arcridian streets. For the further road network plan please refer to **Appendix E: Report on Roads and Stormwater Preliminary Engineering Design Reports** (by Scip)

The Van Den Berg Street needs to be upgraded to a class 4 road with a road reserve of 20m. A 4 way intersection is required, where Van Den Berg meets Artillery. The main access from Arcridian needs a 4 way intersection and dual lane upgrade towards the N4, including taxi bays.

2.4 Sanitation Requirements

2.4.1 Waste Water Treatment Works

The generated sewer flows will be accommodated by the Daspoort waste water treatment works (WWTW) and excessive flow will be accommodated by the Rooiwal 2 WWTW. Rooiwal is currently being upgraded to accommodate the overflow from Daspoort WWTW.

The peak daily dry weather flow for the proposed development area is calculated as 1974 kl/d. However a flow of 13.74 Ml/d was used for the design of the bulk sewage system.

2.4.2 Existing outfall sewer

A new main gravity line is proposed for the development which will start at a diameter of 450mm and will increase to 525mm. It should be noted that the bulk sewer line needs to be upgraded up to the point where it connects to the existing 825mm diameter pipeline.

2.5 Level of Service: Internal Service

2.5.1 Type of development and appropriate level of service

Fort West Phase 2 represents a subsidized integrated housing development consisting mainly of smaller sized Residential 1 erven as well as larger Residential 2 and 3 erven. In terms of the CoT

Guidelines for Design and Construction of Water and Sanitation Systems it is proposed that each property be provided with a full-pressure unrestricted conventional water house connection.

In terms of sanitation it is proposed that each individual erf be provided with full waterborne sanitation.

2.5.2 Residential water demand

The annual average daily demand (AADD) is used to determine the size of the bulk pipelines for the new development. This was calculated using the CoT guidelines for the Design and Construction of Water and Sanitation Systems, as well as the Guidelines for human Settlement Planning and Design ("Red Book").

The residential water demand for Residential 1 development is taken as 700 liters /day/unit for erven of 300 m² or less. The estimate Annual Average Daily Demand (AADD) can therefore be calculated as follows:

The AADD is calculated as 2197kl/d. The AADD that falls within the Lotus gardens reservoir zone is approximately 1000kl/d. The Lotus Gardens reservoir has enough capacity to accommodate Fort West

Phase 2, however Fort West Phase 1 is also in the planning stages. Phase 1 will definitely push the water demand too high for the reservoir and the second Lotus Gardens reservoir will be required.

2.5.3 Water supply: design standards

The proposed bulk pipelines required to accommodate Fort West Phase 2 are:

- A 250mm diameter pipeline supplying water from the Lotus Gardens reservoir running from east to west. This pipeline will connect to the 400mm existing pipeline, after the PVR.
- A 315mm diameter pipeline, (which reduces to 250mm), supplying water from the Pretoria West HL reservoir.

The following will be considered during the detail design of the water reticulation network:

- Hydraulic design of the pipeline network will be done to achieve a minimum head of 25 m under peak demand and a maximum head of 60m.
- Fire demand: Group 1, low risk with 8m residual head at peak flow.
- Velocities in pipes will generally not exceed the following under peak demand; 3,5 m/sec for pipe diameters ≤ 150 mm and 2.5 m/sec for pipe diameters ≥ 200 mm.
- Isolating valves will be provided to isolate any section of pipeline with not more than 4 valves and so that the total length of main included in an isolated section does not exceed a nominal 600 m.
- No more than 60 dwellings will be isolated at a given time (low cost housing development).
- Fire Hydrant spacing to be 240m on 75mm diameter and larger pipes.
- Minimum pipe size in the network will be 75mm diameter.
- Pipe material to be used will be Class 12 uPVC/mPVC, SABS 966 approved.
- Trenching, bedding and backfilling shall conform to SANS 1200 LB and SANS 1200 DB and to class B bedding, backfilled to 93% of Mod.AASHTO.
- House connections will consists of 40mm diameter class 12 HDPE pipes, reducing to 25mm dia.

2.5.4 Sanitation: design standards

An internal reticulation network with connection points to each property is proposed with underground pipes laid in mid block servitudes or road reserves.

The standard sewer and manhole details to be used for this project are indicated in **Appendix G**.

The following guidelines will be used in the detail design of the sewer network:

Hydraulic design of the sewers will be done with the following minimum pipe slopes:

- 1 : 80 at head
- 1 : 80 for 160mm dia pipe
- 1 : 120 for 200mm dia pipe
- 1 : 1600 for 250mm dia pipe
- 1 : 200 for 300mm dia pipe

2.5.5 Electricity: design standards

Basic electrical design standards to be used for housing projects in Tshwane Metro:

- The electrical design load to be used for each unit is 3.5kVA (ADMD)
- Medium voltage cables to be underground
- Low voltage reticulation to be overhead with street lights on the same poles
- Bulk contributions to be based on 3.5kVA and will be assessed on a sliding scale once the township layout is approved and the number of housing units is known

The new substation will provide for a demand of 9,8MVA (9,8Megawatts) and the total extent of the facility will cover less than 1 ha.

2.5.6 Storm water Management

In storm water management a distinction can be made between two types of storms, namely storms of low and high severity. For storms of low severity, which occur frequently, a pipe or channel system may be provided to avoid the frequent problems resulting from overland flow. This system has been termed the minor system.

By considering the effects of the less frequent storms, a major system can be identified which supports the minor system. The major system may include larger conduits and natural or artificial channels. The major system would frequently make use of the road system to convey excess water to suitable points of discharge.

The storm water from the development will drain towards the natural stream (Skinner Spruit) which flows in a west to east direction.

A storm water management report is attached as Appendix_

Some of the existing buildings in the Phase 2 area lie below the flood line, within the flooded area. A flood line analysis was conducted and attached as **Appendix H**

2.6 Planning Frameworks Considered

The provincial policies and guidelines listed here are applicable to the proposed development and the requirements and obligations therein have been considered throughout the EIA process:



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2.6.1 GDARD Policies

- The following GDACE Policy Documents have been considered as a part of the EIA Procedure:
- Red Data Plant Policy for Environmental Impact Evaluations;
- Information Layer and Buffer Zones for Industries, Sewage Treatment Works, Landfill Sites and Mine Dumps;
- Buffer Zone 2: Industries;
- Gauteng Ridges Policy;
- GDARD Conservation Plan Version 3 (C-plan V3) and;
- Gauteng Provincial Integrated Waste Management Policy

2.6.2 Conservation Plan (C-Plan)

The Gauteng Department of Agriculture Conservation and Environment, 2011: Gauteng Biodiversity Gap Analysis Project: Gauteng Conservation Plan Version 3.3, Johannesburg, GDACE, aims to identify and map the distribution of areas that are of importance to biodiversity in Gauteng.

2.6.3 GDACE Ridges Policy

The Gauteng Department of Agriculture, Conservation and Environment has produced a guideline on ridges in Gauteng. The purpose of the guideline is to set out the Department's policy on the conservation, development and use of ridges in the province with a view to ensuring that members of the public are able to make informed decisions regarding proposals for development on ridges and the use of ridges; officials make consistent decisions in respect of planning and environmental applications that involve negative impacts on ridges; and the Department's responsibility in respect of the protection of the environment is carried out in an efficient and considered manner. The guideline indicates that ridges that fall within the following definition are included within the scope of the guideline:

.." A ridge includes hills, koppies, mountains, kloofs and gorges and/or a landscape type or topographic feature that is characterized by two or more of the following features — (i) a crest, (ii) plateau, (iii) cliff or (iv) footslope. In addition, ridges are characterized by slopes of 5° or more when modeled in a Geographic Information System digital elevation model that is based on 20m contour intervals at a scale of 1:50 000.

The functions and benefits provided by ridges range from purely ecological to recreational. The quartzite ridges of Gauteng are extremely limited in distribution. They are characterized by a unique plant species composition that is found nowhere else in South Africa or the world. Many Red List / threatened species of plants and animals inhabit ridges.

Due to their threatened status, Red List species require priority conservation efforts in order to ensure their future survival. The conservation of ridges in Gauteng will contribute significantly to the future persistence of these species. The protection of ridges in their natural condition will greatly improve the bio-geographical capability of the Gauteng urban open space network (Poynton & Roberts, 1985) as ridges can be viewed as naturally existing corridors that can functionally interconnect isolated natural areas (Adams & Dove, 1989) and require minimal or no management (Loney & Hobbs, 1991). Ecological processes associated with ridges, such as wildlife dispersal, evolutionary processes, hydrological processes and pollination, are important for the maintenance and generation of biodiversity and provide important ecosystem services to society.

2.6.4 Tshwane Integrated Environmental Policy (TIEP)

The TIEP describes the environmental vision of the CTMM as follows:

An internationally acclaimed African city of excellence caring for its environment, demonstrating commitment and responsibility through innovation and collaboration.

TIEP's principles essentially the policy aims to make environmental issues and environmental sustainability an essential part of:

- all decision-making processes;
- the development of strategies and programmes for implementation in Tshwane;
- the development and planning of land use; and
- the management of resources and activities.
- The TIEP aims to impact in a practical manner on various municipal operations and procedures.

From the above, it is clear that the vision of the Environmental Management Division, supported by the Tshwane Integrated Environmental Policy (TIEP), adds an environmental concern to the City Vision and CDS.



2.6.5 Gauteng Spatial Development Framework

The Gauteng Spatial Development Framework identified five (5) critical factors for development in the province (and by implication in Tshwane), namely:

- Contained **urban growth**
- Resource based **economic development** (resulting in the identification of the economic core)
- Re-direction of **urban growth** (stabilise/limit growth in economically non-viable areas, achieve growth on the land within the economic growth sphere)
- **Protection of rural areas** and **enhancement of tourism** and agricultural related activities
- **Increased access and mobility.**

The development proposal for the Fort West mixed land use township, complies with a number of the outlined critical factors. The proposed Fort West mixed land Use Township is aimed at providing housing opportunities to at least 8000 families in an affordable manner, within the urban edge, within a well designed mixed use township. The development framework will be designed to meet the needs of the community for housing, convenience, education, social and healthcare amenities. The diverse land uses will further compliment the surrounding land uses.

2.6.6 Tshwane City Strategy

The Tshwane City Strategy is a bold initiative by the City of Tshwane Metropolitan Municipality (CTMM) to influence the development path of the City over the next 20 years. The City Strategy introduces important implicit policy and emphasis shifts. One of the fundamentals of the City Strategy is the restructuring of the urban environment in such a way that people's lives are improved through better and more equal access to economic and social opportunities. Just as with the National Spatial Development Perspective, this implies a focused approach to development around areas with opportunity, not only for economic development, but also for residential development.

Some of the issues related to densification that are clearly highlighted by the City Strategy are:

- Create places of opportunity that will support wide range of densification in places that benefit from access to concentrated public investment in services and infrastructure
- Create economic opportunities at important interchanges and nodes receiving clusters of social facilities and allow higher density residential development to grow around these places.
- Present alternatives to people whereby the advantages that different places can offer are optimised.

The development proposal for the Fort West mixed land use township, complies with a number of the outlined critical factors. The proposed Fort West mixed land Use



Township is aimed at providing housing opportunities to at least 8000 families in an affordable manner, within the urban edge, within a well designed mixed use township. The development framework will be designed to meet the needs of the community for housing, convenience, education, social and healthcare amenities. The diverse land uses will further compliment the surrounding land uses.

2.6.7 Sustainable Development Criteria for Built Environment Projects requiring Environmental Impact Assessments in Gauteng, 2009

This document has been developed by the Gauteng Department of Agriculture and Rural Development to ensure that sustainable development is integrated in to planning and design of built environment projects requiring Environmental Impact Assessments (EIAs) in Gauteng.

The document defines sustainable development and outlines the implications of this for the built environment. It also provides objectives and criteria for sustainable built environments that can be used by developers of built environment project that require EIAs.

The environmental context, legislation and potential future measures to reduce carbon measures make it clear that the built environment must change to support sustainable development and has a very significant role to play. In order to develop practical measures that should be integrated into the built environment it is useful to set out built environment or development objectives that, together, would support sustainable development. These objectives are set out below and form the starting point for the sections in this document which provide more detailed criteria.

Land Use and Integrated Development: Development should be integrated with existing and planned infrastructure and land uses to ensure efficient systems and balanced land use.

Biodiversity: Development should be located where damage to natural environments and ecosystems is minimised. It should ensure that existing natural environments are conserved and take opportunities to strengthen this.

Agriculture and Landscaping: Development should be located where they will not lead to a loss of agricultural land. Landscaping and agriculture should be developed and managed to minimise negative impacts and local food production should be supported.

Water, Sewage and Storm Water Runoff: Development should minimise the consumption of municipal potable water and production of waste into municipal sewage systems. Increased storm water runoff and water pollution should be avoided.

Materials and Construction: Development should minimise the negative environmental impacts of construction and the consumption of resources. Positive social and economic impacts of construction and resource use should be maximised.



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Energy, Mechanical and Electrical Systems: Development should minimise the use of non-renewable energy and maximise use of renewable energy sources.

Waste and Pollution: Development should minimise the amount of waste diverted to land fill. Pollution should also be avoided.

Local Economic Development: Development should support diverse productive local economies that create work and sustainable enterprises.

Transport: Development should reduce the reliance on cars and ensure that low energy environmentally friendly forms of transport are encouraged.

Health and Well Being: Development should support the health and well being of people on site and in neighbouring communities.

Education: Development should support education and ongoing learning of people on site and in neighbouring communities.

Housing: Development should support Inclusionary Housing and ensure that people who work on site do not have to travel long distances to access affordable housing.

Inclusion and Social Cohesion: Development should support social cohesion and benefit the full diversity of the population.

Management and Monitoring: Sustainable development targets that reflect the South African context should be set for the development and operation of the development. Management and monitoring should be carried out to ensure that these are achieved.

The proposed Fort West mixed land use Township is well located to the Tshwane CBD and surrounds. Vacant land will be utilized for predominantly residential development — mostly catering for entry level and middle income bonded housing. Mixed income and social integration across race and income levels is possible for this development. Bulk infrastructure in form of water, sewerage and electricity is readily available. The development proposal offers a vast range of community facilities and services to the surrounding areas.

2.6.8 Tshwane Open Space Framework

Open Space as defined by the Tshwane Open Space Framework (TOSF), adds ecological, social, economic and place making value to any development, and the integration and appropriate response of development to Open Space must at all times be facilitated.



Any development within or adjacent to the TOSF network, must be compatible to the functioning, quality, safety requirements and aesthetics of the Open Space in terms of land use, scale, spatial interaction, appearance and landscaping. Developments must actively contribute to the protection and enhancement of the current and envisioned open space network, without harming the integrity of the open space in any way.

According to the TOSF, open space within a developed area, is referred to as an Urban Environment. This open space becomes Private Open Space, for the exclusive use of the specific community, and is owned and maintained by the representative entity of the development. According to the TOSF, possible open space to be considered for proposed Fort West mixed land use development, includes Green (Irreplaceable site, Protected Area, High Ecological Sensitivity) and Blue (Dams, Wetlands and rivers) *Ecological Nodes*, and Green

(Ridge systems) and Blue (Watercourses, floodlines) *Ways*. These open space typologies are all considered to be of metropolitan significance and influence.

According to GDACE, Green and Blue Nodes are essential in meeting targets set for the conservation of biodiversity in Gauteng. The Tshwane Open Space Framework provides a holistic Framework within which the sustainable spatial development of the City can be guided and directed. The principles of the TOSF will be implemented in the planning phases of the proposed Commercial and Light Industrial Township. These principles serve to facilitate the merger of development along side areas of conservation importance.

As the policy of the City of Tshwane requires that open space is provided in new proposed townships, measures will be taken to incorporate functional "Open Space" areas throughout the Fort West development.



3 Legislation Considered

A number of acts and policies would apply to this development, either through authorisations that has to be obtained or simply through adhering to the principles of the particular legislation and policy. The most important of these that may or may not be of relevance have been described below. This is not an extensive list and it would be advisable to seek legal counsel in order to ensure that the relevant legislation is adhered to.

Environmental Rights

*The Constitution of the Republic of South Africa Act, No. 108 of 1996
Section 24 states that:*

*Everyone has the right to an environment that is not harmful to their health or well-being
Everyone has the right to have the environment protected for the benefit of present and future generations.*

Environmental Management Guiding Principles

National Environmental Management Act, No. 107 of 1998

Comments or findings pertaining to the principles are not included specifically though all sections in this report but have been applied with these principles in mind. The National Environmental Management principles, listed at Section 2 of the National Environmental Management Act 107 of 1998 (NEMA), which provide for the social, environmental and economic sustainability of activities, apply “to the actions of all organs of state that may significantly affect the environment”.

Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental and cultural and social interests equitably (Section 2(2)).

Pollution and degradation of the environment must be avoided, or, where they cannot be altogether avoided, are minimised and remedied (Section 2(4)(ii)).

The use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource (Section 2(4)(v)).

A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions (Section 2(4)(vii)).



The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured (Section 2(4)(f)).

Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge (Section 2(4)(g)).

The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment (Section 2(4)(i)).

Duty of Care and Remediation of Environmental Damage

The duty of care principle is overtly regulated in sections 28 (1) and (3) of the National Environmental Management Act of 1998, and the National Water Act, Section 1:

(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

(3) The measures required in terms of subsection (1) may include measures to-

- Investigate, assess and evaluate the impact on the environment;
- Inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
- Cease, modify or control any act, activity or process causing the pollution or degradation; – Contain or prevent the movement of pollutants or the cause of degradation;
- Eliminate any source of the pollution or degradation;
- Remedy the effects of the pollution or degradation, or
- Remedy the effects of any disturbance to the bed and banks of a watercourse.

Although Section 28 is applicable to all areas of pollution and environmental impact, only those items which have not specifically been addressed in subsequent sections and items of particular importance to Section 28 are included here. However, this section must be borne in mind when assessing any environmental impact described in subsequent sections.

Access to Environmental Information

Promotion of Access to Information Act of 2000 Section 70 and NEMA Section 31



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Anyone has the right to request information of an environmental nature from the Client and cannot be refused on grounds that are not compliant with the legal requirements.

Water and wastewater management

Pollution of Water Resources

National Water Act, No. 36 of 1998: Section 19

Measures must be undertaken by the Developer/Proponent to:

- Cease, modify or control any act or process causing pollution;
- To contain or prevent the movement of pollutants, and
- To remedy the effects of pollution.

Water Wastage

National Water Act of 1998, Section 22(2)(d)

Water wastage is prohibited under this section. The developer/proponent must therefore be able take account for all the water received and be able to demonstrate the optimal use of water.

Waste management

Governing Principles for Waste Management

Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, 2nd Edition (DWAF, 1998)

The following principles, many of which are considered internationally as being essential for the management of Hazardous Waste, are acknowledged in the Minimum Requirements and will also be acknowledged in future regulations.

‘Duty of Care Principle’ – whereby the **generator** of the waste is ultimately responsible for ensuring that the waste is handled, stored, transported and disposed of according to the legislation and in an environmentally sound and responsible manner.

‘Polluter Pays Principle’ – the person or organisation causing pollution is liable for any costs involved in remediation or rehabilitating its effects. The generator of the waste is thus liable unless able to prove that the transferral of management of the waste was a responsible action.

‘Precautionary Principle’ – All waste is assumed to be both highly hazardous and toxic until proven otherwise

Waste Collection and Storage

Section 20(1) of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) states that no disposal site may be established or operated without a permit issued by the Department of Water Affairs.

“Disposal site” means a site used for the accumulation of waste with the purpose of disposing or treatment of such waste, and as such covers any permanent (> 90 days) on-site waste accumulation areas on Client’s premises.



Biodiversity

Weeds and Invader Plants

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

Specifies certain plants that declared weeds and invader plants that must be controlled or eradicated. These species are divided into three categories, and the control measures applicable to the respective categories are as follows:

Category 1:

Invader plants which have been declared weeds and which may not be allowed to occur on land or in inland water surfaces (other than in biological control reserves).

Category 2:

Invader plants that may only occur in areas that have been specifically demarcated for this purpose.

Category 3:

Invader plants that may continue to grow where they already exist. However, no propagating, new planting or trade is allowed and such plants may not occur within 30 metres of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland.

International Law

Convention on Biological Diversity (CBD), June 1993, Ratified 2 November 1995

The aim of the CBD is to effect international co-operation in the conservation of biological diversity and to promote sustainable use of the living natural resources worldwide. It also aims to bring about the sharing of the benefits arising from the utilisation of natural resources.

Threatened or Protected Species

National Environmental Management: Biodiversity Act 10 of 2004 section 57

A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit.

New activities

Environmental Impact Assessments

An environmental assessment for this development is required in terms of Sections 24 and 24D of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), in terms of which GN R 544, 545, and 546 2010 was promulgated, which lists the activities that require such an assessment. The applicable activities are listed in the table below

Table: 1 Listed Activities

GN R544	1	
GN R544	9	The construction of facilities or infrastructure exceeding 1 000 m in length for the bulk transportation of water, sewage or storm water – (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more.
GN R544	10	
GN R544	11	The construction of: (i) canals (ii) channels (iii) bridges, (iv) dams (v) wiers (vi) bulk stormwater outlet structures (x) building exceeding 50 square metres in size where such construction occurs within a watercourse or within 32 m of a watercourse, measured at the edge of the watercourse, excluding where such construction will occur behind the development setback line.
GN R544	12	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shell, shell grit, pebbles or rock from (i) a watercourse
GN R545	15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more
GN R545	18	The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before 03 July 2006 and which have not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 or 2009, made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006,— (i) it is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998); (ii) it is a road administered by a provincial authority; (iii) the road reserve is wider than 30 metres; or (iv) the road will cater for more than one lane of traffic in both directions.
GN R546	4	construction of a road wider than 4 m with a reserve less than 13,5 m. (b) In Gauteng
GN R546	10	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.
GN R546	14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation...

Gauteng Noise Control Regulations

The Gauteng Noise Control Regulations (GN 5479), Regulation 8, promulgated under the Environment Conservation Act of 1989. Regulation 8: Prohibition of disturbing noise

This clause prohibits the company from producing or causing a disturbing noise.

“**Disturbing noise**” is defined as a noise level that causes the ambient noise level to rise above the designated zone level, or if no zone level has been designated, the typical rating levels for ambient noise in districts, indicated in table 2 of SANS 10103.

“**Zone sound level**” means a derived dBA value determined indirectly by means of a series of measurements, calculations or table readings and designated by a local authority for an area.

Regulation 10: Land Use

In addition, the company may not make changes to existing facilities or existing uses of land or buildings or erect new buildings, if these will house or cause activities that will, after such changes, cause a disturbing noise, unless precautionary measures to prevent such noise have been taken to the satisfaction of the local authority with jurisdiction in the area concerned.

Table 2: SANS10103:2004 - extract: Acceptable rating levels for noise in districts

Type of District	Equivalent Continuous Rating For Noise (Dba) – Outdoors	
	Day-time (06h00-22h00)	Night-time (22h00-06h00)
Residential Districts:		
Rural districts;	45	35
Suburban districts with road traffic, and	50	40
Urban districts.	55	45
Non Residential Districts:		
Urban districts with some workshops, with business premises, and with main roads;	60	50
Central business districts, and	65	55
Industrial districts.	70	60



Contractors and tenants

The Law of Contract

As a general rule, the Developer/Proponent cannot escape liability to third parties in terms of an agreement between themselves and a contractor. Such an agreement is not binding on third parties. A third party will still be able to hold Developer/Proponent liable. It is possible for Developer/Proponent to join the contractor as a defendant in legal proceedings, alternatively, recover the damages (or part thereof) paid to the third party from the contractor on a contractual basis.

The agreement between Developer/Proponent and the contractor must at least state that the contractor is aware of all the applicable environmental legislation pertaining to his tasks and that the contractor will strictly adhere to this legislation.

Contractors/tenants on site

This section applies to any contractor working on site or tenant on the property controlled by the Developer/Proponent. This section is included as additional information in ensuring compliance (with regards to all section above) of Client is maintained - compliance remarks is thus not included in this section.

As mentioned in section 3 in this Register, NEMA section 28(1) states that reasonable measures must be taken to prevent pollution or degradation of the environment. Section 28(2) states that the persons on whom subsection (1) imposes an obligation to take reasonable measures include an owner of land

or premises, a person in control of land or premises or a person who has a right to use the land or premises.

Section 154(a) of the National Water Act states the following:

Offences in relation to employer and employee relationships:

Whenever an act or omission by an employee or agent constitutes an offence in terms of this Act, and takes place with the express or implied permission of the employer or principal, as the case may be, the employer or principal, as the case may be, is, in addition to the employee or agent, liable to conviction for that offence.

Developer/Proponent would be considered as the Employer or Principal, the employee or agent being the tenant or contractor. Developer/Proponent is therefore responsible for ensuring that contractors and tenants are compliant with the legislation where it affects the site. Thus Developer/Proponent may be liable for any illegal discharges, spills or accidents caused by these contractors or tenants (in addition to these contractors or tenants being liable).



Developer/Proponent has not taken reasonable measures to ensure that contractors/stakeholders on site are aware of their responsibility on site and the environmental legal requirements (indicated by the incidents and potential incidents that may have caused environmental degradation associated with the contractors/stakeholders activities).

Heritage

South African Heritage Resources

National Heritage Resources Act, Act 125 of 1999

The SA Heritage Resources Agency (SAHRA) must be notified during the early stages certain planned activities (barriers, bridges, change of site character). Certain permit and reporting requirements apply for heritage sites, structures older than 60 years, archaeological, palaeontological and meteorite findings, burial grounds and graves and public monuments and memorials

Common law

Common law principles form the basis of current neighbour law and the law of nuisance. It protects an individuals use and enjoyment of property, but limits the use of property so such use does not interfere with the rights of other people (i.e. Neighbours).

Delict, nuisance & neighbour law

Nuisance and neighbour law are both fall under the law of delict. Nuisance law means to cause a disturbance to another person. This means that the requirements for a successful delict as outlined below apply to neighbour law and the law of nuisance.

The common law rules of delict, nuisance and neighbours can be used to protect your client's environmental rights relating to:

- Noise Pollution;
- Air Pollution, and
- Water Pollution.

The law of delict - actions of other people that cause harm to your clients

The common law of delict allows an individual to claim compensation from someone who does something that causes harm.



Requirements for a successful delictual claim

For such a claim to succeed the person making the claim (the claimant) must prove:

- That the action of the other person was wrong;
- That the person doing the action was negligent, i.e. That the other person was at fault;
- That the claimant suffered a loss which can be given a monetary value;
- That the action of the negligent person caused the monetary loss, and.
- The requirements of wrongfulness and negligence are very important here.

Was the action wrong?

In deciding whether an action was wrong the law tries to determine which actions are seen as wrong by the community as a whole. The action must be wrong because it violates a legal duty to take care (e.g. NEMA, Section 28: 'Duty of Care') or because it results in an unjustified infringement of the legally protected rights of another person. Generally speaking it is wrong to cause harm to another person or their property through negligent conduct.

Was the action negligent?

A person's liability to pay a claim (their guilt) usually depends on whether or not the court finds that they were at fault - i.e. whether they acted negligently or not. In order to test whether the person doing the action was negligent, the courts apply the test of the "reasonable man". In applying this test the court asks:

- Would the reasonable man, in the position of the person doing the action, have foreseen that the action would cause harm?
- Would the reasonable man have taken steps to avoid the harm?

The court may find the action of a person caused the damage to the claimant and he or she will have to pay the claimant a sum of money equal to the amount of damage that the claimant suffered to compensate the claimant for his loss, if the court finds:

- That the reasonable person would have foreseen that the action would cause harm; - That the reasonable person would then have taken steps to avoid the harm, and
- That the person who actually did the action did not take steps to avoid the harm.



The law of nuisance

The law of nuisance is divided into three categories:

- Public nuisance - where someone's action causes an inconvenience to the general public;
- Private nuisance - where an action by one person interferes with another person in the ordinary use of his or her property, and
- Statutory nuisance - where a legislative authority declares an action or process to be a nuisance.

The law of private nuisance

The law of private nuisance recognises the right of an owner of land to enjoy their land in physical comfort, convenience and well-being without unreasonable interference from others. Due to the fact that we have to make some allowances for the actions of the people with whom we share our society, each landowner must be prepared to put up with some interference with their right to enjoy their land. It is therefore possible for this right to enjoy land to be interfered with by smoke, gas, fumes or noise generated by another person, as long as it is not unreasonably interfered with. If the interference is unreasonable then the landowner can take legal action to protect his right to enjoy his land under the law of private nuisance

In the case of private nuisance the person who is usually liable is the person who owns the land from which the nuisance originates. The following people may be liable:

- The owner or occupier of the land who actually causes the nuisance, and
- The person who did not cause the nuisance in the first place, but who has control of the land or has taken over control of the land.

The person who has taken over the land is only liable if that the nuisance is on-going, he or she became aware of the nuisance, and failed to take reasonable steps to stop or limit the nuisance.

The law of neighbours

It is a general rule of our law that a landowner may not use his or her property in a way that causes harm to another person. This means that a landowner's right to use the property is limited and that there is an obligation on him or her not to act in a way that will infringe the rights of a neighbour.

The test of whether the landowner's use of his property fails to comply with this obligation is one of reasonableness and fairness. This principle of reasonableness is relevant to all forms of polluting activities

4 Description of the Receiving Environment

This section contains a description of the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.

Three components to the environment are recognised:

- Physical Environment;
- Biological Environment; and
- Socio-Economic Environment.

This section of the document provides a brief description of the existing biophysical and built / social environments. It draws on information from site visits, the study team and members' experiences, background literature as well as 1: 50 000 maps and photographs. In doing so, it presents a background against which the positive and negative impacts of the proposed options can be assessed. The existing social environment includes information regarding land-use and landownership, culture and historical aspects, etc.

4.1 Physical & Biological Environment

This section contains a description of the physical environment including climate, topography, geology and soil that is characteristic of this site/area.

4.1.1 Climate

Regionally, the site lies within the dry subtropical climate in the mid latitude of the world climate classification. The area receives most of its rainfall in summer with a total rainfall of between 600 to 700 mm per year. Temperatures vary between 7°C and 35°C during summer and -5°C and 24°C during the winter months.



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Table3: Average Temperatures

Month	Average	Temperature (Degrees Celsius) Maximum	Minimum
January	23.1	29.6	16.8
February	22.8	29.1	16.5
March	21.4	28.1	14.6
April	18.1	25.6	10.7
May	14.5	23.1	5.8
June	11.4	20.5	2.3
July	11.4	20.8	2.0
August	14.0	23.5	4.4
September	17.9	26.9	8.9
October	20.5	28.2	12.8
November	21.4	28.2	14.7
December	22.4	28.8	16.0

Table 4: Evaporation Data

Month	A-Pan Evaporation (mm)
January	238.1
February	202.1
March	193.3
April	150.7
May	129.9
June	110.5
July	141.5
August	170.1
September	219.8
October	246.4
November	232.8
December	244.3

4.1.2 Rainfall

The Proposed Fort West development falls within the Crocodile (West) Marico Water Management Area (WMA). The climatic conditions across this WMA are temperate and semi-arid in the east to dry in the west. Rainfall is strongly seasonal, with most rainfall occurring as thunderstorms during the summer period of October to April. Mean annual rainfall ranges from 400 to 800 mm and decreases from the eastern to the western side of the WMA. The mean annual temperature ranges between 18 and 20 C. Maximum and minimum temperatures are experienced during January and July respectively (River Health Programme, 2005).

Table 5: Rainfall Data

Month	Average Rainfall (mm/day)
January	117.1
February	85.4
March	71.9
April	44.9
May	16.9
June	6.7
July	3.0
August	5.4
September	17.8
October	66.8
November	102.3
December	102.8

4.1.4 Wind

Wind direction and wind speed data for the CoT is presented in **Table 6** The data period extends over 8 year, starting on 13 July 1999 and ending on 31 May 2007 (Institute for Soil, Climate and Water).



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Table 6: Wind Data

Wind Direction	Wind Calm	Wind Speed Intervals (meter/second)					Total Percentage
		1-3	4-7	8-12	13-20	>20	
Calm	52.575	0	0	0	0	0	52.57
N	0	8.65	0.16	0	0	0	8.82
NE	0	5.66	0.11	0	0	0	5.77
E	0	6.67	0.15	0	0	0	6.83
SE	0	5.8	0.23	0	0	0	6.04
S	0	2.51	0.12	0	0	0	2.63
SW	0	2.85	0.13	0	0	0	2.97
W	0	6.65	0.22	0	0	0	6.86
NW	0	7.37	0.14	0	0	0	7.51

4.1.5 Topography

The site is located approximately 1440 meters above sea level. The northern boundary is characterised by a class 2 Ridge of the Witwatersberg Ridge System. The area slopes in a southerly direction. Drainage on the site occurs from west to east.

This area comprises of the ridge and rocky outcrop habitat and is considered of high sensitivity. All developmental activities should remain outside these areas. A 20m buffer is proposed surrounding the ridge habitat unit to prevent and minimise edge effects from the development. (SAS)

According to the GDARD Ridges Policy, only 5% of the Ridge is allowed for development and can only take place adjacent to the current transformed areas on the ridge system. Therefore majority of the class 2 ridge site is not developable.

Scientific Aquatic Services (SAS) was appointed to conduct an ecological investigation of the area earmarked for the proposed Fort West development (Phase 2 and the possible expansion of Phase 2). Findings are available under **Appendix D**.

The area falls within the watershed A23D and A21H. The catchment A23D flows to the Apies River and then joins the Pienaars River and ultimately ends up in the Crocodile River.

According to Scientific Aquatic Services, The subject property 2 in its present state can be divided into three broad units, namely the ridge, grassland areas and transformed areas. The transformed areas being a drainage feature caused by damaged service infrastructure, reservoir related therefore releasing large quantities of water and causing possible wetland vegetation to occur and hence not a natural occurring wetland. The western section contains vegetation species, *Eucalyptus camaldulensish* and shows visible human disturbance of excessive traffic and therefore has caused transformation within this area.



4.1.6 Soil

A geotechnical investigation was carried out Consulting Applied Earth and Environmental Specialists on behalf of Scip. Please refer to **Appendix K**. Findings are summarised below.

The study area is underlain by sandy, silty, clayey and gravelly soils overlying residual soils developed over quartzite, shale, andesite bedrock belonging to Daspoort formation, Pretoria group, Transvaal Super group and by a Post Transvaal diabase intrusion. The site has been apportioned into four (4) prominent material Horizons soil Zones A to D.

4.1.7 Geology

All of the above mentioned forms part of the Daspoort Stage of the Pretoria Group, Transvaal Super Group. A large diabase dyke/sill, running in the east-west direction is present immediately to the north of the study area. No dolomite was to be found on or in close proximity of the site.

According to the geotechnical investigation carried out by Consulting Applied Earth and Environmental Specialists the site has been classified into three (3) geotechnical zones. Zone A, Zone B and C, and Zone D.

Zone A: Covered by a thin horizon of potentially compressible sandy and gravelly soils and tentatively classifies as NHBRC Site Class "S1/C1/R" and modified normal foundations, compaction of in situ soils below footings, deep strip footings or soil raft foundations are envisaged for the construction of single storey, masonry residential structures.

Zone B and C: Covered by a moderate to prominent horizon of potentially compressible and moderately expansive soils and tentatively classifies as NHBRC Site class 'S2/C1/H2" and stiffened strip footings, compaction of in situ soils below footings deep strip footings, piled or peered foundations soil raft foundations or spit construction techniques may be considered here.

Zone D: Covered by the a prominent horizon of potentially expansive of clay and tentatively classifies as NHBRS Site class "S1/H2-H3" and stiffened or cellular raft foundations, piled construction, split construction or soil raft foundations, or single storey, masonry residential structures, taking cognizance of areas that may be susceptible to flooding.

4.2 Social, Cultural and Economic Environment

4.2.1 Social and Cultural Environment

Social Development is one of the vehicles that will assist the country to move from a level of under development to development. It is about empowerment of the people in order to increase their potential for self reliance.

CoT is made up of 76 community wards, which are divided into five administrative regions (CoT IDP, 2009). The five regions are:

- Southern Region (Centurion, Olievenhoutbosch area)
- North West Region (Akasia, Soshanguve area)
- Eastern Region (Garsfontein, Mamelo)
- North East Region (Hammanskraal area)
- **Central Region (Inner-City, Atteridgeville area)**

CoT is characterised by a rapidly growing population. The projected annual growth of the population between 1996 and 2001 Community Survey (CS), the population CoT's Household Survey 2008 indicates a growth of 3.4%. The situation is exacerbated by immigration, resulting in an increase of informal settlements and an estimated 26.8% of all households residing in informal housing.

Demographics of a study area are important to ensure that new developments will complement the existing land uses.

The Fort West area forms part of the Atteridgeville and Lotus Gardens ISDF. The population of this area is approximately 172 000 people.

Table 7: Population according to Census 2001:

Population	Percentage
Black	88,9%
White	8.8%
Indian	1.8%
Coloured	0.5%

Most of the surrounding neighbourhoods are in the form of formal housing except for Atteridgeville informal settlement. The predominantly spoken language is Sepedi.

The age group within the area is between 0 and 19 with a higher population of males than females.

Unemployment is high with an emphasis on needs for proper medical and health facilities, Educational facilities, better housing and proper road infrastructure.

Households residing in the five settlements are mostly recent arrivals from rural areas in the Provinces of Limpopo and Mpumalanga. Three-quarters of the households consist of between three and five members.

The Heritage area consists of the former West Fort Leprosy Hospital and associated buildings. (kitchen complex, theatre, stores etc) most of which are illegally occupied and in a dilapidated state in need of repair.

4.2.2 Economic Environment Atteridgeville and Lotus Gardens

Unemployment rate as mentioned above is high averaging at 37%. Below is a table summarising the dominant economic activities within this area.

Table 8: Economic activities for Atteridgeville and Lotus Gardens

Economic Activity	Percentage %
Social and personal services	27%
Retail and wholesale services	18%
Manufacturing services	13%

Agriculture in the study area is limited to the production of crops, which occurs in home gardens, open urban spaces and group gardens.

People within the informal areas are predominantly employed as private household workers and construction worker.

4.3 Heritage Resources

The National Heritage Resources Act (Act No. 25 of 1999), defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate.

The proposed area for Fort West Phase 2 is characterised by Historical buildings that can be dated back to 1839-1911. Of these buildings include the West Fort Hospital that merged with the Daspoort Hospital to form the Pretoria Leprosy Hospital.

This was used to house all leprosy patients within this time. There is also the actual Fort which was erected during the Fortification of Pretoria during the First Anglo Boer War. Many of these buildings have been occupied by illegal squatters and many of these buildings are in ill state of repair.

Heritage conservation and management in South Africa is governed by the *National Heritage Resources Act* (Act 25 of 1999) and falls under the overall jurisdiction of the *South African Heritage Resources Agency* (SAHRA) and its provincial offices and counterparts. Section 38 of the NHRA requires a Heritage Impact Assessment (HIA), to be conducted by an independent heritage management consultant.

A Comprehensive Heritage Assessment has been conducted by Mauritz Naude refer to **Appendix I**



5 Public Participation Process (PPP)

The Public Participation Process (PPP) forms an integral component of the EIA process by affording Interested and Affected Parties (I&APs) the opportunity to identify environmental issues and concerns relating to the proposed development, which they feel should be addressed in the Environmental Impact Assessment Process. The NEMA states in Section 2(4)(f), “the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured”

ACE has conducted the Public Participation Process for the proposed Fort West Phase 2 development during the Scoping Phase of the EIA process. ACE will continue this PPP throughout this EIA process in line with the requirements of the law. Although nobody registered as a I&AP during the Scoping phase, Ace will ensure that this draft EIAR & EMP as well as the final EIAR & EMP will be circulated to all relevant state departments.

The Public Participation Process forms part of EIA becomes the basis of a long-term stakeholder engagement process. For the purposes of this Draft EIAR, the PPP aims to ensure that the full range of stakeholders is informed about proposed development throughout the EIA process.

5.1 Process Followed to Date

Communities that surround developments were invited "inform and be informed" about the development of the proposed development in order to achieve the most positive impacts possible.

The identification of stakeholders is a key deliverable at the outset, and it is noted that there are different categories of stakeholders that must be engaged, from the different levels and categories of government, to relevant structures in the NGO sector. This was achieved by:

- The development of a living and dynamic database that captures details of stakeholders from all sectors;
- The convening of focused and general meetings with stakeholders at different times throughout the EIA process and afterwards;
- The engagement of public leaders from the whom the public generally turn for information, keeping such individuals, well informed about process and progress;
- The fielding of queries from I&AP's and others, and providing appropriate information;
- The convening of specific stakeholder groupings as the need arise;
- The preparation of reports (both baseline and impact assessment) based on the information gathered throughout the EIA via Public Participation Process and feeding that into the relevant decision makers;



- The Public Participation Process include distribution of various types of pamphlets and other information packs; and
- Where appropriate site visits may be organized, as well as targeted coverage by the media.

Specifically the development Public Participation Process entailed the following:

- The fixing of site notices at various points around the perimeter of the site; Appendix L1
- Provide written notice to- The owners and occupiers of land within 100 metres of the boundary of the site who or may be directly affected by the development; Appendix L2
- The municipal councillor of the ward and any organization of ratepayers that represent the community in the area; Appendix
- Different government departments that have jurisdiction in respect of any aspects of township development.
- The placing of adverts about the development and about public meetings in relevant newspapers; Appendix L3
- Ensuring that information is accessible to the public as possible by lodging all relevant information at a range of locations such as councilor's office, libraries and other relevant locations. In addition any person that request information shall be assisted;
- Develop a database or register of all interested and affected parties, as well as other relevant stakeholders; Appendix _ L4
- A record of all comments will be made and submitted as part of the Scoping/EIA reporting process; and Appendix L5
- The ongoing management of the relationship between the public and the EIA team.
- Minutes and records of all meetings held with relevant stakeholders.L6

An advertisement, notifying the public of the Scoping/ EIA process and requesting I&AP's to register their comments with ACE Environmental Solutions, were placed in the Tshwane Sun newspaper on the 30 November 2011. (As per Final Scoping Document). **Appendix L3**

In order to inform surrounding communities and immediately adjacent landowners of proposed development, three (3) site notices were erected on site at visible locations close to the site.

A Background Information Document was circulated to the owners and occupiers of land within 100 metres of the boundary of the site were also notified about the proposed development. A meeting was held with all the ward councillors of City of Tshwane for the Fort West area (refer to **Appendix L6** for minutes of meeting and persons/departments present) in which the Department of Government and Housing as well as City of Tshwane are working on a strategy to keep the residents informed of the continuation of the phases of the development.

Issues raised to date are those of illegal dwellers that have taken up residence due to no housing as well as what are to happen to residents and their dwellings that are legally residing within the proposed area. Ace has received one official request for registered I&AP's and several unofficial telephonic requests. Please refer to **Appendix L5** for comments raised by I&AP's to date.

However the Department of Local Government and Housing in conjunction with City of Tshwane are assisting in maintaining continuous contact with the occupants of Fort Wes to keep them informed and further correspondence or comments shall be provided with Final EIA.

Key stakeholders comprised of the following sectors, were directly informed of the proposed development by either email, post and fax are:

Local Authority;

- Ward Councilor;
- Services providers;
- Non-governmental organizations; and
- Directly adjacent landowners.

5.2 Review of the Environmental Assessment Report

The draft EIAR (this report) will be available for review by the public from the 24th of August 2012 to the 23rd of October 2012. Registered I&APs will be notified of where the EIAR will be available by means of fax, email or post.

Electronic Copies of the document will also be e-mailed to all relevant state departments and relevant municipalities.

5.3 Comments and Responses Report (Please refer to Appendix L7)

Interested and affected parties registered by completing registration forms and forwarding comments via e-mail, fax and telephone to ACE. The comments and responses report that contains a summary of the concerns raised by I&AP's will be included into the Final EIA & EMP. No I&AP's registered in formal writing however we received issues in telephonic nature as forms of general enquiries. **Appendix L5**

6 Need and Desirability of the Proposed Development

The Fort West Phase 2 area falls within the Spatial Development Framework of City of Tshwane Municipality and is located within region 3 of the City of Tshwane. The SDF earmarked this area as residential development zone with supporting services.

The proposed Fort West mixed land Use Township is aimed at providing housing opportunities to at least 8000 families in an affordable manner, within the urban edge, within a well designed mixed use township. The development framework will be designed to meet the needs of the community for housing, convenience, education, social and healthcare amenities. The diverse land uses will further compliment the surrounding land uses.

Furthermore, the urban design rationale for the project is based on the "Breaking New Grounds Policies" of National Government. This policy entails a fully integrated development that includes different housing typologies and promotes social integration. The design is premised on the development of an efficient and high quality network composed of access points, circulation networks, system of blocks and subdivision of erven, the dedicated open space network and infrastructure network. It is defined and enhanced by the form and use of the surrounding land uses.

The site sensitivities will be accommodated into the final development layout/urban design. The theme of the development will be one of a vibrant urban precinct which is highly accessible (private and public transport) and is suited and attractive to various socio-economic, cultural and age groups.

An Urban Design Framework has been prepared and will be the overarching concept that will dictate how land parcels will be developed. The concept is to create an attractive modern, vibrant and safe environment in which to work, live, shop and play with the highest standards of design and construction. The various uses will have a symbiotic relationship and many precincts will have mixed land uses.

7 Potential Alternatives

The concept of Integrated Environmental Management suggests that an Environmental Impact Assessment process, to determine the possible impact of the proposed activity, should incorporate the consideration of feasible alternatives. A reasonable number of possible proposals or alternatives, to achieve the same objective should be assessed. The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental impact assessment process.

Alternatives should be considered as a norm within the Environmental Process. These should include, as applicable, the demand alternative, scheduling alternative, land use alternative including the NO-Go option, location alternatives and service alternatives.

Location alternatives:

This alternative refers to alternative properties, as well as alternative sites on the same property.

Activity Alternative: Alternative activities can include, for example, the incineration of waste rather than disposal at a landfill site, or the provision of public transport rather than increasing the capacity of the roads.

Design/Layout Alternative: Design alternatives include different architectural and/or engineering designs. Layout alternatives take into consideration different spatial configurations of an activity on a particular site

Technology to be used in the Activity/Process Alternatives: These alternatives include the option of achieving the same goal through different means (E.g. 1000 megawatt of energy can be generated through either a coal-fire power station or wind turbines).

Demand Alternatives: These alternatives occur when there is a demand for a certain product or services which can be met by some alternative means (E.g. the demand for electricity can be met by supplying more energy or using energy more efficiently by managing demand).

Input Alternatives: These alternatives are applicable to activities which may use different raw material or energy sources in their process. For example, Industry may consider using either natural gas or high sulphur coal as a fuel source.

Routing alternatives: These alternatives usually apply to linear developments such as power lines, transport and pipeline routes.



Scale alternatives: Certain activities can be broken down into smaller units and can be undertaken at different scales. For example, a housing development can have 10 units per hectare or 50 units per hectare, each of these alternatives will have different impacts.

7.1 Alternative 1: Mixed Nodal Development- Preferred

This is the preferred alternative by the developer. As mentioned before, the development proposal entails the establishment of a mixed-use nodal development, creating a place to work, stay and play.

This development will furthermore also meet the requirements of the surrounding area in terms of retail, institutional activities, work, etc. The proposed development will be a vibrant urban precinct situated around a public open space (this has been identified as one of the main attractions in all major successful developments worldwide), which will incorporate a no-vehicular zone with dedicated pedestrian linkages with the surrounding precincts. The open space will be accessible to the general public and would be a place to relax and play within this vibrant urban precinct.

Furthermore, the open space will be surrounded by the highest buildings in the precinct (i.e. offices, high-rise residential and ground floor retail shops, restaurants, etc.) and will stagger down towards the boundary of the property, therefore not negatively impacting on the surrounding residential and other developments.

This development is viewed as desirable, and as the preferred alternative, due to the following:

- Very few parcels of land are available for this kind of infill development alongside other urban development areas which are situated in accessible locations alongside major infrastructure routes
- The development falls within the spatial development framework and definitely meets the requirements of the area;
- The proposed development will compliment the surrounding urban activities, including residential, light industrial and commercial activities;
- The proposed development's residential section will be more affordable, therefore the development will be accessible to economic groups that could previously not afford to live in this area;
- The socio-economic value of the proposed development is considered high, as mixed-use development caters for a variety of social and economic factors;
- Creation of a safe and sustainable environment via appropriate management;
- Creation of employment opportunities (short to medium term during the construction period over the next eight years, and the spin-off permanent employment);
- Public open space to support a greener environment, while public amenities will be provided;



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- Enhance property value, as well as safety and security of surrounding areas;
- The intention is to create flexibility not only to facilitate world class design and construction, but to ensure a vibrant urban environment and the ability to respond to market demand; and
- The application is in line with the proposals contained in the City of Tshwane Metropolitan Municipality Regional Spatial Development Framework.

7.2 Alternative 2: Light Industrial

The introduction of a light industrial development, although suited to the general functioning and land uses of the surrounding urban environment and other light industrial areas in Lotus Gardens and Fort West, is considered unsuitable due to the following reasons:

- Inappropriateness to the adjacent low-residential developments therefore does not respond to the immediate context and surrounding land- uses;
- Lack of diversity and vibrancy associated with a mixed-use development; and
- Higher risk of pollution to the surrounding drainage lines and the non-perennial stream on the northern part of the site.

7.3 Alternative 3: Low Density Residential

The provision of a low density residential development does not cater for numerous socio-economic requirements and is therefore less favourable than the preferred alternative (Mixed-use Nodal Development), which will include medium and high density residential areas linked to employment opportunities in the retail and commercial industries. Furthermore, other sections of the area are composed of low density residential which already caters for this housing requirement.

Additionally the following drawbacks with respect to this alternative are applicable:

- A valuable opportunity to provide a greater number of residential units, given the pressure for housing provision, is lost and thus only a very small portion of the demand will have been supplied if this alternative is followed;
- This option will exclude a very large number of potential buyers from purchasing property in the area, especially with respect to the current economic environment that we find ourselves in;
- Lack of diversity and vibrancy associated with a mixed-use development; and
- Lack of response to the SDF with regard to densification and the creation of a regional Urban Node.

7.4 Alternative 4: No-Go option

An option of retaining the current situation on site, i.e. an undeveloped and vacant property which would result in the site remaining underutilised in an area under growing pressure for the development of housing and related facilities. There is also the possibility of degradation of the site or even informal land occupation and invasion by squatters, which would be detrimental to future development. This implies that the site be left as is and that no development or alteration be done. If this alternative is pursued the sites existing habitat will be retained. This option has the following drawbacks:

- A high demand for housing and employment provision exists in this area, especially with respect to the proposed developments characteristics as infill development. Should the site not be developed a very viable opportunity to exploit the high density and commercial market in the immediate area will be negated;
- If not developed, the owner will derive no income from the property and will subsequently not be able to maintain it. This will lead to the site falling into disrepair and the protection and appropriate management of potential conservation areas will be negated;
- Illegal squatters or vagrants may potentially settle on the site, as severe pressure for housing in the lower income brackets also exist. Due to the presence of extensive development throughout the greater area, it is possible that undeveloped, un-managed land may be illegally settled; and
- Agriculture is not an economically viable option according to the agriculture potential study

Due to the pressure and demand for the provision of housing and commercial development in the area and the very limited space available for this purpose; Alternative 1 is the preferred option.

8 Environmental Impact Assessment

This chapter outlines the generic methodology that will be followed when evaluating impacts. This generic methodology will be used when assessing the significance of the impacts related to the key issues and impacts raised in **Section 9: Environmental Issues and Impacts**.

8.1 Methodology Used In Determining the Significance of Potential Environmental Impacts

8.1.1 Significance of Impact

This should be described as follows:

- High:** Where it could have a no-go implication for the project irrespective of any possible mitigation.
- Medium:** Where the impact could have a moderate influence on the environment, which would require modification of the project design or alternative mitigation.
- Low:** Where the impact would have little influence on the environment and would not require the project design to be significantly accommodated.
- None:** Where the impact would have no influence on the environment and would not require the project design to be accommodated at all.

The significance of the impact should be determined through the following criteria:

(a) Nature of Impact

This includes a brief description of how the proposed activity will impact on the environment. This should be stated as:

Positive (a benefit), Negative (a cost) or Neutral.

(b) Extent

This refers to the geographic area on which the activity will have an influence and can include the following extents:

Project site – the immediate location of the activity;



Study area – the proposed area and its immediate environs within a 5 km radius of the activity;

Catchment – area of land from which rainfall drains into a river; Local – Local Municipality

District; Regional – Province; National – Country; or International

(c) Duration

This refers to the expected timeframe of an impact and can be expressed as:

Short term (0 – 5 years);

Medium (5 – 15 years);

Long term (15 – 40 years, but where the impact ceases after operation); or

Permanent (over 40 years and resulting in a permanent and lasting change that will always be there).

(d) Likelihood

This considers the likelihood of the impact occurring and should be described as:

Unlikely (where the impact is unlikely to occur);

Likely (where there is a good probability, < 50 % chance that the impact will occur);

Highly likely (where it is most likely, 50-90 % chance, that the impact will occur); or

Definite (where the impact will occur, > 90 % chance of occurring, regardless of any prevention measures).

(e) Severity Scale

The severity is used to evaluate how severe negative impacts would be on the environment, and is described as follows:

Very high (an irreversible and permanent change that cannot be mitigated);

High (long term impacts that could be mitigated, however this mitigation would be difficult, expensive or time consuming);

Medium (medium term impacts that could be mitigated);

Low (short term impacts with mitigation being very easy, cheap, less time consuming or not necessary); or

No effect (no impact by the proposed development).

(f) Beneficial Scale

The beneficial scale is used to evaluate how beneficial positive impacts would be on the environment, and is described as follows:



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Very High	a permanent and very substantial benefit with no real alternative to achieving this benefit;
High	a long term impact with substantial benefit, and alternative ways of achieving this benefit being difficult, expensive or time consuming;
Medium	a medium term impact of benefit with other ways of achieving this benefit being difficult, expensive and time consuming;
Low	a short term impact and negligible benefit with other ways of optimising the benefits being easier, cheaper and quicker; or
No effect	no impact by the proposed development.

8.1.2 Degree of confidence

It is also necessary to indicate the degree of confidence with which one has predicted the significance of an impact, based on the availability of information and specialist knowledge. For this reason, a 'degree of confidence' scale has been provided to enable the reader to determine the certainty of the assessment of significance:

High	More than 90% sure of a particular fact.
Medium	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
Low	Over 40% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

8.1.3 Other Aspects

Other aspects that should be taken into consideration are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented;
- All impacts should be evaluated for the full life cycle of the proposed development including construction and operational phases;
- The impact evaluation should take into account the cumulative effects of other activities which have occurred or are in the process of occurring within the study area; and
- Legal requirements (a list of the specific legal and permit requirements that could be relevant to the proposed project should be identified).

8.1.4 Mitigation and Monitoring

Where negative impacts are identified, mitigation measures (ways of reducing impacts) should be set and where positive impacts are identified, ways of enhancing these impacts should also be mentioned.



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Where no mitigation is feasible, this should be stated and the reasons given. Quantifiable standards against which the effectiveness of the mitigation can be measured should be set. This may include input into monitoring and management programmes



9 Environmental Issues and Impact Assessment

This chapter provides an assessment of the impacts (including cumulative impacts) associated with each issue and further includes mitigation measures to be implemented to reduce the significance of negative impacts.

Potential environmental issues identified as relating to the construction and operation of the proposed development is considered to be:

Biophysical

- Ground and Surface Water Quality
- Soil Loss and Erosion
- Flora and Fauna
- Wetland

Pollution Management

- Air Quality
- Soil Contamination
- Hazardous and Non Hazardous Solid Wastes
- Liquid Waste (Please refer to Municipal Capacity)
- Noise and Vibration

Social Surroundings

- Municipal Capacity
- Road Transport
- Storm Water.
- Employment
- Land Use
- Health and Safety
- Heritage

Cumulative Impacts

- Biophysical Impacts
- Social Impacts

9.1 Ground and Surface Water Quality

9.1.1 Issue

In the short term, surface and ground water may be impacted by construction activities, such as the contamination from fuels, cement, oils and other liquid waste. A potential impact on water quality may also arise from the risk of soil erosion and poor management during the construction phase. There is an existing stream, the Skinner spruit flows through the proposed development. The phase 2 area slopes towards the spruit from west to east. Any surface water contamination may enter this watercourse and impact on the aquatic ecology of the system. All watercourses therefore need to be clearly indicated as “No-development Zones”. During the operation phase, all wastewater must enter the municipal sewer system. Good environmental management practices must be followed to prevent potential contamination of water resources

Characteristics changes will take place in the proposed area, before and after development, and will immensely affect the generated storm water run-off for the area. Before development, the rainwater will be allowed to seep through the permeable soils of the area. After development there will not be much permeable areas left, and storm water pipes will discharge the generated storm water into the Skinner spruit.

9.1.2 Objective

Maintain the quantity of ground and surface water so that existing and potential users are protected.

9.1.3 Existing Environment

The proposed development will meet its water requirements from municipal supplies.

9.1.4 Potential Impact

- a) **Industrial Waste:** Plants and other business ventures release chemical waste and by products that reach water sources. This could include contaminated or heated water associated with a wide range of industrial processes.
- b) **Sewage:** releasing inadequately treated or untreated sewage causes detrimental effects to ground and surface water.
- c) **Surface runoff:** contaminants containing excess nutrients seep into the ground and find their way into water sources.
- d) **Farming practices:** The burning and cutting of wood close to a farm can cause water pollution. This procedure is usually followed to generate land for files or agriculture or livestock. This process affects the type of surface runoff that contaminates a larger body of water.



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- e) **Construction activities:** Contaminated surface runoff may arise due to construction sites that produce a high amount of silt. In some cases of polluted drinking water, silt is responsible for the turbidity which causes water to become murky and hazy in appearance. The higher the risk of turbidity the higher the risk of contracting gastrointestinal disease.

Table 9: Impacts Surrounding Ground and Surface Water Quality

ISSUE:	GROUND AND SURFACE WATER QUALITY	
Project Phase	Construction and Operation	
Impact	Pollution of Surface and Ground Water systems	Health impacts
Nature	Negative (direct)	Negative (indirect)
Extent	Local	Local
Duration	Short Term	Medium Term
Probability	Likely	Unlikely
Degree to which impact cannot be reversed	Low	Medium
Degree to which Impact may cause irreplaceable loss of resources	Low	Low
Confidence level	High	Medium
Significance Pre Mitigation	Low (-ve)	Low (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Moderately Mitigated

9.1.5 Recommended Mitigation

The following measures should be adhered to in order to limit the impact of the construction phase on the quality of water in the area:

Construction

- No construction camps within 50 m of drainage line and standing water source;
- No water abstraction for construction from streams;
- No mixing of concrete to occur within 50 m of water course;
- Appropriate containment structures to be provided;



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- No construction activities to occur in any wetlands;
- No concrete batching to occur directly on the ground;
- All fuel storage to be appropriately bundled;
- Plant to have drip trays to contain any potential leakages of fuels and oils; and
- Enough ablutions to be provided for construction workers on site.

Operation

- All sewerage to be transported within the municipal sewer systems; and Pump stations to have backup facilities and 24 hour emergency storage
- Pump stations to have backup facilities and 24 hour emergency storage.
- Waste management in line with the Local Municipal Waste Policy
- All hazardous waste to be segregated and disposed as per the guidelines of the competent authority.
- Promote the National Water Act regulations
- In public open spaces, practice better landscaping habits such as planting a species of grass with a higher resistance to drought. Plant pest resistant plants to eliminate the need for pesticides. Opt for native plants instead as they would require less water, fertilizer and pesticides.

9.2 Issue: Soil Loss and Erosion

9.2.1 Issue

During construction, the clearing and removal of vegetation, the digging of structure foundations, and earthworks may expose soils to wind and rain and could result in localised erosion. Furthermore, soils will be stockpiled during construction and could become vulnerable to erosion. The channeling of storm water may lead to the formation of gullies. Erosive effects can occur due to stormwater runoff. Construction activities have been identified in as a source of sediment and other suspended solids in runoffs. Large water quality problems arise due to the excessive sedimentation. Therefore excessive erosion has been associated with residential developments and therefore increased sediment production.

9.2.2 Objective

Good management of soil loss and erosion to help in the following essential ways:

- reduce drainage costs
- retain nutrients and chemicals where applied
- reduce hazards when working on eroding soil, and
- help improve water quality.



Soil erosion can be seen as both a symptom of underdevelopment (i.e. poverty, inequality and exploitation), and as a cause of underdevelopment. A reduced ability to produce, invest one's profit and increase productivity, contributes to increasing poverty, and can lead to desertification, drought, floods, and famine.

9.2.3 Existing Environment

The study area is underlain by sandy, silty, clayey and gravelly soils overlying residual soils developed over quartzite, shale, andesite bedrock belonging to Daspoort formation, Pretoria group, Transvaal Super group and by a Post Transvaal diabase intrusion.

Owing to current surrounding land uses, the site has been subjected to various anthropogenic influences over an extended period of time and has therefore affected the initial soil profile state.

9.2.4 Potential Impact

Large amounts of soil and particles called sediment can move off construction sites along with other form of pollutants attached. This is one of the greatest forms of pollutants entering our surface water.

Runoff containing pollutants can enter the nearby water sources as well as ground and surface water. Loss of existing natural vegetation occurs due to removal of vegetation through construction or development, i.e. the clearing of fields.

The movement of equipment and vehicles causes mud and debris to be tracked from site and causes increased soil compaction which reduces infiltration and increases runoff volume.

Table 10: Impacts Surrounding Soil Loss and Erosion

ISSUE:	SOIL LOSS AND EROSION	
Project Phase	Construction and Operation	
Impact	Erosion	Siltation of Drainage Channels
Nature	Negative (direct)	Negative (direct and indirect)
Extent	Site	Study area
Duration	Short Term	Medium Term
Probability	Likely	Likely
Degree to which impact cannot be reversed	Low	Medium
Degree to which Impact may cause irreplaceable loss of resources	Low	High
Confidence level	High	Medium
Significance Pre Mitigation	Medium (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.2.5 Recommended Mitigation

Construction – Refer to attached EMP

- Maintain good soil structure.
- Protect the soil surface by adequate crop and residue cover.
- Use special structural erosion control practices where necessary.
- Removal of vegetation to take place only within demarcated construction site.
- Non-essential removal of vegetation to be avoided;
- No work is to be conducted within 32 meters of all drainage lines;
- Formal runoff prevention to be implemented on steep slopes. These could be in the form of beams, netting, barriers constructed out of topsoil or flatter road surfaces.

Operation – Refer to Storm Water Management Plan Attached

- Surfaced roads to be considered on steep slopes (gradient > 5%);
- Velocity of runoff on roads and drains to be kept to a minimum, flatter road surfaces and energy dissipaters could achieve this.
- All areas where vegetation cover has been removed are to be rehabilitated to its original state with the help of the Landscape Architect.

9.3 Issue: Fauna & Flora

9.3.1 Issue

It can be said through Scientific Aquatic Services findings that the construction footprint and activities will have an effect on the ridge areas and possibly the more natural grassland areas, should mitigation measures not be implemented. Thus it is recommended that no development activity takes place within the high sensitivity areas (ridges). Based on the observations of the study by, the construction footprint should, as far as possible, be limited and mitigation measures should be implemented to minimise the construction impacts on the subject properties. (SAS)

Refer to **Appendix D** for detailed Ecological Study by Scientific Aquatic Services.

9.3.2 Objective

Flora and fauna forms a major part of biodiversity. Each species is a potential natural resource. The objective is to promote sustainable development without habitat destruction, invasive foreign plants and animals, over collection, and other environmental damage that are eroding our natural plant and animal communities.

9.3.3 Existing Environment

The area of proposed development site is characterised by the *Savanna biome* and *Central Bushveld Bioregion*.

The vegetation types of relevance here is the

- *Andesite Mountain Bushveld,*
- *Marikana Thornveld* and
- *Gold Reef Mountain Bushveld.*



The conservation status of each vegetation type as presented by Mucina & Rutherford, (2006) is “least threatened” for

- *Andesite Mountain Bushveld* and *Gold Reef Mountain Bushveld*- Least threatened
- *Marikana Thornveld* – Endangered.

The northern boundary of both of the subject properties runs along a well-defined ridge, forming part of the Witwatersberg and the Daspoortrand. Some ridge areas have been transformed within the subject property 1 through exiting residential developments and communities of *Eucalyptus camaldulensis*. Ridges and outcrops are known to provide unique habitat for various faunal and floral species. Therefore, ridges and outcrops are considered of high ecological importance and needs to be conserved to ensure ongoing survival of species that reside among them

The ridge on the northern section of the subject properties represent a high present ecological state (PES) and have the highest potential of supporting an increased diversity of floral species. These ridges have seen little transformation and are considered to be ecological intact.

According to Gauteng Conservation C Plan (Version 3) it is indicated that the site falls within ecologically important areas, namely the “ridges” with primary vegetation present.

Subject property can be divided into 3 units namely ridges, grassland and transformed areas.

The subject properties do not fall within one of the priority areas identified by the Grasslands program. This is mainly due significant impact from current and historical subsistence agricultural activities and residential infrastructure development surrounding the southern section of the site

According to Scientific services there are 12 possible impacts on the ecology of the proposed area of development and can be concluded that construction footprint and activities will have an effect on the ridges of the area and it's over all ecology as well as the natural grasslands within. The only floral species of concern that was identified during the assessment was *Hypoxis hemerocallidea* and *Eucomis autumnalis* located within the central sections of the grassland unit. No RDL bird species were noted during the site assessment.

It is therefore recommended that construction activities remain at a safe distance from sensitive areas and that no construction activities to take place within these areas. Any species of concern that is encountered to be undisturbed. The subject properties is bordered on the southern boundary by residential development and informal settlements, with all the environmental degradation associated with informal housing encountered such as dumping sites and alien encroachment and therefore little natural vegetation or habitat remains.



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9.3.4 Potential Impact

Construction activities are an important user of land resources, many of which are produced or derived through processes which impact on biodiversity. Therefore it is vitally important in protecting sensitive sites and minimising damage to ecology.

Construction

- a) **On site disturbance:** Impacts on protected species at designated sites are significant. Protection of sites from damaging development, water resources, and protected species are highlighted.
- b) **Off-site impacts on habitats:** Of increasing significance are offsite effects of development on adjacent areas. These indirect effects may include pollution of air and water, hydrological impacts, disturbance, fires, unregulated access, isolation or fragmentation, ancillary development and operations (such as access roads) and the displacement of individuals and populations of species leading to increased pressure on other sites. Such effects may be as harmful to a site as direct loss.
- c) **Disturbance and Fragmentation:** Construction needs land and the use of land can have direct impacts in terms of destruction of habitats and more subtle effects on biodiversity such as disturbance and fragmentation. Example of these would be noise and light. Although this might not have a direct impact on Fauna and Flora it could lead to changes in behaviour such as eating and breeding patterns which could have a negative effect on ecological populations.
- d) **Sourcing of materials:** Gravel, sand, iron ore, rocks etc are all major materials needed for the construction industry and the production of these materials can impact heavily on biodiversity.



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Table 11: Impacts on Biodiversity

ISSUE:	BIODIVERSITY	
Project Phase	Construction and Operation	
Impact	Impacts to Vegetation Types of Conservation Importance	Vegetation Impacts
Nature	Negative (Direct & Indirect)	Negative (Direct)
Extent	Site	Site
Duration	Long Term	Long Term
Probability	Likely	Definite
Degree of Irreversibility	Medium	Medium
Degree to which Impact may cause irreplaceable loss of resources	Not Replaceable	Moderately Replaceable
Confidence level	High	High
Significance Pre Mitigation	Low (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Moderately Mitigated	Easily Mitigated

Table 11: Impacts on Biodiversity (continued)

ISSUE:	BIODIVERSITY	
Project Phase	Construction and Operation	
Impact	Disturbance to Resident Fauna	Habitat Fragmentation
Nature	Negative (direct)	Negative (direct)
Extent	Site	Site
Duration	Medium Term	Medium Term
Probability	Likely	Likely
Degree of Irreversibility	Not reversible	Not Reversible
Degree to which Impact may cause irreplaceable loss of resources	Not Replaceable	Not Replaceable
Confidence level	Medium	High
Significance Pre Mitigation	Low (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Moderately Mitigated	Not Easily Mitigated

9.3.5 Recommended Mitigation - Refer to attached EMP

The defined areas of high sensitivity (ridge areas) should remain undeveloped as public or private open space

- A sensitivity map to be considered during the planning and construction phases of the proposed development activities to aid in the conservation of ecology within the proposed development area. Refer to **Appendix D** for Sensitivity Map within the Ecological Assessment by SAS.
- All footprint areas should remain as small as possible and should not encroach onto the ridge areas.
- Alien species should be eradicated and controlled to prevent their spread beyond the site boundary.
- Construction vehicles should be restricted to travelling only on the existing road servitudes to limit the ecological footprint of the proposed development activities



Enhance the overall ecological quality, extent, capacity, structure and functioning of the site and the surrounding ecological network by creating new habitats, buffer areas and landscape features that are of importance. Such effort should particularly be concentrated:

- in areas where the most important, fragile and/or threatened habitats and species are known to occur; where there are species requiring large ranges and/or those with limited powers of dispersal, which have particularly suffered as a result of habitat patches becoming reduced in size and isolated within intensively managed modern and often inhospitable landscapes
- on species with low reproductive capacity or species highly sensitive to disturbance and species subject to recovery programmes

Restore and, where possible, link and connect existing habitats and landscape features which could potentially be of major importance

Retain and Incorporate within the development site layout existing habitats, important species, buffer areas and landscape features of major importance.

Compensate for features lost to development through the

- re-creation as nearby as possible of features and landforms capable of maintaining the same ecological functions and with the same capacity to support at least the same ecological functions and with the same capacity to support at least the same quantity and quality of habitats and species as would otherwise be lost or displaced through development;
- restoration and enhancement of surrounding/nearby features unaffected by development;
- creation of new or additional buffer areas to reduce impacts;
- translocation, where possible, of habitats and species that would otherwise be lost.
- manage existing, restored, newly created or translocated habitats and landscape features of major importance;
- monitor existing, restored, enhanced, and newly created or translocated habitats and landscape features of major importance and ensure that they are unaffected by the new development and continue to support wild fauna and flora.

9.4 Issue: Air Quality

9.4.1 Issue

The clearing of vegetation in preparation for construction exposes the soil to dust which increases the Particulate Matter (PM) concentration in the atmosphere. PM is documented as contributing to respiratory tract infections, especially in rural areas much like the proposed site. The disturbed soil contributes to windblown dust. Furthermore, heavy construction vehicles will be required during construction of the development.

This could impact on air quality by pollution through exhaust emissions, as well as dust created by vehicles and the construction plant. Bulk material operations on construction sites, such as rock crushing activities, can also contribute to windblown dust. During the operation phase of the proposed Fort West Phase 2 Development air quality will also be impacted by the increase in vehicle movement and pollution through exhaust emissions.

9.4.2 Objective

The objectives of the air quality monitoring programme are to assist effective air quality management and open communication to all stakeholders.

The air quality standard used during air quality monitoring comprises limit values based on health risk or environmental risk (or both) and associated averaging period's indicative of exposure durations, in addition to the following criteria:

- Monitoring and data management protocols for air quality assessment and reporting,
- Permissible frequencies of exceeded limit values within defined time frames, and
- Time frames for achieving compliance in non-attainment areas.

9.4.3 Existing Environment

The proposed development falls within an already built up environment.

9.4.4 Potential Impact

Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, demolition, burning, and working with toxic materials.

All construction activities generate high levels of dust (typically from concrete, cement, wood, stone, silica) and this can carry for large distances over a long period of time. Construction dust is classified as PM10 - particulate matter less than 10 microns in diameter, invisible to the naked eye.

Research has shown that PM10 penetrate deeply into the lungs and cause a wide range of health problems including respiratory illness, asthma, bronchitis and even cancer.

Another major source of PM10 on construction activities comes from the diesel engine exhausts of vehicles and heavy equipment. This is known as diesel particulate matter (DPM) and consists of soot, sulphates and silicates, all of which readily combine with other toxins in the atmosphere, increasing the health risks of particle inhalation.

Diesel is also responsible for emissions of carbon monoxide, hydrocarbons, nitrogen oxides and carbon dioxide. Noxious vapours from oils, glues, thinners, paints, treated woods, plastics, cleaners and other hazardous chemicals that are widely used on construction sites, also contribute to air pollution.

Table 12: Impacts Surrounding the Quality of Air

ISSUE:	AIR QUALITY	
Project Phase	Construction and Operation	
Impact	Atmospheric pollution	Public Health
Nature	Negative (direct)	Negative (direct)
Extent	Regional	Local
Duration	Long Term	Short Term
Probability	Likely	Likely
Degree to which impact cannot be reversed	High	High
Degree to which impact may cause irreplaceable loss of resources	Low	Low
Confidence level	Low	Medium
Significance Pre Mitigation	Low (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.4.5 Recommended Mitigation

- To prevent erosion and run-off, minimise land disturbance and leave maximum vegetation cover.
- Control dust through fine water sprays used to dampen down the site.
- Screen the whole site to stop dust spreading, or alternatively, place fine mesh screening close to the dust source (e.g. bathing plant).
- Cover skips and trucks loaded with construction materials and continually damp down with low levels of water.
- Cover piles of building materials like cement, sand and other powders, regularly inspect for spillages, and locate them where they will not be washed into waterways or drainage areas.
- Use non-toxic paints, solvents and other hazardous materials wherever possible
-



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- Segregate, tightly cover and monitor toxic substances to prevent spills and possible site contamination.
- Cover up and protect all drains on site.
- Collect any wastewater generated from site activities in settlement tanks, screen, discharge the clean water, and dispose of remaining sludge according to environmental regulations.
- Use low sulphur diesel oil in all vehicle and equipment engines, and incorporate the latest specifications of particulate filters and catalytic converters.
- No burning of materials on site.

9.5 Issue: Soil Contamination

9.5.1 Issue

Soil pollutants include a large variety of contaminants or chemicals (organic and inorganic), which could be both naturally-occurring in soil and man-made. In both cases, the main **soil pollution causes** are the human activities (i.e., the accumulation of those chemicals in soil at levels of health risk is due to human activities such as accidental leaks and spills, dumping, manufacturing processes, etc.).

Construction sites are important causes of soil pollution in urban area due to their almost ever present nature. In general, any chemical handled at construction sites may pollute the soil. Additionally, construction dust may easily spread around by air and is dangerous due to its lower particle size (less than 10 microns). Such construction dust may trigger respiratory illnesses, asthma, bronchitis and even cancer. This may act as a poison in soil and may be re-distributed by wind.

9.5.2 Objective

Ensure that soil contamination is limited, and rehabilitation of contaminated areas is to an acceptable standard consistent with the intended land use.

9.5.3 Existing Environment

The study area is underlain by sandy, silty, clayey and gravelly soils overlying residual soils developed over quartzite, shale, andesite bedrock belonging to Daspoort formation, Pretoria group, Transvaal Super group and by a Post Transvaal diabase intrusion.

Visible edge effects of rural residential development were noted on the proposed study area of development for habitat unit 3. Therefore the soil has already undergone changes from its perceived natural state due to anthropogenic disturbances. These disturbances are dumping, gravel footpaths, gravel roads, and rural housing within isolated areas which led to significant vegetation transformation as well as alien invasive species.



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For habitat unit 2, a large portion of the property has been transformed due to residential developments, alien infestation and due to previous agricultural activities.

For habitat unit 1, the subject properties runs along a well-defined ridge, forming part of the Witwatersberg and the Daspoortrand. Some ridge areas have been transformed within the subject

property 1 through exiting residential developments. The ridges on the northern section of the property have seen little transformation and are considered to be ecologically intact.

9.5.4 Potential Impact

Accidental spills and leaks

during storage, transport or use of chemicals (e.g., leaks and spills of gasoline and diesel at gas refill points);

Transportation activities

(e.g., vehicle emissions)

Dumping of chemicals

(accidental or intended – such as illegal dumping);

Storage of wastes

(which may leak to groundwater or generate polluted vapours)

Cracked paint

chips falling from building walls, especially **lead-based paint**;

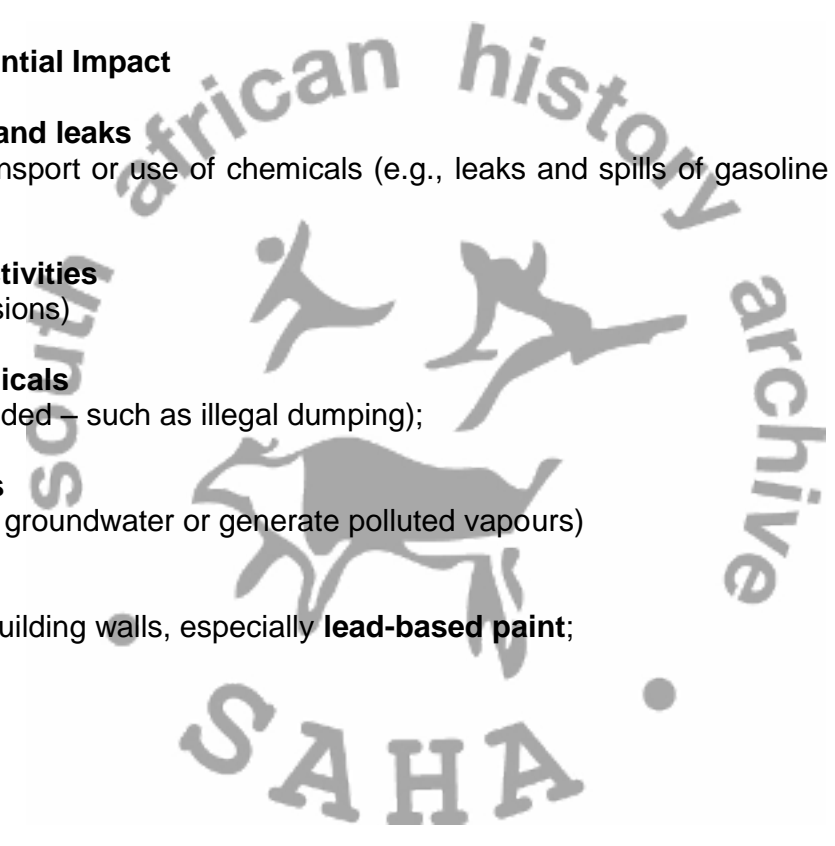


Table 13: Impacts Surrounding Soil Contamination

ISSUE:	SOIL CONTAMINATION	
Project Phase	Construction and Operation	
Impact	Contamination	Spills
Nature	Negative (direct)	Negative (direct and indirect)
Extent	Site	Study area
Duration	Short Term	Medium Term
Probability	Likely	Likely
Degree to which impact cannot be reversed	Low	Medium
Degree to which Impact may cause irreplaceable loss of resources	Low	High
Confidence level	High	Medium
Significance Pre Mitigation	Medium (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.5.5 Recommended Mitigation

Construction

The following mitigation measures and good housekeeping are proposed to limit impacts:

- Prepare and implement a site-specific EMP.
- Educate employees in chemical management and ensure correct procedures are followed.
- Ensure emergency response plans, spill clean up plans and equipment, MSDS availability and emergency training are up to date and consistent with the EMP.
- Collect and recycle lubricants.
- Avoid accidental spills through good practice.
- Removal of vegetation to take place only within demarcated construction site.
- Non-essential removal of vegetation to be avoided;
- No work is to be conducted within 32 meters of all drainage lines;



- No construction to take place within sensitive areas associated with the ridge or any other sensitive areas, where practical;
- Formal runoff prevention to be implemented on steep slopes. These could be in the form of beams, netting, barriers constructed out of topsoil or flatter road surfaces.
- Prepare and implement a Waste Management Plan
- Good housekeeping and preventative maintenance will aid prompt actions.
- Areas, along with a 20m buffer to prevent edge effects, remain undeveloped as public or private open space when development commences.

9.6 Hazardous and Non Hazardous Solid Wastes

9.6.1 Issue

The construction phase of the development is likely to generate waste from clearing of vegetation, builder's rubble, general construction refuse and minor hazardous waste including paint tins, cleaning acids, asphalt's and oils. The development could therefore impact on the environment by generating solid waste pollution. The contractor and developer should ensure that Waste Management Plan (See **Appendix C**).are implemented during the entire construction phase of the proposed project. During the operations phase, Municipal waste management will service the proposed residential area.

9.6.2 Objective

- To comply with the National Environmental Management Waste Act (NEMWA)
- To ensure the correct identification and classification of waste;
- Keep Hazardous Waste from entering the environment illegally;
- Implement "cradle-to-grave" principles by means of planned waste management strategies;
- Control a Hazardous Waste until it is safely disposed of, by setting Minimum Requirements at crucial points in its management.

Activities producing hazardous and nonhazardous waste should comply with the existing regulations. Solid waste includes all debris and waste (e.g. litter, food waste, cable pieces, vegetation and tree stumps, building rubble, etc), including hazardous waste (e.g. oils).

9.6.3 Existing Environment

Within the proposed development area, waste management practices are not being implemented due to illegal occupants who have taken up residence in the existing buildings. These occupants come from poverty stricken and less fortunate backgrounds which puts waste management practices last on their priority list.



In this case, with no support at this stage or the presence of strict rules and regulations, people dispose of their waste as quickly and conveniently as well as cost effectively as possible. It was noted that several areas were littered with waste as well as dumped in large piles along the streets.

The proposed Fort West development shall, by means of upgrading the existing environment and through strong government support by implementing a waste management strategy, improve waste management practices within this area.

9.6.4 Potential Impact

Health

Chemical poisoning through chemical inhalation
Low birth weight
Cancer
Congenital malformations
Neurological disease

Environment

Degrades water and soil quality
Resulted in high algal population in rivers and sea.
Waste breaks down in landfills to form methane, a potent greenhouse gas
Change in climate and destruction of ozone layer due to waste biodegradable
Littering, due to waste pollutions, illegal dumping, Leaching: is a process by which solid waste enter soil and ground water and contaminating them.

Based on the size and scope of the proposed activity, characteristics of the subject area and mitigation identified, impacts arising from the management of hazardous and non hazardous materials are considered to be low, and it is predicted with a high degree of confidence that they can be managed to minimise environmental harm. Further it is believed that any impacts will be local and of short duration.

Table 14: Impacts Surrounding Solid Waste

ISSUE:	SOLID WASTE POLLUTION	
Project Phase	Construction	Operation
Impact	Construction Waste	General Waste
Nature	Negative (direct)	Negative (direct and indirect)
Extent	Regional	Regional
Duration	Short term	Long term
Probability	Highly Probable	Highly Probable
Degree of Irreversibility	Medium	Medium
Degree to which Impact may cause irreplaceable loss of resources	Low	Low
Confidence level	Medium	Medium
Significance Pre Mitigation	Medium (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.6.5 Recommended Mitigation

- Prepare and implement a site-specific EMP.
- Prepare and implement a site-specific Waste Management Plan.

Waste Management Plan (See appendix C)

No construction waste should enter the surrounding environment; and no cleared vegetation to be burnt on-site.

City of Tshwane Metropolitan Municipality to develop a formal waste collection strategy Roads design to cater for refuse collection trucks; and No waste should enter the surrounding environment.



9.7 Issue: Visual and Noise

9.7.1 Issue

The proposed development will impact on the environment both visually and through limited noise pollution. The project site is currently adjacent to a residential and industrial area and therefore the construction of the development will disturb the landscape to a limited extent.

Noise levels are expected to rise during the construction phase of the development. Construction activities that cause noise include vehicle trafficking, generator noise, pressure hammers and construction worker's voices, etc. These noise levels are not assessed to be a nuisance to adjacent residents and communities.

The construction of the proposed development in its totality represents a transition from the current setting to a new multi faceted development. It is therefore inevitable that adverse visual impacts will occur in regards to the construction and operating phase of the development.

Although there are no significant mitigation measures to combat the visual impacts arising from construction activities, it is vitally important to attend to the contractor's camp where building material is stocked and on site housing quarters will be temporary features. These should be managed in such a way to cause minimal visual impacts on the environment.

9.7.2 Objective

To avoid and/or minimise adverse noise/vibration and visual impacts associated with the operation of any plan, machinery or other equipment on site at all times through implementation of construction methodology and appropriate management measures.

9.7.3 Existing Environment

The proposed development falls within an already built up environment.



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9.7.4 Potential Impact

Noise:

There are significant noise sources within subject area due to existing settlements located in the surrounding areas to the proposed development. Construction noise impacts will be short term over the duration of the project life span. Transport noise impacts will be distributed along the length of the transport route, comprising approximately of heavy vehicle movements daily. While construction will occur during daytime only, operational noise impacts will occur continuously.

The most important factors affecting noise propagation are:

- type of source (point or line);
- distance from source;
- atmospheric absorption;
- wind;
- temperature and temperature gradient;
- obstacles such as barriers and buildings;
- ground absorption;
- reflections; and
- rainfall and humidity.

Visual:

The activities that are expected to cause visual impacts during construction would be:

- Excessive clearing and stripping of topsoil for site preparation and temporary access roads;
- Temporary work camps, large equipment and structures, may not be visually appealing;
- The extent and intensity of the security and construction lighting at night;
- Construction activities; and
- Dust from construction activities and access roads.

With regards to construction care must be taken to maintain temporary structures within the contractors camp at an aesthetic acceptable level..



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Table 15: Noise and Visual Impacts

ISSUE:	NOISE AND VISUAL	
Project Phase	Construction	Construction and Operation
Impact	Noise	Visual Impacts
Nature	Negative (direct)	Negative (direct)
Extent	Local	Site
Duration	Short term	Long term
Probability	Highly Probable	Highly Probable
Degree of Irreversibility	Medium	Medium
Degree to which Impact may cause irreplaceable loss of resources	Medium	Medium
Confidence level	Medium	Medium
Significance Pre Mitigation	Low (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Moderately Mitigated

9.7.5 Recommended Mitigation

Noise

All construction activities, including materials delivery, must be restricted to the approved hours of:

- 7:00am to 6:00pm Monday to Friday;
- 8:00am to 1:00pm Saturday;
- At no time on Sunday or public holidays;

Silencers to be used as appropriate on plant, construction vehicles and equipment; and
Location of construction workers camp.

All site personnel must adhere to the site OH&S requirements in relation to use of appropriate personal protective equipment (PPE) when operating, or in the vicinity of noise generating plant/equipment.



Noise and vibration awareness training for all site staff including subcontractors as part of general site induction and tool-box talk activities.

Strict adherence to approved works times. In the event that out of hours delivery activities are required, the approval process will be completed via consultation with the Project Managers office, and the approval of the ECO.

Vehicles will not be left turned on or idling at the site for longer than minimum amount of time required to complete site activities.

Visual

Site Preparation:

Rehabilitate disturbed areas as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil.

Temporary Access Roads:

All areas affected by the activity would need to be rehabilitated and re-vegetated. This includes areas such as temporary access roads, etc. During the construction phase, construction roads would require an effective dust suppression management programme, such as regular wetting and/or the use of non-polluting chemicals that would retain moisture in the road surface

Temporary Buildings and Structures:

Temporary buildings and structures used during the construction phase that are required to be built from steel or concrete can be painted a dark natural tone to fit in with surrounding environment. General housekeeping must be maintained within the contractors camp so that it is clean and tidy at all times.

Landscaping

Throughout the period of the development, there must be a clear and committed maintenance and monitoring programme to undertake these works. The production of a clear phasing plan will ensure that the protection of existing landscape features and the planting of structural landscaping can be implemented according to a clear strategy and in doing so minimise any negative visual impacts.

Signage

All necessary signage on the site should be limited in size and scale and comply with legislative requirements



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9.8 Issue: Municipal Capacity

9.8.1 Issue: Bulk Water

In an attempt to meet housing shortages within the city of Tshwane Metropolitan Municipality significant stress has been applied to municipal services such as bulk water supply, bulk sewerage and electrification.

According to the engineering report (**See Appendix G**) The Proposed development falls across two reservoir zones namely the Lotus Gardens and Pretoria HL reservoir zones and within the Lotus Garden reservoir zone, part of the development falls in the PRV subzone as well.

The average annual daily demand (AADD) is used to determine the bulk pipelines required for the new development. Scip Engineers calculate this using the CoT Guidelines for the Design and Construction of Water and Sanitation Systems as well as the guidelines for Human Settlement and Planning and Design.

According to Scip the AADD that falls within Lotus Gardens reservoir zone is approximately 1000 kl/d. The Lotus Gardens has enough capacity to accommodate Phase 2 of the proposed Fort West Development however, phase 1 will increase the water demand beyond its capacity and therefore a second Lotus Garden reservoir will be required.

A 250mm diameter main waterline is required to supply the northwestern part of the proposed development, from the Lotus Garden reservoir. The southern eastern section of the proposed development will be fed from Pretoria HL reservoir by a 315mm pipeline.

9.8.2 Issue: Bulk Sewerage

The existing sewer line of 215mm is not sufficient in servicing Phase 2 of Fort West. The upgrading of the bulk sewer line will have to be done. This will have to be done for both phases, 1 and 2, of the proposed Fort West development and will be done in collaboration.

The proposed new development will be serviced by the Daspoort WWTW and the over flow will be accommodated by Rooiwal which is being upgraded to accommodate the excess flow.

In terms of a new main outfall sewer, a new main gravity line is proposed for this development and will increase to 525mm. Refer to **Appendix G** for Report on Water and Sanitation.

9.8.3 Issue: Electrification

Electricity supply problems are a constant feature of life, in some parts it has led to electrical outages as the demand outstrips supply is struggling to supply the electricity. Should the design standards of the proposed development not be implemented and not been upgraded, service delivery issue here and the huge number of illegal connections have led to a huge electricity power demand which Eskom cannot accommodate.

9.8.4 Objective

The objective is to ensure that the Municipality has the sufficient capacity to cope with the extension of services to accommodate the proposed new development.

9.9.5 Existing Environment

The Lotus Gardens has enough capacity to accommodate Phase 2 of the proposed Fort West Development however, phase 1 will increase the water demand beyond its capacity and therefore a second Lotus Garden reservoir will be required.

A 250mm diameter main waterline is required to supply the northwestern part of the proposed development, from the Lotus Garden reservoir. The southern eastern section of the proposed development will be fed from Pretoria HL reservoir by a 315mm pipeline.

The proposed new development will be serviced by the Daspoort WWTW and the over flow will be accommodated by Rooiwal which is being upgraded to accommodate the excess flow.

In terms of a new main outfall sewer, a new main gravity line is proposed for this development and will increase to 525mm.

9.8.6 Potential Impact

Inadequate services will have a detrimental effect on the environment and can also be a deciding factor whether or not the development will take place or not.

Table 16: Issues Surrounding the Municipalities Capacity to meet service requirements

ISSUE:	MUNICIPAL CAPACITY		
Project Phase	Operation		
Impact	Bulk Water	Bulk Sewerage	Electrification
Nature	Negative (direct)	Negative (direct)	Negative (direct)
Extent	Local	Local	Site
Duration	Long Term	Long Term	Long Term
Probability	Highly Likely	Highly Likely	Highly Likely
Degree to which impact cannot be reversed	Low	Low	Low
Degree to which Impact may cause irreplaceable ¹ loss of resources	Low	Low	Low
Confidence level	High	High	High
Significance Pre Mitigation	Low (-ve)	High (-ve)	Low (-ve)
Significance Post Mitigation	Neutral	Neutral	Neutral
Degree of Mitigation	Easily Mitigated	Moderately Mitigated	Easily Mitigated

9.8.7 Recommended Mitigation

Bulk Sewerage

The proposed new development will be serviced by the Daspoort WWTW and the over flow will be accommodated by Rooiwal which is being upgraded to accommodate the excess flow.

In terms of a new main outfall sewer, a new main gravity line is proposed for this development and will increase to 525mm.

Bulk Water

A 250mm diameter main waterline is required to supply the northwestern part of the proposed development, from the Lotus Garden reservoir. The southern eastern section of the proposed development will be fed from Pretoria HL reservoir by a 315mm pipeline

Bulk Electricity

Basic electrical design standards to be used for housing projects in Tshwane Metro.

The electrical design load to be used for each unit is 3.5kVA (ADMD)

Medium voltage cables to be underground

Low voltage reticulation to be overhead with street lights on the same poles

Bulk contributions to be based on 3.5kVA and will be assessed on a sliding scale once the township layout is approved and the number of housing units is known

9.9 Issue: Potential Flooding

9.9.1 Issue

If managed correctly the construction activities onsite are unlikely to increase the potential for flooding in the area. However, the impact on lower lying areas should be verified. Once complete, the development will cause an increase in hard standing areas, such as roads, houses, roofs, etc. This will result in an increase in the volumes of storm water, which may lead to localised flooding. It is planned that the proposed development will direct storm water off-site thereby minimising the potential for flooding. However this is based on the assumption that storm water management is adequately addressed in the design. Please refer to **Appendix E Storm Water Management Plan**

9.9.2 Objective

According to the National Water Act (No 36 of 1998), no person may establish a township unless the layout plan shows, in a form that is acceptable to the local authority concerned, lines indicating the maximum level likely to be reached by floodwaters on average once in every 100 years. The Skinner spruit flood line will dictate the boundaries of the planned erven adjacent to the Skinner spruit. Understanding the potential changes to streamflow and how it is affected by land use and therefore helping communities reduce their current and future vulnerability to floods.

9.9.3 Existing Environment

From the flood line report it is clear that some of the existing properties are located below the 1:100 year flood line. A possible reason for this may be that development was allowed to take place below the 1:100 year flood line prior to Act no. 36 of 1998, but not below the 1:50 year flood line. Refer to **Appendix H** for Report on flood line by Scip Engineering group.

Some of the existing buildings in the Phase 2 area lie below the flood line, within the flooded area.



9.9.4 Potential Impact

The changes in land use associated with urban development affect flooding in many ways. Removing vegetation and soil, grading the land surface, and constructing drainage networks increase runoff to streams from rainfall. As a result, the peak discharge, volume, and frequency of floods increase in nearby streams. Changes to stream channels during urban development can limit their capacity to convey floodwaters. Roads and buildings constructed in flood-prone areas are exposed to increased flood hazards, including inundation and erosion, as new development continues.

Flood risk is a combination of the chance of a flood occurring and the consequences of the flood for people, property and infrastructure. Managing risks from floods may involve altering the chance of flooding affecting a community; and/or reducing the impacts of flooding by reducing the community's vulnerability and exposure to flooding. Immediate impacts of flooding include loss of human life, damage to property, destruction of crops, loss of livestock, and deterioration of health conditions owing to waterborne diseases. Some economic activities may come to a standstill, people are forced to leave their homes and normal life is disrupted.

Table 17: Impacts surrounding Flooding

ISSUE:	FLOOD POTENTIAL	
Project Phase	Operation	
Impact	Loss of property	Public Safety
Nature	Negative (direct)	Negative (direct)
Extent	Catchment	Catchment
Duration	Long Term	Long Term
Probability	Likely	Likely
Degree to which impact cannot be reversed	Low	Low
Degree to which Impact may cause irreplaceable loss of resources	High	High
Confidence level	Medium	Medium
Significance Pre Mitigation	High	High
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated



9.9.5 Recommended Mitigation

There are many approaches for reducing flood hazards in areas of development. Elevate Buildings and bridges, protected with floodwalls and levees, or designed to withstand temporary inundation.

Drainage systems have to be expanded to increase their capacity for detaining and conveying high streamflows; for example, by using rooftops and parking lots to store water.

Techniques that promote infiltration and storage of water in the soil column, such as infiltration trenches, permeable pavements, soil amendments, and reducing impermeable surfaces can also be incorporated into new and existing residential and commercial developments to reduce runoff from these areas.

On-site measures to attenuate peak flood discharge. This could be achieved through on-site water detention, grass-line swales, storm water infiltration systems, undulation, landscaping or a combination of the aforementioned.

In order to protect the properties below the new 1:100 year flood line, a formal concrete channel should be constructed to contain the 1:100 year flood. The existing concrete lined channel should therefore be widened and extended to modify the 1:100 year flood line. A formal concrete channel with a bottom width of 12m and average slope of 2.5% will be big enough to contain the 1:100 year flood line safely.

Monitoring the Progress of Storms. If factors such as amount of rainfall, degree of ground saturation, degree of permeable soil, and amount of vegetation can be determined, then these can be correlated to give short-term prediction, in this case called a forecast, of possible floods.

9.10 Issue: Employment

9.10.1 Issue

The construction of the proposed development is likely to provide short term employment for casual labourers in the surrounding residential areas of Atteridgeville. This may lead to increased skills development through contractor training. This is a positive impact of the project on employment in the surrounding area.

9.10.2 Objective

One of the key factors of rural-urban migration is the lack of employment in rural areas, increasing exponentially the ever-growing challenges related to providing adequate basic infrastructure to a growing number of unplanned low-income urban settlements.



The lack of reliable infrastructure assets in rural areas leading to the lack of access to basic social services, markets and job opportunities, often force the local rural population to migrate.

Therefore, an improvement that would be brought about through the proposed development is to enhance the quality of life by providing access to basic services and as a result, provided as job opportunities with the aim in mind to create job creation sustainably.

9.10.3 Existing Environment

The unemployment rate in the Lotus Gardens area is high, averaging at 37%. Hence, any new development in the area must bring in job opportunities.

Employment profile:

According to the 2001 Census the unemployment rates are as follows:

Atteridgeville	48%
Lotus gardens	37%
Kwaggasrand	14%
Pretoria West	19%

Economic Sector contributing activities

The most dominant industries / places of employment in the *Atteridgeville and Lotus Gardens area*, is:

- Social and personal services (27%),
- wholesale and retail services (18%),
- manufacturing (13%).

People in the informal areas are predominantly employed as private household workers and construction workers.

Table 18: Issues surrounding Employment

ISSUE:	EMPLOYMENT	
Project Phase	Construction	
Impact	Job Creation	Construction Workers
Nature	Positive (direct and indirect)	Negative (direct)
Extent	Regional	Local
Duration	Short Term	Short Term
ISSUE:	EMPLOYMENT	
Project Phase	Construction	
Impact	Job Creation	Construction Workers
Probability	Highly Probable	Probable
Degree of Irreversibility	Low	Low
Degree to which Impact may cause irreplaceable loss of resources	Low	Low
Confidence level	Medium	Medium
Significance Pre Mitigation	Low (+ve)	Medium (-ve)
Significance Post Mitigation	Medium (+ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.10.4 Potential Impact

Employment creation is viewed as an important development objective. Through the construction of roads, water sewer systems, residential parks, business parks and Industrial developments, this allows for the influx of job creation that will lead to economic growth, upliftment of the poorer sector and increased quality of life.

It is vital to take cognizance of the fact that contractors are of the ability to source outside labour for skilled jobs. This then leaves the local community jobless and no ability to acquire education, skills and knowledge for the enhancement of them academically and then excluding them the opportunity to a better quality of life.



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9.10.5 Recommended Mitigation

- Contractors should be encouraged to source labour from surrounding areas;
- External construction workers should be housed in secure camp and are to abide by rules of the EMP to prevent public disruption (ie. Spread of HIV/AIDS, crime, public disturbance).
- Have a local community liason available for the representation of the community which addresses community concerns and issues.
- Provide skills training programmes which will support the upliftment of the local community.

9.11 Issue: Land Use

9.11.1 Issue

If this area remains undeveloped it could result in the site remaining underutilized in an area under growing pressure for the development of housing and related facilities. There is also the an emerging situation of degradation of the site and even informal land occupation and invasion by squatters, which would be detrimental to any future development in this area. This implies that the site be left as is and that no development or alteration be done.

Fort West is seen as having a high potential for benefiting from predominantly subsidized housing according to the ISDP of CoT.

9.11.2 Objective

The Fort West Phase 2 area falls within the Spatial Development Framework of the City of Tshwane Municipality. The area is earmarked as a priority development area. The proposed development has the potential to decrease the unemployment status of the Atteridgeville and Lotus Garden areas. A number of community, retail, commercial and social developments (schools) are to be built as part of the development initiative. These project components will assist in increasing the economy of the area and / or region and the potentially the quality of life for the residents.

9.11.3 Existing Environment

The dominant land use within the area is residential and compromises of formal and informal structures with informal structures mainly concentrated in the areas directly west of Atteridgeville. According to the ISDF only 53% can be classified as formal housing therefore highlighting the housing problem in this area.

Many of the old historical buildings are occupied by illegal dwellers. There are no agricultural holdings within or immediately near the proposed area.

9.11.4 Potential Impact

If this area remains undeveloped it could result in the site remaining underutilised in an area under growing pressure for the development of housing and related facilities.

There is also the possibility of degradation of the site further and informal land occupation and invasion by squatters has already occurred within but will be exasperated which would be detrimental to future development.

Table 19: Impacts surrounding Land Use

ISSUE:	LAND USE	
Project Phase	Operation	
Impact	Provision of Housing	Community Upliftment
Nature	Positive (direct)	Positive (direct and indirect)
Extent	Local	Local
Duration	Long Term	Long Term
Probability	Definite	Probable
Degree of Irreversibility	Low	Low
Degree to which Impact may cause irreplaceable loss of resources	Low	Low
Confidence level	High	Medium
Significance Pre Mitigation	Medium (+ve)	Low (+ve)
Significance Post Mitigation	High (+ve)	Medium (+ve)
Degree of Mitigation	NA	NA

9.11.5 Recommended Mitigation

It is recommended that the proposed development proceed as planned with the provision that the approved EIA and EMP be implemented to ensure minimum impacts on the environment.

9.12 Issue: Health and Safety

9.12.1 Issue

The proposed development has minimal potential to create a health and safety risk for neighbouring residents from the community. The construction of the development does pose a health and safety risk to construction workers. This can be mitigated with the correct implementation of a health and safety plan to be developed by the contractor.

9.12.2 Objective

Continually improve and reduce the environmental, health and safety impacts from the proposed development activities. To Meet or exceed all regulatory, legal and other requirements and to maintain a proactive approach to providing information to the community concerning construction operations and initiatives taken for protecting the environment.

9.12.3 Existing Environment

The current environment consists of formal and informal housing. Many illegal squatters have taken up residents in many of the old rundown buildings. Many of these building are in ill state of repair and pose a serious safety hazard. Environmental hazards such as contamination of resources will eventually occur should no upgrade or development take place within this area.

9.12.4 Potential Impact

The leading safety hazards on site are:

- Falls from height,
- Motor vehicle accidents,
- Excavation accidents,
- Electrocution,
- Inappropriate use of machines,
- Struck by falling objects.

Some of the main health hazards on site are:

- Asbestos,
- Solvents,
- Noise,
- Manual handling activities.



Hazards to non-workers:

- Improperly designed barricades
- No proper access control to wandering public members
- No demarcated areas or proper signage that says construction underway or no access.

Table 20: Safety Impacts

ISSUE:	SAFETY	
Project Phase	Construction	
Impact	Construction Workers	Public
Nature	Negative (direct)	Negative (direct and indirect)
Extent	Site	Local
Duration	Short term	Short term
Probability	Highly Probable	Probable
Degree of Irreversibility	Low	Low
Degree to which Impact may cause irreplaceable loss of resources	Low	Low
Confidence level	Medium	Medium
Significance Pre Mitigation	Medium (-ve)	Low (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.12.5 Recommended Mitigation

Public

- Site demarcated and access to public is to be prohibited;
- Safety and informative signage to be erected;
- Off-site movement of construction vehicles to adhere to rules of the road; and
- Pedestrians have the right of way.

Construction Workers

- Emergency services, including the local fire fighting service, police and ambulance shall be posted noticeably in the Contractor's Camp
- A health and safety plan is to be developed and implemented as soon as land clearing commences.
- The Contractor is to take cognisance of the requirements of the Occupational Health and Safety Act No.85 of 1993 and is to adhere to all relevant regulations. This is a compulsory and a Health and Safety Audit is to be undertaken each month to ensure compliance and such reports to be submitted along with an Environmental Management Report to the Competent Authority (GDARD).
- No personnel other than the regular safety watchman for the site, is to stay overnight on site.
- Proper access control is to be maintained by the Safety Officer.
- Proper Health and Safety workshops to be implemented so that all members on site are fully educated.
- All employees on site to wear appropriate Personal Protection Equipment (PPE).
- The Contractor is to ensure that all vehicles are in a road-worthy condition.
- An incidents and complaints register to be kept on site for the availability of review of the relevant authorities i.e. GDARD.

9.13 Issue: Heritage Resources

9.13.1 Issue

Heritage conservation and management in South Africa is governed by the *National Heritage Resources Act* (Act 25 of 1999) and falls under the overall jurisdiction of the *South African Heritage Resources Agency* (SAHRA) and its provincial offices and counterparts. Section 38 of the NHRA requires a Heritage Impact Assessment (HIA), to be conducted by an independent heritage management consultant.

Fort West Phase 2 development area is characterised by old historical buildings which have been assessed by Mauritz Naude. Refer to **Appendix I**

9.13.2 Objective

To identify landscape features within the Study Area, including sites of historical events, historical field patterns, tracks and cultural elements which will be affected by the proposed development and to propose any measures required to mitigate against identified impacts.



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9.13.3 Existing Environment

The proposed area for Fort West Phase 2 is characterised by Historical buildings that can be dated back to 1839-1911. Of these buildings include the West Fort Hospital that merged with the Daspoort Hospital to form the Pretoria Leprosy Hospital. This was used to house all leprosy patients within this time. There is also the actual Fort which was erected during the Fortification of Pretoria during the First Anglo Boer War.

Many of these building have been occupied by illegal squatters and many of these buildings are in ill state of repair

9.13.4 Potential Impact

The possibility does exist that these resources may become degraded due to unmanaged development possible vandalism and deliberate degradation of sites for economic gain.

Table 21: Impacts on Heritage Resources

ISSUE:	Heritage Resources	
Project Phase	Construction	
Impact	Cultural significance	Historical Buildings
Nature	Negative (direct)	Negative (direct and indirect)
Extent	Local	Site
Duration	Short term	Short term
Probability	Highly Probable	Probable
Degree of Irreversibility	Low	High
Degree to which Impact may cause irreplaceable loss of resources	Low	High
Confidence level	Medium	Medium
Significance Pre Mitigation	High	High
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Easily Mitigated	Easily Mitigated

9.13.5 Recommended Mitigation

Recommendations extracted from Heritage 'Impact Assessment by. *M. Naude Appendix I*

The site:

- A conservation management plan must be drafted for the village. The conservation management plan must include (a) a heritage assessment of the site and institution according to the criteria of the National Heritage Resources Act; (b) a statement of significance of the site; (c) a documents stating the 'Obligations of the significance' that must guide the approach to the protection and management of the site; (d) a 'Conservation Management Policy' framework and (e) 'Rehabilitation Guidelines' for each building which will be retained and re-used.
- The village must be managed according to a zoning scheme which is based on the cultural significance of individual areas and clusters of places of significance.
- General density per square meter may be altered in the case of new work and infill.

Infra structural elements:

- The main arterial route into the village and serving the core section of the village must be retained, upgraded and used as the main arterial for the re-use and development of the village.
- The other secondary roads serve as connecting lines and may either by used or altered according to the needs of the development.

Buildings:

- All buildings in the village must be recorded prior to drafting any design proposals and prior to any demolitions or development of any kind. Recording implies that all the buildings must be (a) recorded photographically; (b) measured drawings be drafted of the floor plans, elevations and elements of each building and (c) these recordings be compiled into a report accompanied with descriptions of the buildings in standard architectural vocabulary.
- Of exceptional significance are the three red brick buildings in the core section of the village (old church, main building and small dwelling). They must be retained and restored.
- The village also contains several clusters of buildings which seem to have the same floor plans and elevations. This aspect needs to be determined in detail. Structural and architectural integrity of each building will determine whether it will be retained and re-used.

Activity areas:

- One of the key components of the village is the presence of cemeteries. They must be retained and not relocated.
- Other open spaces between buildings may be used for 'new work' in order to make the village functional and economically viable



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9.14 Cumulative Impacts

The following cumulative impacts could be associated with a development of this nature.

9.14.1 Ridges

The northern boundary of both of the subject properties runs along a well-defined ridge, forming part of the Witwatersberg and the Daspoortrand. Some ridge areas have been transformed within the subject property 1 through exiting residential developments and communities of *Eucalyptus camaldulensis*. Ridges and outcrops are known to provide unique habitat for various faunal and floral species. Therefore, ridges and outcrops are considered of high ecological importance and needs to be conserved to ensure ongoing survival of species that reside among them

Table 22: Cumulative impacts with regards to the Witwaters Ridge

ISSUE	IMPACT	SIGNIFICANCE POST	INTERACTION OPPORTUNITY	SIGNIFICANCE OF CUMULATIVE IMPACT
The Ridge	Habitat Destruction	Low (-ve)	The increase of human traffic and construction footprint and activities will have an effect on the ridge areas and possibly the more natural grassland areas, should mitigation measures not be implemented.	Ridges and outcrops are considered of high ecological importance and needs to be conserved to ensure ongoing survival of species that reside among them However, the impacts are easily mitigated and therefore the significance of the cumulative impact remains Low (-ve).
	Disturbance of High Ecological State.	Low (-ve)		
	Transformation from Natural State	Low (-ve)		

9.14.2 Social

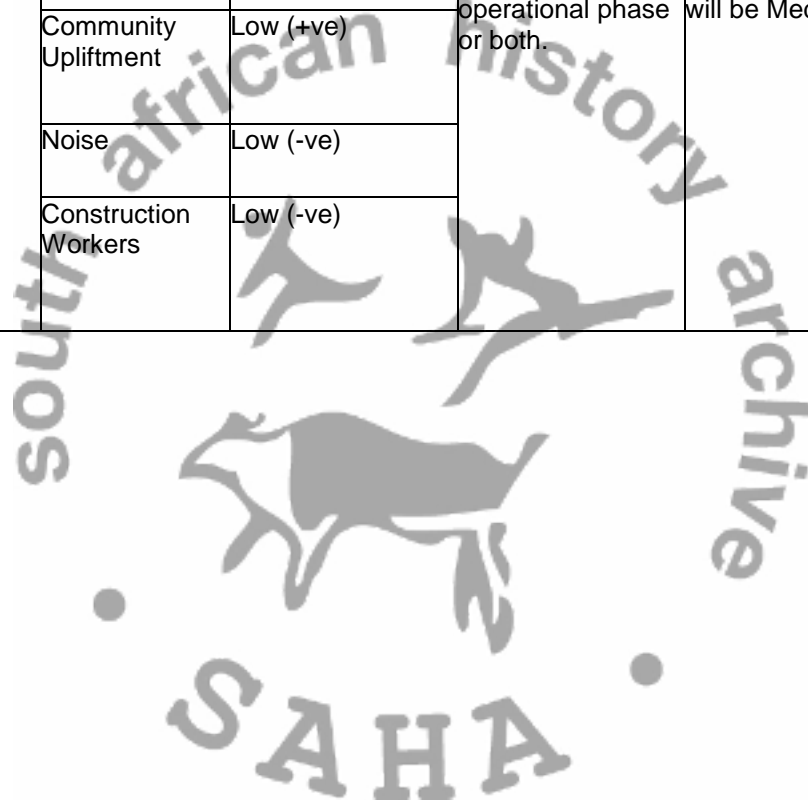
A development of this nature will cumulatively impact on the number of informal settlements, address the current housing shortage and will also create jobs throughout the construction and operation phases. It is essential to weigh the negative versus the positive impacts to obtain an overall cumulative social impact. .



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Table 23: Cumulative impacts on society

ISSUE	IMPACT	SIGNIFICANCE POST	INTERACTION OPPORTUNITY	SIGNIFICANCE OF CUMULATIVE IMPACT
Social Issues	Provision of Jobs	Low (+ve)	It is highly likely that these impacts will interact during either the construction phase, the operational phase or both.	Due to the location of the site it is not anticipated that the cumulative impact will be significant. Rather it is expected that the significance of the impact will be Medium (+ve).
	Provision of Housing	High (+ve)		
	Community Upliftment	Low (+ve)		
	Noise	Low (-ve)		
	Construction Workers	Low (-ve)		





10 Key Environmental Issues

10.1 Fauna & Flora: Recommendations of any Specialist Reports

10.1.1 Summary of the Findings

The conservation status of each vegetation type as presented by Mucina & Rutherford, (2006) is “least threatened” for *Andesite Mountain Bushveld* and *Gold Reef Mountain Bushveld* and “endangered” for *Marikana Thornveld*.

The Gauteng Conservation Plan (Version 3) has indicated that the properties fall in ecologically important areas (ridges) with primary vegetation. Some ridges have been transformed within the subject property 1 according to the Gauteng C-plan.

Ridges were identified on the northern side of the subject property, which have seen less transformation and with the highest species diversity encountered of all habitat units. These ridge areas are considered of high sensitivity and are important for ongoing ecological condition and functioning of the areas that will surround the proposed development in the future.

The grassland areas located on the southern section of the subject property have been transformed due to previous or historic agricultural activities. Although no current activities are taking place, this area is dominated by grass species that are often found in disturbed places such as old cultivated lands e.g. *Hyparrhenia hirta* and *Eragrostis curvula*.

The subject property 2 in its present state can be divided into three broad units, namely the ridge, grassland areas and transformed areas.

Ridges have seen less transformation and with the highest species diversity encountered of all habitat units. These ridge areas are considered to be of significantly increased sensitivity and are important for ongoing ecological condition and functioning of the areas that will surround the proposed development in the future.

The ecological condition and functioning of the open veld areas within the subject property 2 are considered moderate to low depending on the vegetation transformation and habitat degradation encountered during the assessment. Within the grassland habitat unit of subject property 2 a drainage feature was identified extending from the reservoir on the northern top section of the property towards the eastern sections of the open grassland areas. This drainage feature was caused by damaged service infrastructure, possibly related to the reservoir, releasing large volumes of water and causing typical wetland vegetation to occur. Thus this feature cannot be considered as a natural wetland system.

The western section of the subject property 2 also contains *Eucalyptus camaldulensis* species and footpaths scattered throughout the subject property, causing transformation within the area.



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Two RDL floral species namely *Hypoxis hemerocallidea* (25°44'16.51"S 28° 5'52.75"E) and *Eucomis autumnalis* (25°43'57.00"S 28° 6'15.39"E) were identified within the open grassland habitat unit of subject property 2. The populations of both these plant species are considered to be “declining” as a result of their high demand for medicinal use. Medicinal plant species encountered are all regarded as common and widespread species, with the exception of *Hypoxis hemerocallidea* and *Eucomis autumnalis* considered a “declining” floral species by the PRECIS Database.

The RDSIS assessment of the property provided a medium score of 40%, indicating a low-medium importance to RDL species conservation within the region. Thus the development could threaten the overall RDL species conservation, specifically within the ridge areas, but mitigation measures should still be implemented to minimise the overall impacts within the ridge and other areas. (*Scientific Aquatic Services 2012*)

10.1.2 Recommendations

- The subject properties are located within the Urban Edge, and development within the Urban Edge is encouraged, provided that the development is not detrimental to the ecological environment and is in line with local spatial development planning (Gauteng, 2010).
- Any *H. hemerocallidae* and *Eucomis autumnalis* species encountered during the proposed developmental activities should be rescued and relocated to areas with increased sensitivity such as ridges which are designated as open space areas.
- Based on the above assessment it is evident that there are twelve possible impacts on the ecology of the area observed
- Most of the impacts are moderate to high level impacts, while if mitigation takes place no high level impacts remain, and the majority of the impacts can be reduced to a lower level with the exception of three impacts that can be reduced to a medium-low level.

10.2 Road Transport: Summary of the Findings and Recommendations of any Specialist Reports

10.2.1 Summary of the Findings

Road System

The site will serve as a good access to its south side to the N4 and R104, giving virtually unlimited destinations east- and westward, as well as links to major north-south connections such as Quagga Road. This will then allow travel southward to the industrial sites, the Acelor Mittal plant, Sunderland Ridge and other places to work.

Traffic:

According to Transportation and Traffic technology Africa (Pty)Ltd (TTT) it is estimated that the site will generate 1613 peak-hour vehicle trips with a directional split of 1049:565. The east-west split of these trips will be about 60:40. The study has allowed for growth in the existing traffic from Lotus Gardens at a rate of 3% per annum, which will add substantially to the flow on Acridian Street which also gives access via a Parclo interchange, to the N4 east. While this growth may be unrealistic for the area which is already developed, it is noted that there is much open land north of Lotus Gardens and west of the site, which will surely also add traffic to Acridian Street in due course.

Traffic Flow:

TTT also expected that the increased traffic on Acridian Street will require the installation of traffic signals situated at the N4 ramp junctions by the horizon year 2018. The timing of this will depend on observations of traffic queue lengths. The existing major intersections of Acridian Street and Strachan Street with the R104 already have heavy peak-hour traffic loads, and are approaching the need for upgrading, regardless of the proposed new township. This upgrading will require additional east-west lanes through the intersections, and left-turn slip lanes on north and south approaches.

Refer to Traffic impact Assessment as **Appendix J**

10.2.2 Recommendations

Intersections of Acridian Street and Strachan Street with the R104 to be upgraded in the near future, should development transpire or not as is recommended by the TIA specialist.

Increased traffic flow and therefore increased pressure could be a possibility at the N4 ramp junctions on Acridian street particularly from the proposed development. Therefore monitoring of traffic in these two areas to be implemented.

The road link from the township through Elandsport to the east will not be cut off by the future freeway PWV9, but will be maintained there-after by the provision of the planned eastward extension of Anthesis Street from Lotus Gardens, along the southern boundary of the site. This road will extend to run into the existing Staats Artillery Road, and it must be ensured that it is given a link to Van den Berg Street, east of the PWV9. (TTT Pty Ltd)

10.3 Storm Water: Summary of the Findings and Recommendations of any Specialist Reports

10.3.1 Summary of the Findings

There is an existing stream, the Skinner Spruit flows through the proposed development. The phase 2 area slopes towards the spruit from west to east.

From the flood line report it is clear that some of the existing properties are located below the 1:100 year flood line. A possible reason for this may be that development was allowed to take place below the 1:100 year flood line prior to Act no. 36 of 1998, but not below the 1:50 year flood line.

Some of the existing buildings in the Phase 2 area lie below the flood line, within the flooded area.

10.3.2 Recommendations

In order to protect the properties below the new 1:100 year flood line, a formal concrete channel should be constructed to contain the 1:100 year flood. The existing concrete lined channel should therefore be widened and extended to modify the 1:100 year flood line. A formal concrete channel with a bottom width of 12m and average slope of 2.5% will be big enough to contain the 1:100 year flood line safely.

10.4. Heritage Resources

10.4.1 Summary of the Findings

According to the Heritage Specialist, the site of Fort West is considered to be of exceptional cultural significance. This is due to the age of the village and the age of the bulk of the buildings on the site. It is not only significant because of the architectural fabric and historic buildings but as an institution. The Wesfort leprosy hospital facility was the successor of a similar facility on Robben Island and eventually became the only facility of its kind in South Africa. Therefore this site facility is to be classified as 'rare' according to the criteria for cultural significance of the National Heritage Resources Act.

Each building and structure played a specific role in the existence of this village. Most of the buildings are older than 60 years and are protected under the 60 years clause of the National heritage Resources Act. The village consist of several precincts as they were developed over time and not necessarily designed in such a way that they interface and interact with each other in the same manner a factory would be designed. Several seemingly detached precincts have been created, each with its own spatial layout and architectural vocabulary. **Extract by: M. Naude**

10.4.2 Recommendations

Buildings:

- All buildings in the village must be recorded prior to drafting any design proposals and prior to any demolitions or development of any kind. Recording implies that all the buildings must be (a) recorded photographically; (b) measured drawings be drafted of the floor plans, elevations and elements of each building and (c) these recordings be compiled into a report accompanied with descriptions of the buildings in standard architectural vocabulary.
- Of exceptional significance are the three red brick buildings in the core section of the village (old church, main building and small dwelling). They must be retained and restored.
- The village also contains several clusters of buildings which seem to have the same floor plans and elevations. This aspect needs to be determined in detail. Structural and architectural integrity of each building will determine whether it will be retained and re-used.

Activity areas:

- One of the key components of the village is the presence of cemeteries. They must be retained and not relocated.
- Other open spaces between buildings may be used for 'new work' in order to make the village functional and economically viable.
- Plans of 'infill and 'new work' must be submitted to the heritage specialist in order to assess the impact of these designs on the heritage site in general and the individual buildings in particular.
- Plans for the appropriate memorialization of cemeteries and any other grave sites must be submitted to the heritage specialist for assessment.
- Cemeteries must be made visitor friendly and accessible to the public (and anyone associated with the deceased).

10.5 Assumptions, Uncertainties and Gaps in Knowledge;

The main source of data used for demographic profiles and population growth estimates as per this study were the 1996 and 2001 census data. The 1996 and 2001 census data should not be regarded as the final say regarding an area, but should be viewed as indicative of broad trends within an area.

The study was done with the information available to the specialist at the time of executing the study, within the available time frames and budget. However, ACE did endeavour to take an evidence-based approach in the compilation of this report and did not intentionally exclude scientific information relevant to the assessment.

Impacts and I&APs responses to coping with these can never be predicted with 100% accuracy, even when circumstances are similar and predictions are based on rigorous research results.

The other specialist reports, that were completed as part of this study were scrutinised to inform the EIA. The assumptions, uncertainties and gaps in knowledge listed in those reports therefore impacted on this assessment.

10.6 EAP's opinion as to whether the activity should or should not be authorised

Given the low significance of the negative impacts of the project and the positive impacts associated with a development of this nature, it is the EAP's opinion that Gauteng Department of Local Government and Housing be allowed to develop the land parcel according to the design considered in this EIA. Development should however be conducted in accordance with the recommendations given in this EIAR with special attention to the Environmental Management Programme.



11 Environmental Impact Statement

11.1 Need and Desirability

The proposed site has been identified as an area for development, according to the City of Tshwane Municipality Spatial Development Framework. Furthermore, there is a need for a mixed use development specifically within the project area. The development can therefore meet the need to accommodate previously disadvantaged individuals.

Provision must be taken into account for this proposed development which takes into account affordability and life style changes. The community will also benefit from a full range of communal facilities in the area. In terms of the BNG Principles, it is essential in the promotion of sustainable living. The proposed Fort West Phase 2 development will, in terms of the Spatial Development Framework, redress the number of informal settlements, address the current housing shortage and backlog, and create employment opportunities in both the construction and operational phases.

11.2 Positive and Negative Impacts

The Scoping and EIA phases of this project have not identified any fatal flaws which should prevent the project from proceeding.

Positive direct impacts include job creation and community upliftment. Furthermore, the development will address the shortage of formal housing in the Fort West area.

Positive indirect impacts include utilising the 'undetermined' area of land for the betterment of the community, instead of leaving it in its current state and at the mercy of land invaders, therefore creating future problems for the Biophysical and Socio-economic environment. The proposed development can be seen as a dorm of social-economic and environmental upliftment and alleviating overcrowding.

Post mitigation negative impacts discussed in this report are all rated as Low Significance. The most significant impacts could be on the Ridge of the Witwatersrand and Heritage resources.

Although, the construction and operation of the proposed Fort West Development could, potentially have negative impacts on the environment. These have been identified and can be effectively mitigated and monitored, significantly reducing the risk on the environment. The management of the negative impacts will require the implementation of the necessary mitigation measures



11.3 Alternatives

This is the preferred alternative by the developer. As mentioned before, the development proposal entails the establishment of a mixed-use nodal development, creating a place to work, stay and play.

This development will furthermore also meet the requirements of the surrounding area in terms of retail, institutional activities, work, etc. The proposed development will be a vibrant urban precinct situated around a public open space (this has been identified as one of the main attractions in all major successful developments worldwide), which will incorporate a no-vehicular zone with dedicated pedestrian linkages with the surrounding precincts.

Other Alternatives investigated is the option to develop a Light Commercial area or Low Density Residential housing only. None of these alternatives are in line with the City of Tshwane's Integrated Development Plan.

An option of retaining the current situation on site (No Go), i.e. an undeveloped and a mixture of formal and informal housing, with more emphasis on informal, which would result in the site remaining underutilised in an area under growing pressure for the development of housing and related facilities. There is also the possibility of degradation of the site or even informal land occupation and invasion by squatters, which would be detrimental to future development. This implies that the site be left as is and that no development or alteration be done. If this alternative is pursued the sites existing habitat will be retained. This option has the following drawbacks:

- A high demand for housing and employment provision exists in this area, especially with respect to the proposed developments characteristics as infill development. Should the site not be developed a very viable opportunity to exploit the high density and commercial market in the immediate area will be negated;
- If not developed, the owner will derive no income from the property and will subsequently not be able to maintain it. This will lead to the site falling into disrepair and the protection and appropriate management of potential conservation areas will be negated;
- Illegal squatters or vagrants may/have potentially settled on the site, as severe pressure for housing in the lower income brackets also exist. Due to the presence of extensive development throughout the greater area, it is possible that undeveloped, un-managed land may be illegally settled; and
- Agriculture is not an economically viable option according to the agriculture potential study

Due to the pressure and demand for the provision of housing and commercial development in the area and the limited space available for this purpose; given the fact that the proposed development falls within the Urban Edge and are earmarked as a HIGH priority development area and the fact that this development can, with careful implementation of this EMPR and WMP be implemented with a low impact on the environment, it is recommended that the preferred alternative be authorized by GDARD.

11.4 Recommendations

The following Recommendations are deemed necessary by the EAP and should be included as conditions in an Environmental Authorisation for the proposed Fort West Phase 2 development:

In terms of design, surfaced roads should be enforced on steeper slopes; Construction within 30 meters of all designated drainage lines should be prohibited

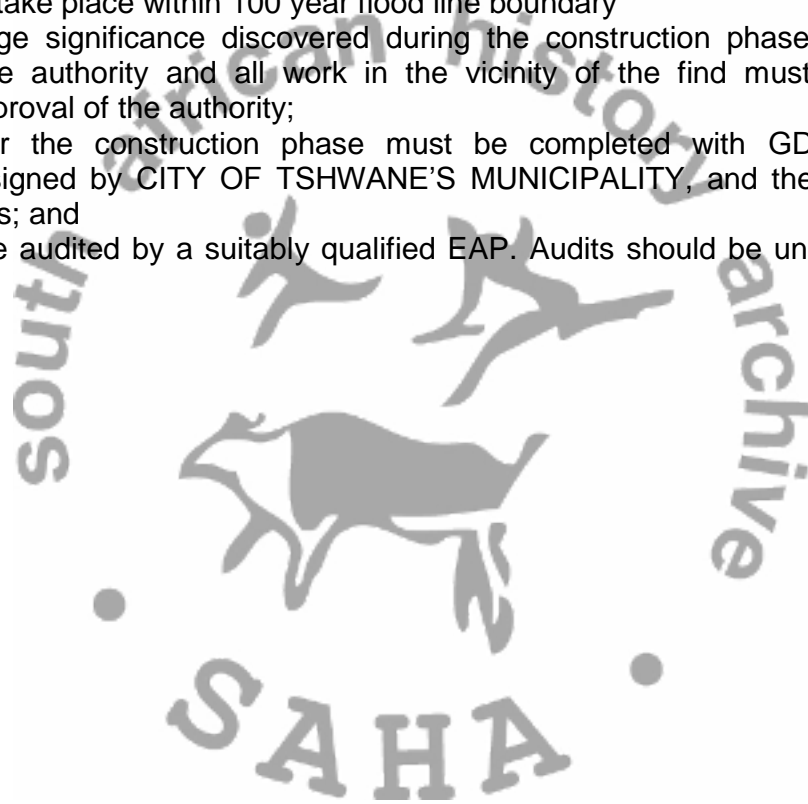
The removal of thicket vegetation along designated drainage lines is to be prevented;

No development to take place within 100 year flood line boundary

Any sites of heritage significance discovered during the construction phase to be reported to the responsible heritage authority and all work in the vicinity of the find must stop. Work may only recommence on approval of the authority;

The draft EMP for the construction phase must be completed with GDARD's conditions and requirements and signed by CITY OF TSHWANE'S MUNICIPALITY, and the relevant contractor as implementing agents; and

The EMP should be audited by a suitably qualified EAP. Audits should be undertaken, at least, on a monthly basis.

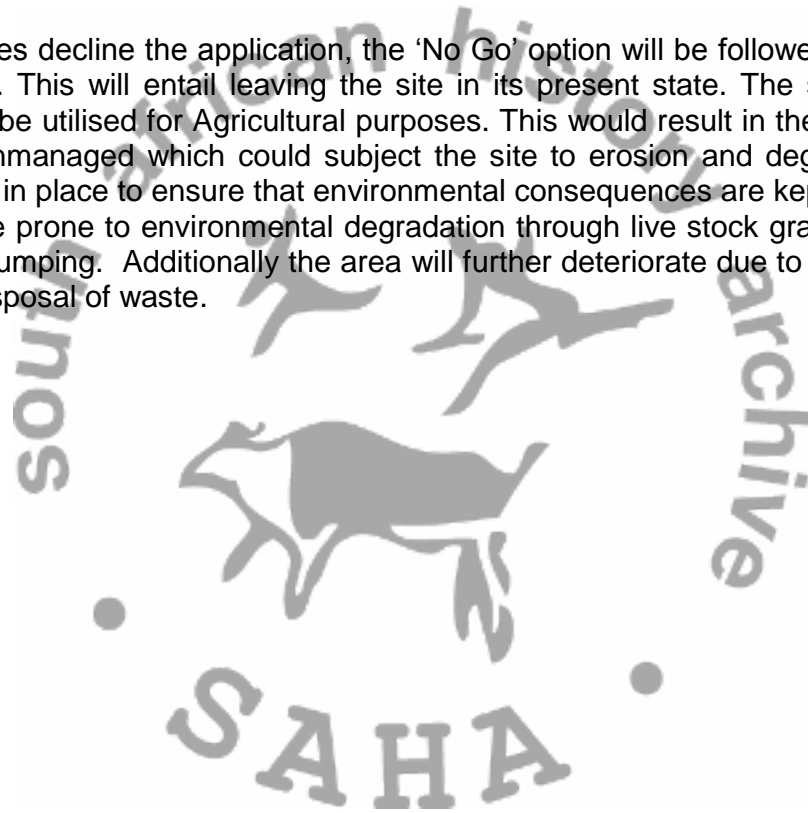




12 Conclusion

The purpose of this report is to provide the relevant authority with sufficient information on the potential impacts of the proposed development, so that an informed decision can be made with regards to the authorisation of the proposed development. Potential impacts were identified in consultation with I&APs, and through the technical expertise and experience of Environmental Assurance. The report sought to ascertain the impact of the proposed development on the environment, of which we humans are part, and the probability of the impacts occurring

Should the authorities decline the application, the 'No Go' option will be followed and the status quo of the site will remain. This will entail leaving the site in its present state. The site is currently vacant, although it's use to be utilised for Agricultural purposes. This would result in the site being unattended, uncontrolled and unmanaged which could subject the site to erosion and degradation, as no control mechanisms will be in place to ensure that environmental consequences are kept at a minimum. The area will still be prone to environmental degradation through live stock grazing, animal hunting by individuals, illegal dumping. Additionally the area will further deteriorate due to anthropogenic activities and uncontrolled disposal of waste.



13 References

- 1 *ECOLOGICAL ASSESSMENT AS PART OF THE EIA PROCESS FOR THE PROPOSED FORT WEST DEVELOPMENT, TSHWANE: SCIENTIFIC AQUATIC SERVICES , REPORT AUTHOR S. VAN STADEN (PR. SCI. NAT) N. BEZUIDENHOUT REPORT REFERENCE: SAS 212008 DATE: MARCH 2012*
- 2 *PRELIMINARY ENGINEER DESIGN REPORT ROADS AND STORMWATER: SCIP ENGINEERS 22 JUNE 2012*
- 3 *PRELIMINARY ENGINEER DESIGN REPORT WATER AND SANITATION: SCIP ENGINEERS*
- 4 *FORT WEST PHASE 2 WATER AND SEWER MASTER PLANS: DEVELOPMENT OF PROPOSED TOWNSHIP: GLS CONSULTING*
- 5 *FORT WEST FLOOD LINE REPORT: SCIP ENGINEERS*
- 6 *PHASE 1 HERITAGE SURVEY OF HISTORIC WEST FORT LEPROSY HOSPITAL SITE (PRETORIA): PROJECT BY: M. NAUDE 2012*
- 7 *PROPOSED RESIDENTIAL TOWNSHIP ON PORTION 3 AND A PORTION OF THE REMAINDER OF THE FARM FORT 646 JR IN TSHWANE MUNICIPALITY: TRAFFIC IMPACT ASSESSMENT: TRANSPORT AND TRAFFIC TECHNOLOGY AFRICA PTY LTD*



Appendix A
GDARD Acceptance Letter



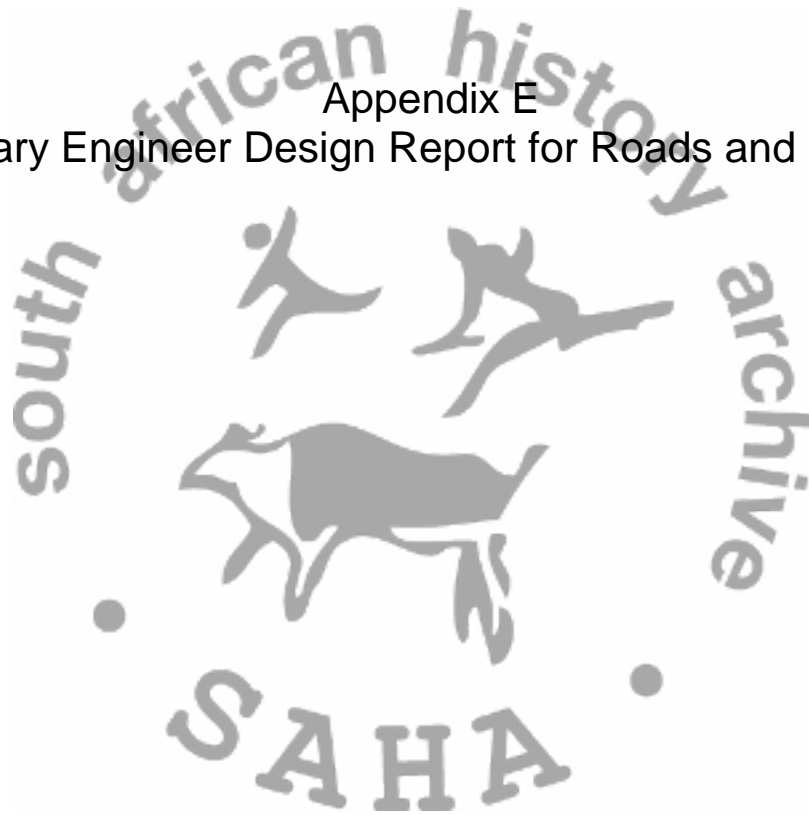
Appendix C
Waste Management Plan





Appendix D
Ecological Assessment

Appendix E
Preliminary Engineer Design Report for Roads and Stormwater





Appendix F Water and Sanitation Master Plan



Appendix G
Preliminary Engineer Design Report for Water and Sanitation



Appendix H
Flood Line Report



Appendix I
Heritage Impact Assessment



Appendix J
Traffic Impact Assessment



Appendix K
Geotechnical Investigation









Appendix L2
Proof of Written Notification

Appendix L3
Proof of Newspaper Advertisement





Appendix L4
Stakeholder Database





Appendix L5
Comments Received

Appendix L6
Minutes of Meeting



Appendix L7
Comments and Response Report





Appendix M
Proposed Bulk Sewer Layout





Appendix N
Layout of Proposed Development

